

PROVINCIAL LAND USE PLAN OF KHYBER PAKHTUNKHWA DISTRICT LAKKI MARWAT



Vol 02: Sectoral Studies
Deliverable 4: Draft Landuse Plan Report



The Urban Unit
Urban Sector Planning & Management Services Unit (Pvt.) Ltd.



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SECTORAL STUDIES

Volume II of the District Land Use Plan (DLUP) for Lakki Marwat presents the sectoral analyses that provide the technical foundation for the spatial and zoning framework outlined in Volume I. Each study assesses the district's physical, economic, and social systems to determine how land should be allocated, serviced, and managed through 2045. The findings of these studies guided the delineation of residential, industrial, commercial, institutional, and environmental zones, ensuring that the spatial proposals are evidence-based and locally responsive.

The studies are structured around **twelve (12)** interlinked sectors that collectively define the district's development framework: housing, economy and employment, agriculture and livestock, industry, transportation and mobility, water supply, sewerage and drainage, solid-waste management, social infrastructure (education and health), and environment and climate resilience. Each sector examines existing conditions, quantifies deficiencies, estimates future requirements, and identifies the spatial implications of those needs.

The **population and settlement** study provided the demographic foundation for all subsequent sectoral analyses. It examined census data, household surveys, and growth trends between 1998 and 2017 to determine population distribution, density, and migration dynamics across urban and rural areas of the district. The analysis showed steady population growth with notable concentration in Lakki City and its peri-urban belt, reflecting a gradual shift from rural to urban livelihoods. Projections up to 2045 indicated continued urbanisation, requiring proportionate expansion in housing, public facilities, and infrastructure. These demographic insights established the baseline for estimating sectoral demands in housing, education, health, water supply, and other services.

The **housing** analysis identified a growing backlog resulting from limited serviced land and informal construction. It recommended densification within existing urban areas and planned extensions to accommodate the projected increase in urban households. These recommendations were translated into residential zoning and density patterns in Volume I.

The **economic** and employment assessment highlighted the dominance of agriculture, trade, and the public sector, with emerging potential for agro-processing and small-scale industries. This analysis guided the allocation of industrial and commercial land along major transport corridors and near existing economic clusters. The agriculture and livestock study emphasised the need to protect high-yield areas and improve productivity through agro-supportive infrastructure, leading to the demarcation of agricultural protection zones and agro-industrial nodes.

The **industrial** sector review recommended land for light industry and logistics, which are reflected in the proposed industrial and warehousing zones of Volume I.

The **transportation and mobility assessment** mapped existing road hierarchies, traffic volumes, and accessibility gaps. Its recommendations—development of ring and radial roads, improvement of junctions, and integration of freight routes—formed the structural framework for connectivity in the proposed land-use plan.

The **water supply, sewerage, drainage, and solid-waste management studies** examined infrastructure coverage and performance. They identified the need for system rehabilitation, expansion of treatment facilities, and integrated waste-management sites, leading to the reservation of land for utility corridors, treatment plants, and landfill areas.

The **education and health** analyses revealed spatial disparities in access to facilities, particularly in peripheral union councils. Their quantitative service-gap assessments determined the land allocations for schools, colleges, and health complexes in each urban settlement.

Finally, the **environment and climate-resilience study** mapped ecological assets, floodplains, and hazard-prone zones. It recommended creation of green buffers, riverfront corridors, and conservation belts, which have been incorporated into the land-use structure to improve environmental quality and mitigate disaster risks.

The sectoral studies for housing, water supply and sanitation, solid-waste management, and transportation include clearly defined short- and long-term interventions consistent with institutional capacity and available resources. Short-term priorities (2025–2030) focus on rehabilitation of existing systems,

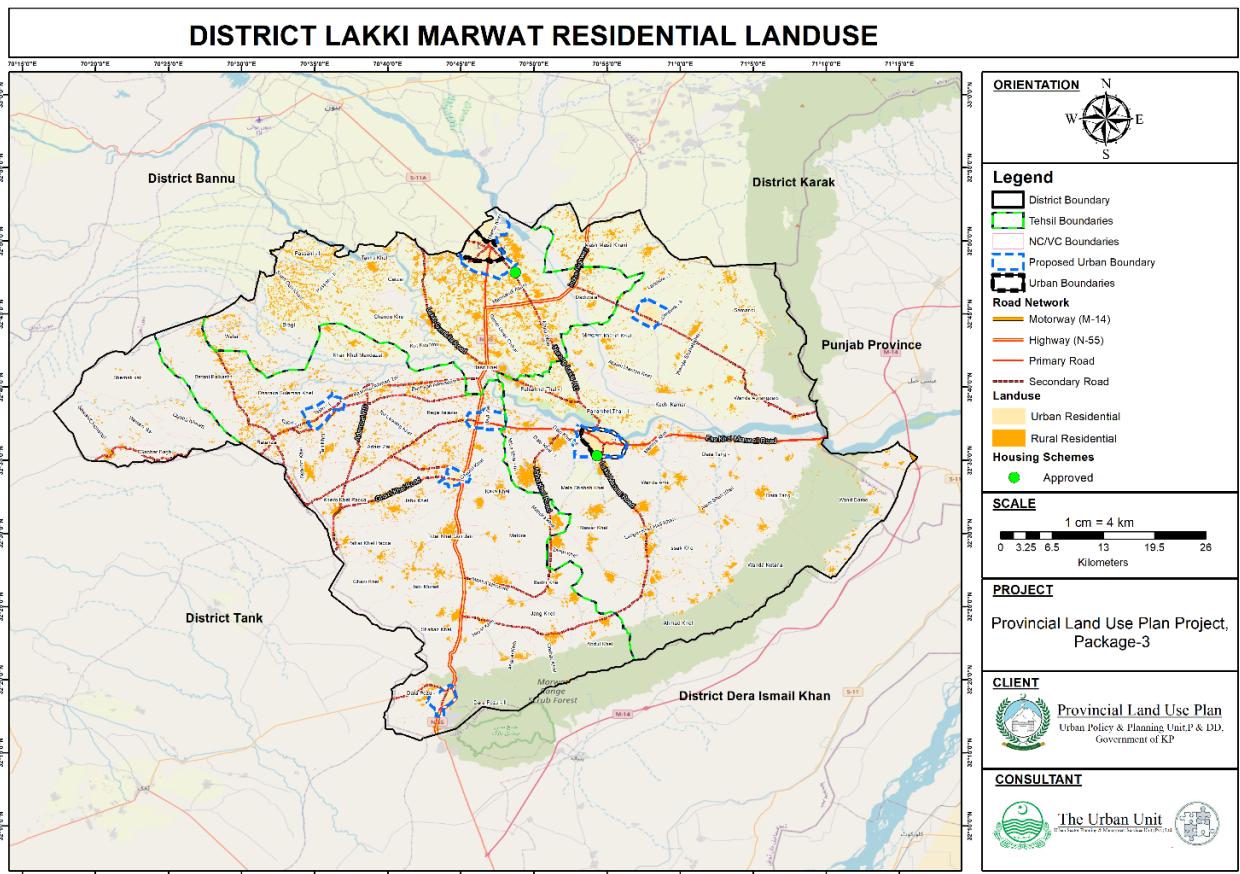
improvement of service delivery, and initiation of essential infrastructure projects. Long-term measures (2030–2045) emphasise expansion, efficiency enhancement, and sustainability of urban services in line with projected population and economic growth. The remaining sectors provide complementary policy and spatial recommendations to ensure coordinated implementation across the district.

Through the integration of these analyses, Volume II bridges data and design. It translates sectoral findings into spatial decisions presented in Volume I, ensuring that land-use proposals respond to real demographic pressures, economic potential, and environmental constraints. Together, the two volumes provide a coherent planning framework for guiding Lakki Marwat’s balanced and resilient development over the next two decades.

1 Housing

Housing is needed for everyone, regardless of whether they live in urban or rural areas, which is further closely connected to other land uses. Therefore, the housing sector is diversified and encompasses all urban activities related to work, education, and recreation. To fulfill the required need for housing, other land uses is needed as well. A massive amount of land is required for residential purposes, and with it, other activities are facilitated accordingly. As housing is the most important area to focus on, it is crucial to study its existing characteristics and spatial dynamics to prepare future Land Use Plans. Both qualitative and quantitative aspects of the housing sector should be considered to analyze land suitability, limitations, and constraints.

The characteristics of the existing housing stock in District Lakki Marwat are studied using various data sources, including secondary data from the census as well as primary data from the Household Information Survey. The characteristics of the housing stock include the average household size, housing stock, growth pattern, and density trends, as well as the existing housing backlog and future housing demand in District Lakki Marwat for the plan period. Residential Land use of District Lakki Marwat is shown in the **Map** below.



Map 1-1: District Lakki Marwat Residential Landuse

1.1 Existing Housing Condition

1.1.1 Existing Housing Stock

To analyze the growth pattern and estimate the existing housing stock, data from the 1998, 2017 and 2023 Population and Housing Censuses have been utilized. Based on the previous housing data available between 1998, 2017 and 2023, projections for the year 2025 have been made using arithmetic growth method.

During the period from 1998 to 2017, District Lakki Marwat witnessed a significant increase in housing units, rising from 54,232 to 100,831 an overall growth of 86% while from 2017 to 2023 the housing growth increase to 6% from 100,831 housing units to 131,800 Units. This growth was more prominent in urban areas, which experienced a 98% increase, compared to an 83% rise in rural areas between 1998 and 2017. This notable expansion highlights the district's mounting demographic and settlement pressures, emphasizing the need for strategic infrastructure development and effective service delivery during that time.

Based on the projections, the urban housing stock in District Lakki Marwat is expected to reach 26,839 units in 2025, while the rural housing stock is anticipated to grow to 112,703 units. This will bring the total projected housing stock in the district to 139,542 units. Between 2017 and 2023 the housing stock grew by 31% whereas from 2023 till 2025, the housing stock growth is 6%.

The **Table** below shows the urban/rural and tehsil-wise housing growth patterns in District Lakki Marwat, highlighting the percentage increase in housing units over the specified periods.

Table 1-1: District Lakki Marwat Housing Units and Growth Pattern¹

| Administrative Area | Housing 1998 | Growth (1998-2017) | Housing 2017 | Growth (2017-2023) | Housing 2023 | Growth (2023-2025) | Projected Housing 2025 |
|----------------------|--------------|--------------------|--------------|--------------------|--------------|--------------------|------------------------|
| District Urban | 9,801 | 98% | 19,387 | 31% | 25,349 | 6% | 26,839 |
| District Rural | 44,431 | 83% | 81,444 | 31% | 106,451 | 6% | 112,703 |
| District Overall | 54,232 | 86% | 100,831 | 31% | 131,800 | 6% | 139,542 |
| Urban Areas | | | | | | | |
| Lakki Marwat | 3,654 | 124% | 8,176 | 29% | 10583 | 6% | 11,185 |
| Serai Naurang | 2,318 | 79% | 4,152 | 27% | 5255 | 5% | 5,530 |
| Ghazni Khel | 374 | 49% | 558 | 48% | 823 | 8% | 890 |
| Dara Pezu | 1,066 | 103% | 2,169 | 39% | 3021 | 7% | 3,234 |
| Tajori | 1,089 | 89% | 2,062 | 26% | 2593 | 5% | 2,726 |
| Landiwa | 816 | 76% | 1,437 | 29% | 1860 | 6% | 1,966 |
| Taja Zai | 483 | 73% | 834 | 45% | 1213 | 8% | 1,308 |
| Rural Areas | | | | | | | |
| Tehsil Lakki Marwat | 13,368 | 87% | 25,004 | 30% | 32,629 | 6% | 34,535 |
| Tehsil Serai Naurang | 13,712 | 85% | 25,420 | 29% | 32,842 | 6% | 34,698 |
| Tehsil Ghazni Khel | 16,422 | 69% | 27,715 | 30% | 35,964 | 6% | 38,027 |
| Tehsil Bettani | 930 | 255% | 3,304 | 52% | 5,016 | 9% | 5,444 |

1.1.2 Housing Stock by Type

In 1998, Lakki Marwat District had a total of 54,232 housing units, with a dominant share of Katcha structures at 79.6%, followed by Pacca at 15.00%, and Semi Pacca at only 5.4%. Urban areas showed slightly better construction quality, particularly in Lakki Municipal Committee, where Pacca units made up 30% of the stock. Rural areas, however, remained heavily reliant on Katcha housing, highlighting a clear

¹ Pakistan Bureau of Statistics. (April, 2021). District Lakki Marwat-Final Results of Sixth Population and Housing Census-2017. Table-1: Area, Population by Sex, Sex Ratio, Population Density, Urban Proportion, Household Size and Annual Growth Rate. Table -30: Housing Units by Numbers of Rooms, Tenure and Rural/Urban.

* The Cantonment housing units from 1998 and 2017 have also been included.

urban-rural disparity in construction standards. This distribution reflects limited development and infrastructure investment across much of the district then.

By 2017, the housing stock in Lakki Marwat District rose to 100,831 units, with a significant shift toward permanent structures. Pacca units now comprised nearly 34% of all housing, while Katcha structures declined to 42.4%. The most notable improvements occurred in urban areas like the Lakki Municipal Committee, where over 72.6% of the housing was Pacca. Rural tehsils such as Lakki Marwat and Sarai Naurang also saw substantial transitions toward more durable housing. This transformation indicates improved construction practices and better access to building materials and services, an essential consideration for future land use planning, infrastructure development, and service provision.

Table below shows the details of the previous housing stock in District Lakki Marwat as per the census reports.

Table 1-2: District Lakki Marwat: Previous Housing Stock²

| Administrative Area | 1998 | | | | 2017 | | | | 2023 | | | |
|----------------------|--------|-------|------------|--------|--------|--------|------------|---------|--------|-------|------------|--------|
| | Katcha | Pacca | Semi Pacca | Total | Katcha | Pacca | Semi Pacca | Total | Katcha | Pacca | Semi Pacca | Total |
| District Urban | 2,904 | 1,666 | 592 | 5,162 | 1,308 | 7,985 | 1,629 | 10,922 | 824 | 11661 | 1409 | 13894 |
| District Rural | 40,310 | 6,470 | 2,290 | 49,070 | 41,506 | 26,587 | 21,816 | 89,909 | 45598 | 46024 | 26284 | 117906 |
| District Overall | 43,214 | 8,136 | 2,882 | 54,232 | 42,814 | 34,572 | 23,445 | 100,831 | 46422 | 57685 | 27693 | 131800 |
| Urban Areas | | | | | | | | | | | | |
| Lakki Marwat MC | 2,005 | 1,064 | 404 | 3,473 | 867 | 5,704 | 1,275 | 7,846 | 588 | 8510 | 1072 | 10170 |
| Sarai Naurang TC | 899 | 602 | 188 | 1,689 | 441 | 2,281 | 354 | 3,076 | 236 | 3151 | 337 | 3724 |
| Rural Areas | | | | | | | | | | | | |
| Lakki Marwat Tehsil | 25,592 | 2,332 | 941 | 14,365 | 10,875 | 8,612 | 7,284 | 26,771 | 10225 | 15558 | 9119 | 34902 |
| Sarai Naurang Tehsil | 12,544 | 1,246 | 551 | 14,341 | 13,851 | 7,150 | 5,495 | 26,496 | 17240 | 11110 | 6023 | 34373 |
| Ghazni Khel Tehsil | 1,655 | 2,511 | 768 | 19,434 | 15,141 | 10,676 | 7,521 | 33,338 | 16276 | 18593 | 8746 | 43615 |
| Bettani Tehsil | 519 | 381 | 30 | 930 | 1,639 | 149 | 1,516 | 3,304 | 1857 | 763 | 2396 | 5016 |

1.1.3 House Sizes in Lakki Marwat

The distribution of housing sizes in District Lakki Marwat reflects a combination of compact urban development and spacious rural housing patterns, shaped by population density, cultural norms, and land availability. **Table** below presents a consolidated view of housing sizes across urban and rural areas of District Lakki Marwat as per the Housing Information Survey (HIS):

Table 1-3: District Lakki Marwat Housing Sizes in Marla³

| Administrative Area | Less Than 5 | 5 - 10 | 11 - 20 | Above 20 |
|---------------------|-------------|--------|---------|----------|
| District Urban | 7% | 44% | 35% | 14% |
| District Rural | 11% | 33% | 41% | 15% |
| District Overall | 10% | 35% | 40% | 15% |
| Urban Areas | | | | |
| Lakki Marwat | 5% | 23% | 9% | 2% |
| Sarai Naurang | 1% | 9% | 11% | 5% |

² Pakistan Bureau of Statistics. (April, 2021). District Lakki Marwat-Final Results of Sixth Population and Housing Census-2017. Table-24 and 26 Selected Housing Characteristics of Urban and Rural Localities.

* The Cantonment housing units from 1998 and 2017 have also been included.

³ Household Information Survey

| | | | | |
|----------------------|----|-----|-----|----|
| Ghazni Khel | 0% | 2% | 2% | 1% |
| Dara Pezu | 0% | 4% | 4% | 2% |
| Tajori | 0% | 1% | 3% | 2% |
| Landiwa | 0% | 3% | 4% | 0% |
| Taja Zai | 0% | 2% | 2% | 2% |
| Rural Areas | | | | |
| Tehsil Lakki Marwat | 3% | 11% | 12% | 4% |
| Tehsil Sarai Naurang | 3% | 8% | 14% | 6% |
| Tehsil Ghazni Khel | 5% | 12% | 13% | 5% |
| Tehsil Bettani | 0% | 2% | 1% | 0% |

These figures highlight a dual spatial trend: while urban areas tend toward moderate to high-density housing, rural settlements display a preference for larger, low-density plots. This variation demands differentiated planning strategies that account for diverse housing needs and land utilization approaches.

In urban areas, the majority of houses are within the 5 to 10 Marla range, making up approximately 44% of the housing stock. This is followed by 11 to 20 Marla units at 35%, reflecting a moderate-density urban fabric. Smaller plots, especially under 5 Marla, constitute a notable share particularly in Lakki Marwat City and Sarai Naurang—indicating a growing trend toward compact, space-efficient residential development. The overall pattern suggests strong potential for infill housing, Vertical expansion, and Densification strategies, to accommodate urban growth without uncontrolled sprawl.

Conversely, rural areas of Lakki Marwat exhibit a marked preference for larger plot sizes. Approximately 41% of houses are larger than 10 Marla, especially in tehsils like Lakki Marwat and Sarai Naurang, where traditional lifestyles support more spacious housing. Additionally, 40% of homes fall within the 11 to 20 Marla range, often supporting multi-generational families, agricultural activities, and livestock enclosures. Plots smaller than 5 Marla are relatively rare in rural settings, averaging only 10%, indicating that land availability is still generous in these areas.

1.1.4 Housing Occupancy

Housing occupancy refers to the legal and functional status of residential units, indicating whether homes are owner-occupied, rented, rent-free, or government provided. In District Lakki Marwat, housing occupancy is overwhelmingly skewed towards owner-occupied units, with an average of 99% of households owning their homes. This reflects a deeply rooted tradition of self-constructed housing, multi-generational ownership, and a strong attachment to ancestral land—particularly evident in rural areas. Rental housing accounts for only 1% of the district's total, while rent-free and government housing each make up non contribution in housing occupancy.

In urban areas, ownership remains dominant at 96%, but a growing rental trend is becoming apparent, particularly in Sarai Naurang, where 2% of homes are occupied by tenants, and 1% are under government housing. This rental concentration suggests a transitional housing demand driven by urban migration, labor mobility, and increasing population pressures. Other urban areas like Lakki Marwat, Ghazni Khel, Dara Pezu, Tajori, Landiwa and Taja Zai maintain 100% ownership, highlighting the resilience of traditional housing models outside the main city core.

In rural Lakki Marwat, the average homeownership rate is even higher at 99%, with only 1% rental housing and negligible government-provided options. Several rural tehsils such as Lakki Marwat, Sarai Naurang, Ghazni Khel and Bettani report 100% ownership, reflecting high levels of tenure security and self-sufficiency. The near-universal ownership in rural areas supports strategies that promote: Incremental housing improvements, basic service provision and guided rural expansion with plot regularization.

Table below shows the details of the Housing occupancy in District Lakki Marwat as per the HIS.

Table 1-4: District Lakki Marwat Housing Occupancy⁴

| Administrative Area | Owned | Rented | Rented Free | Government |
|---------------------|-------|--------|-------------|------------|
|---------------------|-------|--------|-------------|------------|

⁴ Household Information Survey

| | | | | |
|----------------------|-----|----|----|----|
| District Urban | 96% | 3% | 0% | 1% |
| District Rural | 99% | 0% | 0% | 0% |
| District Overall | 99% | 1% | 0% | 0% |
| Urban Areas | | | | |
| Lakki Marwat | 38% | 0% | 0% | 0% |
| Serai Naurang | 24% | 2% | 0% | 1% |
| Ghazni Khel | 5% | 0% | 0% | 0% |
| Dara Pezu | 10% | 0% | 0% | 0% |
| Tajori | 6% | 0% | 0% | 0% |
| Landiwa | 8% | 0% | 0% | 0% |
| Taja Zai | 6% | 0% | 0% | 0% |
| Rural Areas | | | | |
| Tehsil Lakki Marwat | 30% | 0% | 0% | 0% |
| Tehsil Serai Naurang | 31% | 0% | 0% | 0% |
| Tehsil Ghazni Khel | 35% | 0% | 0% | 0% |
| Tehsil Bettani | 4% | 0% | 0% | 0% |

1.1.5 Average Household Size

The average size of a household is a key factor in housing projections as it directly impacts the demand for housing units. This value helps in determining the number of housing units required to accommodate a specific population. Smaller household sizes usually lead to a higher demand for housing units, while larger household sizes can reduce the number of units needed. Urban areas may have different average household sizes compared to rural areas due to factors such as housing costs, availability, and cultural preferences.

The **Table** presents the average household size for various administrative areas of Lakki Marwat District in 2017 and projections for 2025 and 2045. A consistent declining trend is observed across both urban and rural areas, indicating a gradual reduction in household size over time. For example, Lakki Marwat City's average household size decreases from 7.8 in 2017 to 5.87 by 2045, while Serai Naurang shows a relatively slower decline from 7.8 to 6.96. Similarly, in rural areas, Lakki Marwat Tehsil drops from 8.83 to 5.96, and Serai Naurang Tehsil from 8.83 to 7.12. These projections are crucial for estimating future housing needs and guiding residential land allocation in the Lakki Marwat District Land Use Plan. The household sizes have been projected using exponential growth method using the growth rate of household size of 1998 and 2017 censuses.

Table below shows the details of average household sizes in newly proposed urban areas of District Lakki Marwat as well as the rural areas.

Table 1-5: Average Household Size

| Administrative Area | Projected Household Size 2025 | Projected Household Size 2045 |
|----------------------|-------------------------------|-------------------------------|
| Urban Areas | | |
| Lakki Marwat | 7.00 | 5.87 |
| Serai Naurang | 8.95 | 6.96 |
| Ghazni Khel | 8.36 | 7.51 |
| Pezu | 7.70 | 7.01 |
| Tajori | 9.07 | 6.46 |
| Landiwa | 8.29 | 7.61 |
| Taja Zai | 10.08 | 8.45 |
| Rural Areas | | |
| Tehsil Lakki Marwat | 7.17 | 5.96 |
| Tehsil Serai Naurang | 8.57 | 7.12 |
| Tehsil Ghazni Khel | 6.66 | 5.54 |
| Tehsil Bettani | 6.79 | 5.64 |

1.1.6 Housing Density

The existing housing density 2025 in District Lakki Marwat has been calculated using the residential area from the land use classification statistics and the projected housing stock 2025 calculated above in Table 1-1. According to the land use statistics, the total residential area in District Lakki Marwat is 10,613 hectares in which 9416 hectares is in occupied by the urban area of Lakki Marwat and 1,197 hectares is in rural area.

By dividing the number of housing units by the respective areas, the residential density in urban areas is found to be 20 housing units per hectare, while in rural areas, it is 12 units per hectare. The overall housing density for the district is 13 units per hectare. Table below shows the housing density for both urban and rural areas of District Lakki Marwat.

Table 1-6 District Lakki Marwat Housing Density (Hectares)

| Administrative Area | Residential Area (Hectare) | Projected Housing Units 2025 | Current Housing Density 2025 (Unit per Hectare) |
|----------------------|----------------------------|------------------------------|---|
| District Urban | 1197 | 26839 | 20 |
| District Rural | 9416 | 150027 | 12 |
| District Overall | 10613 | 176866 | 13 |
| Urban Areas | | | |
| Lakki Marwat | 409 | 11185 | 27 |
| Serai Naurang | 488 | 5530 | 11 |
| Ghazni Khel | 76 | 890 | 12 |
| Pezu | 104 | 3234 | 31 |
| Tajori | 119 | 2726 | 23 |
| Landiwa | 142 | 1966 | 14 |
| Taja Zai | 84 | 1308 | 15 |
| Rural Areas | | | |
| Tehsil Lakki Marwat | 3131 | 33753 | 11 |
| Tehsil Serai Naurang | 2848 | 49146 | 12 |
| Tehsil Ghazni Khel | 3340 | 42311 | 11 |
| Tehsil Bettani | 97 | 24817 | 56 |

1.2 Current Housing Backlog and Future Demand

A housing backlog refers to the gap between the demand for housing and the available supply of housing units. This unmet demand can have significant social and economic consequences, including increased housing costs, overcrowding, homelessness, and a decline in overall quality of life.

The current housing backlog of District Lakki Marwat has been calculated by dividing the projected population 2025 by the proposed average household size 2025, the result is the number of total existing housing demand 2025 in District Lakki Marwat. Then by subtracting the number total housing demand 2025 from the existing housing stock 2025, it gives us the current backlog as the result.

1.2.1 Current Housing Backlog

Currently, as per the calculation, there is a backlog of 16,843 houses in District Lakki Marwat. In urban areas, the backlog is surplus with (2,898) housing units, and in rural areas, the backlog is 19,741. The urban area housing backlog is further divided into 7 urban areas. In the Lakki Marwat City, the backlog is 180, while in Sarai Naurang the deficiency of housing units is 1402, while all other centers have no housing backlog respectively.

In the rural areas of Lakki Marwat Tehsil and Serai Naurang Tehsil, there is a backlog of 4,258 and 3,537. In Ghazni Khel Tehsil, the backlog is 10,604 units, while Bettani Tehsil has a backlog of 1,342 housing units. **Table** below gives us the current backlog as the result.

Table 1-7 District Lakki Marwat Current Housing Backlog (2025)

| Administrative Area | Population 2025 (A) | Projected Housing Units 2025 (B) | Household Size 2025 (C) | Existing Housing Demand 2025 (D) | Housing Backlog (D-B) |
|----------------------|---------------------|----------------------------------|-------------------------|----------------------------------|-----------------------|
| District Urban | 190,455 | 26,839 | 7.96 | 23,941 | (2,898) |
| District Rural | 975,777 | 112,703 | 7.37 | 132,445 | 19,741 |
| District Overall | 1,166,232 | 139,542 | 7.46 | 156,385 | 16,843 |
| Urban Areas | | | | | |
| Lakki Marwat | 79553 | 11,185 | 7.00 | 11,365 | 180 |
| Serai Naurang | 62042 | 5,530 | 8.95 | 6,932 | 1,402 |
| Ghazni Khel | 5437 | 890 | 8.36 | 650 | (239) |
| Pezu | 8989 | 3,234 | 7.70 | 1,167 | (2,067) |
| Tajori | 8125 | 2,726 | 9.07 | 896 | (1,830) |
| Landiwa | 14953 | 1,966 | 8.29 | 1,804 | (162) |
| Taja Zai | 11356 | 1,308 | 10.08 | 1,127 | (181) |
| Rural Areas | | | | | |
| Tehsil Lakki Marwat | 278146 | 34,535 | 7.17 | 38,793 | 4,258 |
| Tehsil Serai Naurang | 327673 | 34,698 | 8.57 | 38,235 | 3,537 |
| Tehsil Ghazni Khel | 323884 | 38,027 | 6.66 | 48,631 | 10,604 |
| Tehsil Bettani | 46074 | 5,444 | 6.79 | 6,786 | 1,342 |

1.2.2 Future Housing Demand

The future housing demand for 2025-2045 for the District Lakki Marwat has been calculated by dividing the additional population of 2045 by the projected average household size 2045. The overall future housing demand for 2025-2045 of District Lakki Marwat is 198,295 out of these, 169,768 houses are needed in the urban area, whereas 28,526 houses are required in the rural areas of District Lakki Marwat.

Table 1-8: District Lakki Marwat Future Housing Demand (2025-2045)

| Administrative Area | Additional Population | Household Size 2045 | Future Housing Demand 2045 (A) | Current Housing Backlog (B) | Total Housing Demand (A+B) |
|----------------------|-----------------------|---------------------|--------------------------------|-----------------------------|----------------------------|
| District Urban | 174887 | 6.49 | 26945 | 1581 | 28526 |
| District Rural | 925772 | 6.17 | 150027 | 19741 | 169768 |
| District Overall | 1100659 | 6.22 | 176972 | 21322 | 198295 |
| Urban Areas | | | | | |
| Lakki Marwat | 80329 | 5.87 | 13683 | 180 | 13863 |
| Serai Naurang | 59195 | 6.96 | 8506 | 1402 | 9907 |
| Ghazni Khel | 3935 | 7.51 | 524 | 0 | 524 |
| Pezu | 6504 | 7.01 | 928 | 0 | 928 |
| Tajori | 7369 | 6.46 | 1141 | 0 | 1141 |
| Landiwa | 10823 | 7.61 | 1423 | 0 | 1422 |
| Taja Zai | 8219 | 8.45 | 972 | 0 | 973 |
| Rural Areas | | | | | |
| Tehsil Lakki Marwat | 201315 | 5.96 | 33753 | 4258 | 38012 |
| Tehsil Serai Naurang | 349998 | 7.12 | 49146 | 3537 | 52683 |
| Tehsil Ghazni Khel | 234416 | 5.54 | 42311 | 10604 | 52915 |
| Tehsil Bettani | 140043 | 5.64 | 24817 | 1342 | 26158 |

1.2.3 Area Requirement

Based on the proposed housing density 2045, the area required for accommodating housing need has been calculated by dividing the total future housing demand by the proposed housing density. Area required is then doubled to accommodate the services and amenities that are accompanied by housing. By subtracting the infill development area from the total area required, the net area required for the long-term period is calculated. The land available for infill development, as derived from the land use base map, has been taken into account. Infill development within the CBA of each urban area includes vacant land, barren land, rangeland, and agricultural land.

For urban areas, the proposed housing density ranges from 25 to 33 houses per hectare. In rural areas, due to variations in household sizes across different tehsils, the proposed densities for projection purposes are as follows: 120 houses per hectare in Tehsils Lakki Marwat and 150 houses in Serai Naurang tehsil, 140 houses per hectare in Tehsils Ghazni Khel and 200 houses per hectare in Tehsils Bettani. A summary of these details is presented in the **Table** below.

Table 1-9: Area Required 2025-2045 (Hectares)

| Administrative Area | Total Future Housing Demand | Proposed Housing Density 2045 | Area Required | 100% additional land for services | Total Area Required (A) | Infill Development (B) | Net Area Required (A-B) |
|----------------------|-----------------------------|-------------------------------|---------------|-----------------------------------|-------------------------|------------------------|-------------------------|
| District Urban | 26131 | 33 | 911 | 911 | 1822 | 154.7 | 1667.3 |
| District Rural | 169768 | 21 | 1177 | - | - | - | 1177 |
| District Overall | 195899 | 25 | 1992 | 911 | 1822 | 154.7 | 2844.3 |
| Urban Areas | | | | | | | |
| Lakki Marwat | 13863 | 35 | 397 | 397 | 794 | 41 | 753 |
| Serai Naurang | 9907 | 30 | 328 | 328 | 656 | 41 | 615 |
| Ghazni Khel | 524 | 20 | 26 | 26 | 52 | 7.2 | 44.8 |
| Pezu | 928 | 35 | 27 | 27 | 54 | 33.6 | 20.4 |
| Tajori | 910 | 25 | 37 | 37 | 74 | 20 | 54 |
| Landiwa | 1423 | 25 | 57 | 57 | 114 | 7.9 | 106.1 |
| Taja Zai | 972 | 25 | 39 | 39 | 78 | 4 | 74 |
| Rural Areas | | | | | | | |
| Tehsil Lakki Marwat | 38012 | 120 | 317 | - | - | - | 317 |
| Tehsil Serai Naurang | 52683 | 150 | 351 | - | - | - | 351 |
| Tehsil Ghazni Khel | 52915 | 140 | 378 | - | - | - | 378 |
| Tehsil Bettani | 26158 | 200 | 131 | - | - | - | 131 |

1.3 Affordability Inputs Relative to Local Income Level

Housing is one of the basic human needs: the World Health Organization defined it as a “residential environment which includes, in addition to the physical structure that man uses for shelter, all necessary services, facilities, equipment and devices needed or desired for the physical and mental health and social well-being of the family”. Globally, housing is defined as affordable if a basic housing unit, which provides a minimum amount of personal space (anywhere from 250 to 500 square feet) and amenities, is accessible at 20% to 40% of gross monthly household income for either rent or mortgage.⁵

Beyond affordability in monetary terms, adequacy is also essential: a house cannot be deemed affordable if it is overcrowded, structurally unsafe, or lacking in basic services. Therefore, to evaluate the real cost and affordability of housing, expenditures related to water, electricity, gas, and sanitation must also be considered, alongside the structural quality and spatial sufficiency of the dwelling.⁶

⁵ A framework for affordable housing in Pakistan, International Growth Center, 2019.

⁶ What is affordable Housing? Habitat for Humanity.

According to the HIS carried out by the Consultant in District Lakki Marwat, only 1% of the households live in a rented house with monthly rent varying from Rs 3000 to Rs 8000, with an average rent of Rs 5000 per month for a household. The average household income of District Lakki Marwat is Rs 37500 per month. On average, about 0.5% of the household income is paid in rent, which according to the international definition stated above, falls in the affordable housing.

According to Table 1-4, 99% of the houses in the entire district of Lakki Marwat were owned by people which clearly put aside financial affordability defined above internationally. So, in the project area, affordability was studied with respect to adequacy through the following physical aspects keeping the average household size for the complete district:

- Structure of house
- Average covered area
- Rooms per house
- Bathrooms per house
- Persons per room
- Period of construction

The below **Table** below demonstrates the analysis performed on the above physical criteria for affordable housing in District Lakki Marwat.

Table 1-10: Physical Criteria for Affordable Housing⁷

| Structure of house (Pacca) | Avg. Covered Area (Marla) | Avg. Rooms per house | Avg. Bathrooms per house | Avg. Persons per room | Period of Construction (11-50 years) |
|----------------------------|---------------------------|----------------------|--------------------------|-----------------------|--------------------------------------|
| 37% | 10 | 4 | 2 | 3 | 90% |

In the light of the above table, less than half (37%) of the houses in District Lakki Marwat are constructed with permanent (pacca) materials. The average covered area is 10 marla (approximately 2,720 sq. ft.), and each house has an average of four rooms and two bathrooms. With an average household size of nine persons, this results in 302 sq. ft. of space per person, falling within the internationally accepted range of 250–500 sq. ft. for adequate living space. Additionally, the ratio of three persons per room in overall district is consistent with global standards for non-congested living environments.

Regarding the age of the housing, 90% of housing units were built within the last 11–50 years⁸. According to the U.S. Department of Housing and Urban Development, this falls below the average structural lifespan of 70 years, suggesting that most housing units are still structurally viable.

Housing adequacy was further evaluated based on access to essential services:

- Potable Water
- Electricity
- Gas
- Sanitation

The below **Table** summarizes the facilities available to the housing units in District Lakki Marwat.

Table 1-11: Availability of Basic Facilities⁹

| Potable Water | Electricity | Gas | Sanitation |
|---------------|-------------|--------|------------|
| 37.96% | 88.06% | 15.16% | 5.38% |

Analyzing the above table, it is evident that potable water is accessible to 37.96% of the population. Although nearly 88.06% of households report access to electricity, the HIS indicates that 88% face load shedding exceeding 16 hours per day, limiting its usability. Access to gas is critically low, with only 15.16% of households connected to pipe or LPG sources. Wastewater and solid waste disposal, collectively termed

⁷ Calculated from Household Survey conducted by Consultant, January 2023.

⁸ Calculated from Household Survey conducted by Consultant, January 2023.

⁹ Calculated from the Household Survey conducted by the Consultant in January, 2023.

as sanitation for analysis turned out to be available for only 5.38% population indicating that dispose their household solid waste and wastewater into open drains or spaces. Furthermore, while the HIS findings show that over 87.86% of drinking water sources meet SDG Indicator 6.1.1 (“improved source”), 12.42% of these are located outside the household premises, compromising accessibility and convenience.¹⁰

Table 1-12: Housing Affordability & Adequacy within District Lakki Marwat

| Category | Indicator | Findings | Assessment |
|------------------------|--|--|--|
| Economic Affordability | % of Households in Rented Units | 1% | Low reliance on rental market |
| | Average Monthly Rent | PKR 5,000 | 30% of average income (PKR 30,000) |
| | International Benchmark (Rent-to-Income) | 20–40% | Within affordable threshold |
| Physical Adequacy | Avg. Covered Area | 10 marla (≈ 2,720 sq. ft.) | Meets space standards |
| | Avg. Persons per Room | 4 persons | Acceptable standard (≤3 persons/room) |
| | Avg. Rooms per House | 4 | Adequate |
| | Avg. Bathrooms per House | 2 | Adequate |
| | Structure Type | 37% Pacca houses | Below desirable standard |
| | Construction Age | 90% houses built 11–50 years ago | Within structural lifespan |
| Service Adequacy | Personal Space per Person | ≈ 302 sq. ft./person | Within international norms (250–500) |
| | Access to Potable Water | 37.96% within premises | Low |
| | SDG Indicator 6.1.1 (Improved Water Source) | 87.86% (but 12.42% sources outside premises) | Physically improved but not accessible |
| | Electricity Access | 88.06% households | High access, but quality is poor |
| | Electricity Load Shedding | 88% experience >16 hours/day | Severely impacts usability |
| | Access to Gas (Natural/LPG) | 15.6% | Very low |
| | Access to Sanitation (Waste & Wastewater Disposal) | 5.38% | Critically inadequate |

In a nutshell, while housing in District Lakki Marwat appears affordable in terms of economic cost and physical adequacy, the lack of essential services undermines this affordability. Inadequate access to potable water, uninterrupted electricity, safe cooking fuel, and proper sanitation significantly affects quality of life and public health. These findings indicate that true housing affordability must be measured not only by cost or size but by the ability of households to live safely and with dignity. Therefore, ensuring equitable and reliable access to basic urban services is vital for fostering resilient, inclusive communities across District Lakki Marwat.

1.4 Review of Housing Schemes in the Public and Private Sectors

In District Lakki Marwat, housing schemes are categorized into four types: **Approved**, **Unapproved**, **Application Submitted**, and **Illegal**.

- Approved schemes are those that have been both technically and physically approved by the respective TMAs.
- Unapproved/ Application Submitted schemes do not comply with housing regulations or by-laws.
- Illegal schemes have no official documentation or recognized boundaries.

In District Lakki Marwat, a total of 27 housing schemes have been identified, encompassing both public and private sector developments. Of these, only two schemes—one located in Tehsil Lakki Marwat and the other in Tehsil Sarai Naurang—have been formally approved by the relevant authorities.

¹⁰ Calculated from the Household Survey conducted by the Consultant in January, 2023.

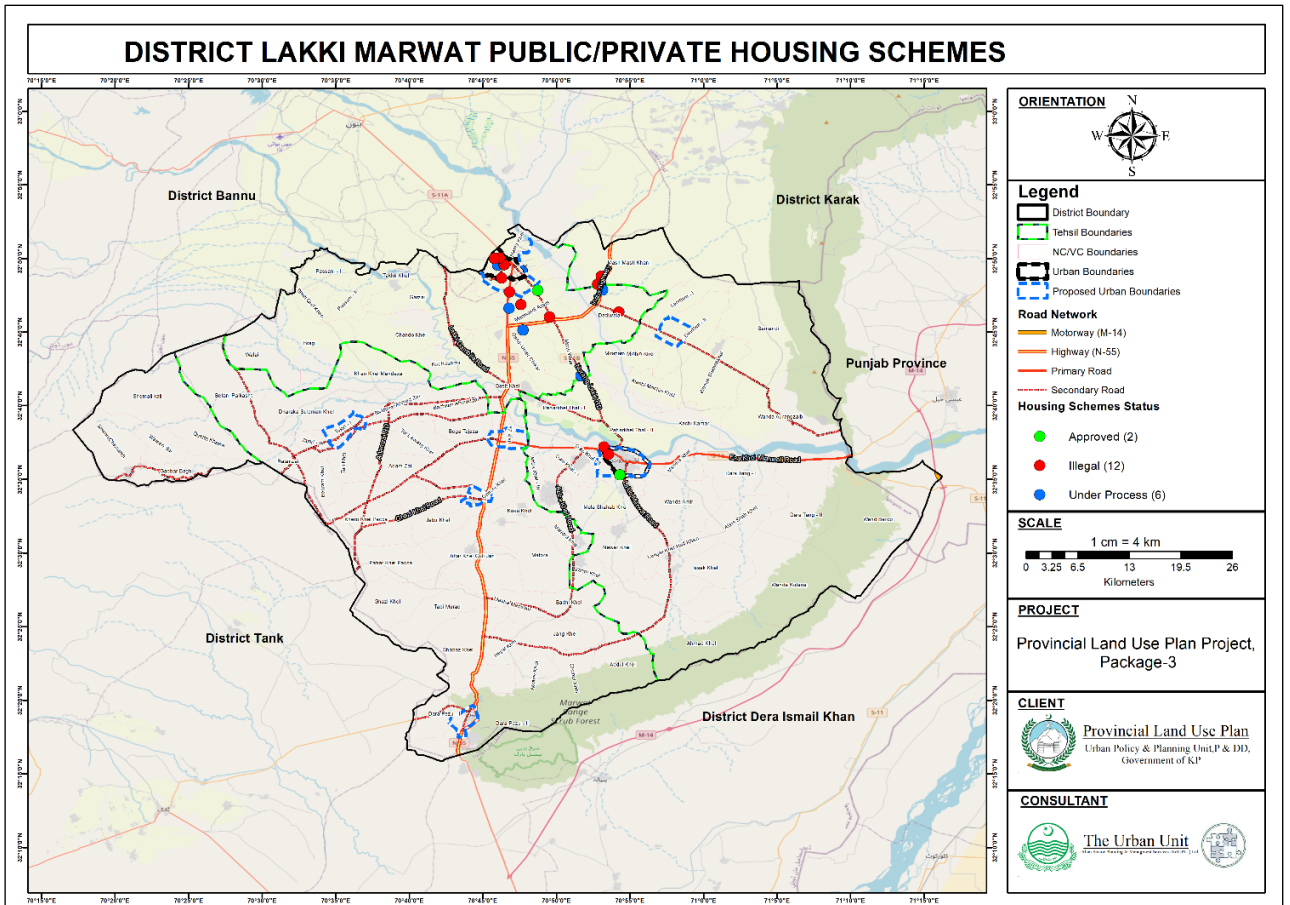
Currently, seven additional housing schemes are under the process of approval, which include two schemes within Tehsil Lakki Marwat and five within Tehsil Sarai Naurang. These are at various stages of scrutiny and evaluation for compliance with planning and development regulations.

However, a significant number, eighteen housing schemes, are identified as illegal or unapproved developments. Among these, twelve are situated in Tehsil Sarai Naurang, while six are located in Tehsil Lakki Marwat. These unauthorized schemes are operating without requisite planning permissions, raising concerns regarding unregulated land conversion, lack of infrastructure provision, and potential environmental impacts.

This situation highlights the urgent need for strengthened regulatory enforcement, public awareness, and institutional coordination to ensure that future housing developments in the district align with the approved land use framework and urban growth management objectives.

Table 1-13: District Lakki Marwat Public and Private Housing Schemes

| S. No | Name of Housing Scheme | Status | Remarks | Area | Tehsil/TMA |
|-------|------------------------------------|---------------|--|------|---------------|
| 1 | Lakki Housing Scheme | Approved | Approved | 168 | Lakki Marwat |
| 2 | Waziristan Town | Under Process | NOC from EPE is awaited | 180 | Lakki Marwat |
| 3 | Alamgir Enclave | Under Process | In process | 170 | Lakki Marwat |
| 4 | Islam Abad Town | Illegal | Notice is issued | | Lakki Marwat |
| 5 | Rujjal Town | Illegal | Notice is issued | 185 | Lakki Marwat |
| 6 | Farman Town | Illegal | Final Notice Issued | 95 | Lakki Marwat |
| 7 | Khan Town | Illegal | Final Notice Issued | | Lakki Marwat |
| 8 | CPEC Town | Illegal | Final Notice Issued | 145 | Lakki Marwat |
| 9 | Muhammad Town | Illegal | Final Notice Issued | | Lakki Marwat |
| 10 | Naurang Model Town | Approved | Approved | 183 | Sarai Naurang |
| 11 | Modern Village Sarai Naurang | Under Process | NOC is awaited due to the verification of property documents | 198 | Sarai Naurang |
| 12 | Malik Qadus Town | Under Process | NOC is awaited due to the verification of property documents | 49 | Sarai Naurang |
| 13 | Green town | Under Process | Awaiting NOC EPA | 100 | Sarai Naurang |
| 14 | Hayat town | Under Process | Awaiting NOC EPA | 91.5 | Sarai Naurang |
| 15 | Sardar Hassan Khan, Gandapoor Town | Under Process | Not Applied | 99 | Sarai Naurang |
| 16 | New Al-Khalid Town | Illegal | Not Applied | 41 | Sarai Naurang |
| 17 | Al-Khalid Town | Illegal | Not Applied | 72 | Sarai Naurang |
| 18 | Salam Town | Illegal | Not Applied | 160 | Sarai Naurang |
| 19 | Salam Town | Illegal | Not Applied | 96 | Sarai Naurang |
| 20 | Muhammad Taif S/O Abdullah Jan | Illegal | Not Applied | 35 | Sarai Naurang |
| 21 | Hurain Model Town | Illegal | Not Applied | 20 | Sarai Naurang |
| 22 | Malik Saad Town | Illegal | Not Applied | 76 | Sarai Naurang |
| 23 | Al-Haram Town | Illegal | Not Applied | 242 | Sarai Naurang |
| 24 | Bilawal Town | Illegal | Not Applied | 60 | Sarai Naurang |
| 25 | Hamid Ullah khan | Illegal | Not Applied | 35 | Sarai Naurang |
| 26 | Haram Town | Illegal | Not Applied | 48 | Sarai Naurang |
| 27 | Iftekhar Abad | Illegal | Not Applied | 50 | Sarai Naurang |



Map 1-2: District Lakki Marwat Public and Private Housing Schemes

1.4.1 Spatial Analysis of Public/Private Housing Schemes

The spatial development analysis of approved and NOC-issued housing schemes was conducted using data collected through field visits, consultation meetings with the respective TMAs, and the use of Google Earth and ArcGIS for identifying housing societies and their infrastructural development. Following the field visits and consultations, all approved housing schemes and those with applications submitted were mapped using ArcGIS.

- In the Lakki Housing Scheme, located in Tehsil Lakki Marwat, no substantial development work has been observed. Infrastructure development is limited to the construction of the main gate, the main boulevard, and the boundary wall, while the houses constructed are none.
- Similarly, in the Naurang Model Town, situated in Tehsil Sarai Naurang, only minimal development has taken place. There is a slight infrastructure development, with only the main boulevard, boundary wall, and the Society’s office being developed.

The details of the approved housing schemes and those having applications submitted are provided in the **Table** and **Map** below.

Table 1-14: Existing Legal Housing Schemes¹¹

| S.NO | NAME | AREA TMA's | TEHSIL/TMA | STATUS | Infrastructural development in % | Built Houses in % |
|------|----------------------|------------|---------------|----------|----------------------------------|-------------------|
| 1 | Lakki Housing Scheme | 163 Kanals | Lakki Marwat | Approved | 10 to 20 | 0 |
| 2 | Naurang Model Town | 100 Kanals | Sarai Naurang | Approved | 20 to 30 | 0 |

¹¹ Spatial analysis from Google earth and Data Collected from TMA during consultation session held at DC Office 17 March 2025

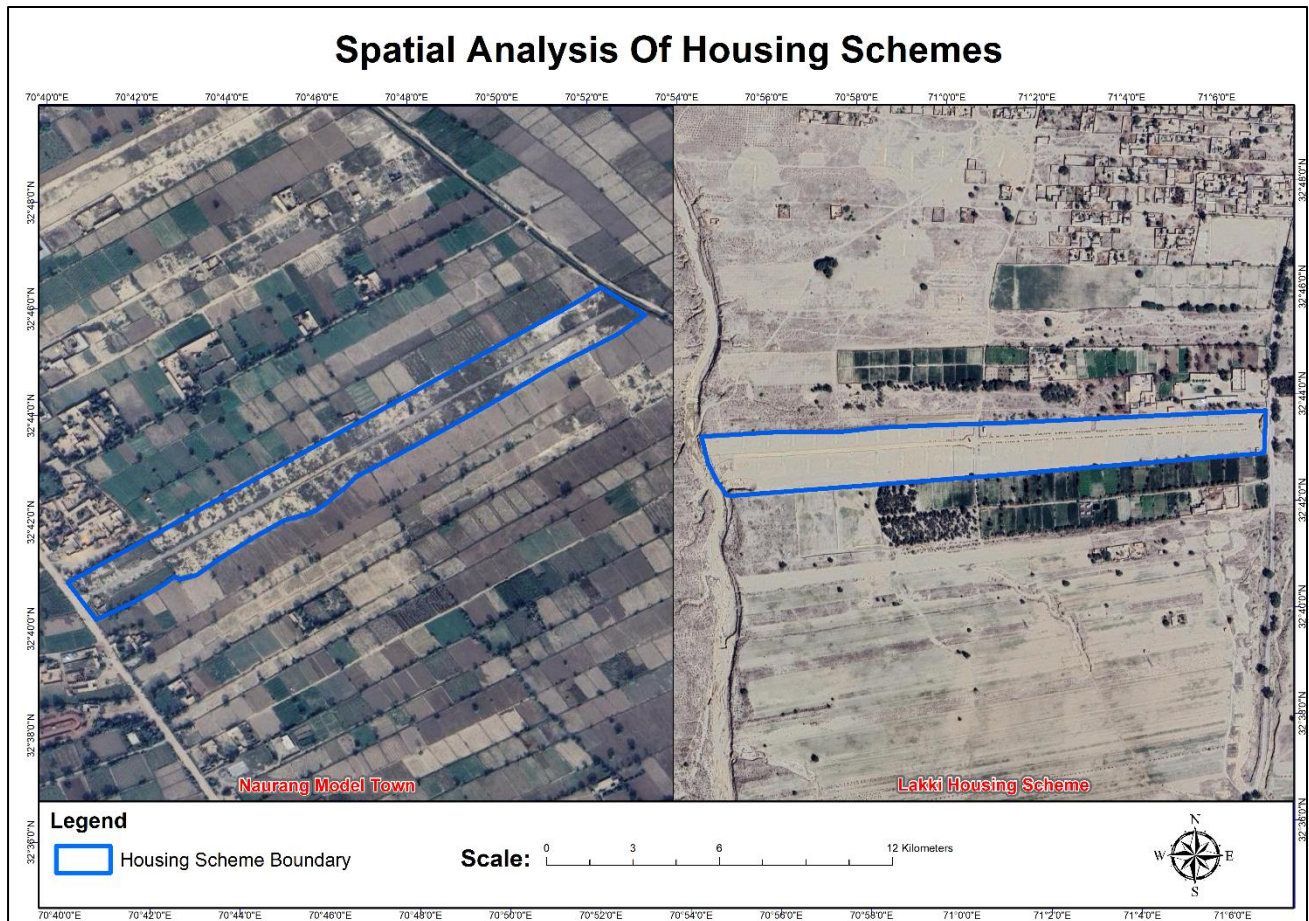


Figure 1-1: Spatial Analysis of Approved Housing Schemes

1.4.2 Spatial Analysis of Illegal/Unapproved Housing Schemes

- The Waziristan Town Housing Scheme, located in Tehsil Lakki Marwat, also reflects a very limited infrastructure development. There is no main gate, and no boundary wall, with zero houses being constructed. Only the society's administrative office has been constructed. Its file is also submitted for the approval process.
- In the illegal Alamgir Enclave Housing Society, situated in Tehsil Lakki Marwat, no development has been observed. There are no constructed roads, houses, boundary walls, or the main gate
- Similarly, in the illegal Rujjal Town Housing Scheme, also located in Tehsil Lakki Marwat, development remains considerable. Being a small society, it has no main gate and includes about 5 or 6 houses, while the boundary wall is mostly constructed.
- Another housing scheme, Farman town, in Tehsil Lakki Marwat, is also illegal and has been issued a final notice for regularization, wherein limited infrastructural development has been observed, with only the main boulevard being paved, while a significant number of houses, about 10, accounting for 40 to 50% are being constructed.
- The Khan Town housing society, located in Tehsil Lakki Marwat, is also illegal and has been issued the final notice for regularization. In the town, minimal infrastructure development has been carried out. To date, only the layout plan has been implemented, showing the main road and streets, while the society's office and 5 or 6 houses have been constructed. The boundary wall has been built only on one side.
- CPEC Town, located in Tehsil Lakki Marwat, spanning across 145 kanals, is also an illegal township. Only the road and street layout have been provided, while having no Main Gate, boundary wall, or houses being constructed.
- Muhammad town, situated in Lakki Marwat, encompassing 76 kanal, has no visible infrastructural development, with a total of only two houses being built.
- In Modern Village Sarai Naurang Housing Society (approval under process), situated in Tehsil Sarai Naurang, wherein considerable development is visible. The main gate, the streets, the main

boulevard, and a central park have been constructed, while a total of 2 or 3 houses have been constructed.

- Malik Qadus Towns, located in Tehsil Sarai Naurang, is also an unapproved housing scheme with considerable infrastructure development, including a boundary wall, the main gate, paved main boulevard, and streets, and a single house being built.
- The illegal Green Town in Tehsil Sarai Naurang is an unapproved scheme, having partial development, with only a single house being constructed. It has no main gate and has a proper boundary wall, while the main road is paved, but the streets are not.
- Hayat Town, located in Tehsil Sarai Naurang, is unapproved, has minimal development, with no boundary wall or houses. Only the road and street layout have been provided. It is awaiting NOC from the EPA.
- Sardar Hassan Khan Gandapoor Town, located in Sarai Naurang Tehsil, has considerable infrastructural development, with a main gate, a proper boundary wall, road, and street layout, and a single house being constructed. It is also unapproved and has not been applied for approval.
- New Al-Khalid Town is also one of the illegal townships in Tehsil Sarai Naurang, covering 41 kanals, and has not applied for approval. There is limited development, with only the road and street layout partially provided, a boundary wall along both sides, and 4 or 5 houses. However, the township lacks a main gate.
- Al-Khalid Town is also an illegal one, located in Tehsil Naurang, covering 72 kanals, and has having partially developed boundary wall with no main gate and unpaved road and street layout, with 40 to 50% houses being built.
- Salam Town, situated in Tehsil Sarai Naurang, along Kakki Road, covering 160 kanals, has not applied for approval. It lacks the main gate and has only the unpaved roads and street layout, while the boundary wall is partially built (10 to 20%), and about 40 to 50% houses are being built.
- Salam Town, situated in Tehsil Sarai Naurang, along Muslim Bagh Road, covering 96 kanals, has also not applied for approval. It also lacks a main gate and the boundary wall, with only the unpaved road and street layout being provided. It has a commercial market at front and 1 or 2 houses being built.
- Bilawal Town, situated in Tehsil Sarai Naurang, covering 60 kanals, is also one of those having not applied for approval. It lacks the main gate and boundary wall, with only roads and streets paved layout being provided. About 30 to 40% houses are being built.
- Iftikhar Town, situated in Tehsil Sarai Naurang, covering 50 kanals, has not applied for approval. It has no main gate or boundary wall, with no houses yet being constructed.

The remaining housing schemes highlighted in red are illegal/unapproved and lack defined boundaries, which prevents their spatial analysis. Details of the Unapproved/Illegal housing schemes are provided in the table below and visually shown in Figures.

Table 1-15: Existing Illegal/Unapproved Housing Schemes

| S.NO | NAME | AREA TMA's | TEHSIL/T MA | STATUS | Infrastructural development in % | Built Houses in % |
|------|------------------------------|-------------|---------------|-----------------------|----------------------------------|-------------------|
| 1. | Waziristan Town | 99.5 Kanals | Lakki Marwat | Application Submitted | 20 to 30 | 5 |
| 2. | Alamgir Enclave | 98 Kanals | Lakki Marwat | Application Submitted | 0 | 0 |
| 3. | Rujjal town | 99 Kanals | Lakki Marwat | Illegal | 20 to 30 | 30 to 40 |
| 4. | Khan town | 98 Kanals | Lakki Marwat | Illegal | 20 to 30 | 20 to 30 |
| 5. | Farman Town | 80 Kanals | Lakki Marwat | Illegal | 40 to 50 | 30 to 40 |
| 6. | CPEC Town | 145 Kanals | Lakki Marwat | Illegal | 10 to 20 | 20 to 30 |
| 7. | Muhammad Town | 76 Kanals | Lakki Marwat | Illegal | 0 to 10 | 0 to 10 |
| 8. | Modern Village Sarai Naurang | 198 kanals | Sarai Naurang | Illegal | 30 to 40 | 0 to 10 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | |
|-----|---------------------------------------|----------------|------------------|------------------|----------|----------|
| 9. | Malik Qadus Town | 49 Kanals | Sarai Naurang | Under Process | 30 to 40 | 0 to 10 |
| 10. | Green Valley | 27 Kanals | Sarai Naurang | Under Process | 30 to 40 | 0 to 5 |
| 11. | Hayat Town | 91.5 Kanals | Sarai Naurang | Under Process | 0 to 10 | 0 to 5 |
| 12. | Sardar Hassan Khan, Gandapoor Town | 99 kanals | Sarai Naurang | Under Process | 40 to 50 | 5 to 10 |
| 13. | New Al-Khalid Town | 41 Kanals | Sarai Naurang | Illegal | 20 to 30 | 30 to 40 |
| 14. | Al Khaled Town | 72 Kanals | Sarai Naurang | Illegal | 30 to 40 | 2 to 5 |
| 15. | Salam Town | 160 Kanals | Sarai Naurang | Illegal | 10 to 15 | 5 to 10 |
| 16. | Salam Town | 96 Kanals | Sarai Naurang | Illegal | 15 to 20 | 0 |
| 17. | Muhammad Taif S/O Abdullah Jan | 35 Kanals | Sarai Naurang | Illegal | 0 | 0 |
| 18. | Hurain Model Town | 20 Kanals | Sarai Naurang | Illegal | 0 | 0 |
| 19. | Malik Saad Town | 76 Kanals | Sarai Naurang | Illegal | 0 | 0 |
| 20. | Al-Haram Town | 242 Kanals | Sarai Naurang | Illegal | 0 | 50 to 60 |
| 21. | Bilawal Town | 60 Kanals | Sarai Naurang | Illegal | 20 to 30 | 40 to 50 |
| 22. | Hamid Ullah khan | 35 Kanals | Sarai Naurang | Illegal | 0 | 0 |
| 23. | Haram Town | 48 Kanals | Sarai Naurang | Illegal | 0 | 0 |
| 24. | Iftekhar Abad | 50 Kanals | Sarai Naurang | Illegal | 20 to 30 | 0 to 10 |
| 25. | Islam Abad Town | Illegal | Lakki Marwat | Illegal | 0 | 0 |

Spatial Analysis Of Housing Schemes

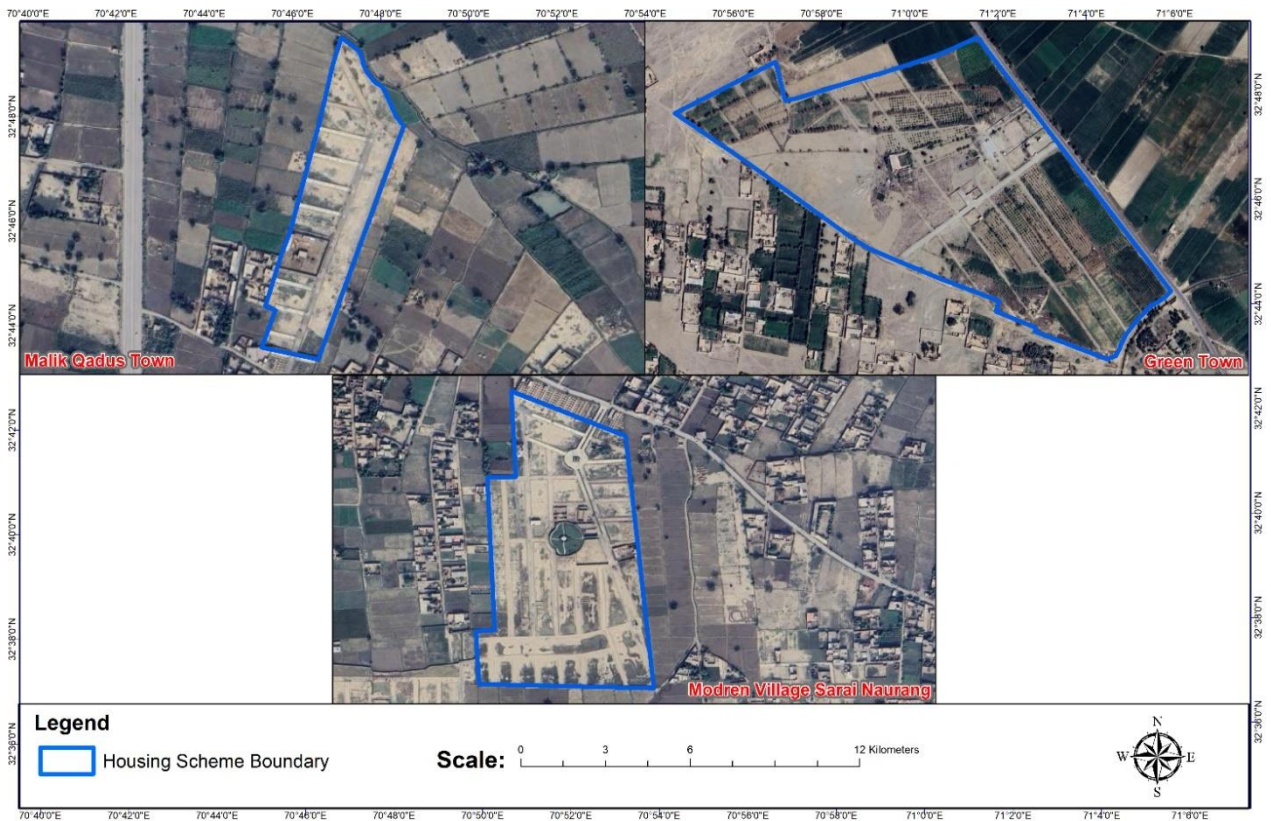


Figure 1-2: Spatial Analysis of Unapproved Housing Scheme

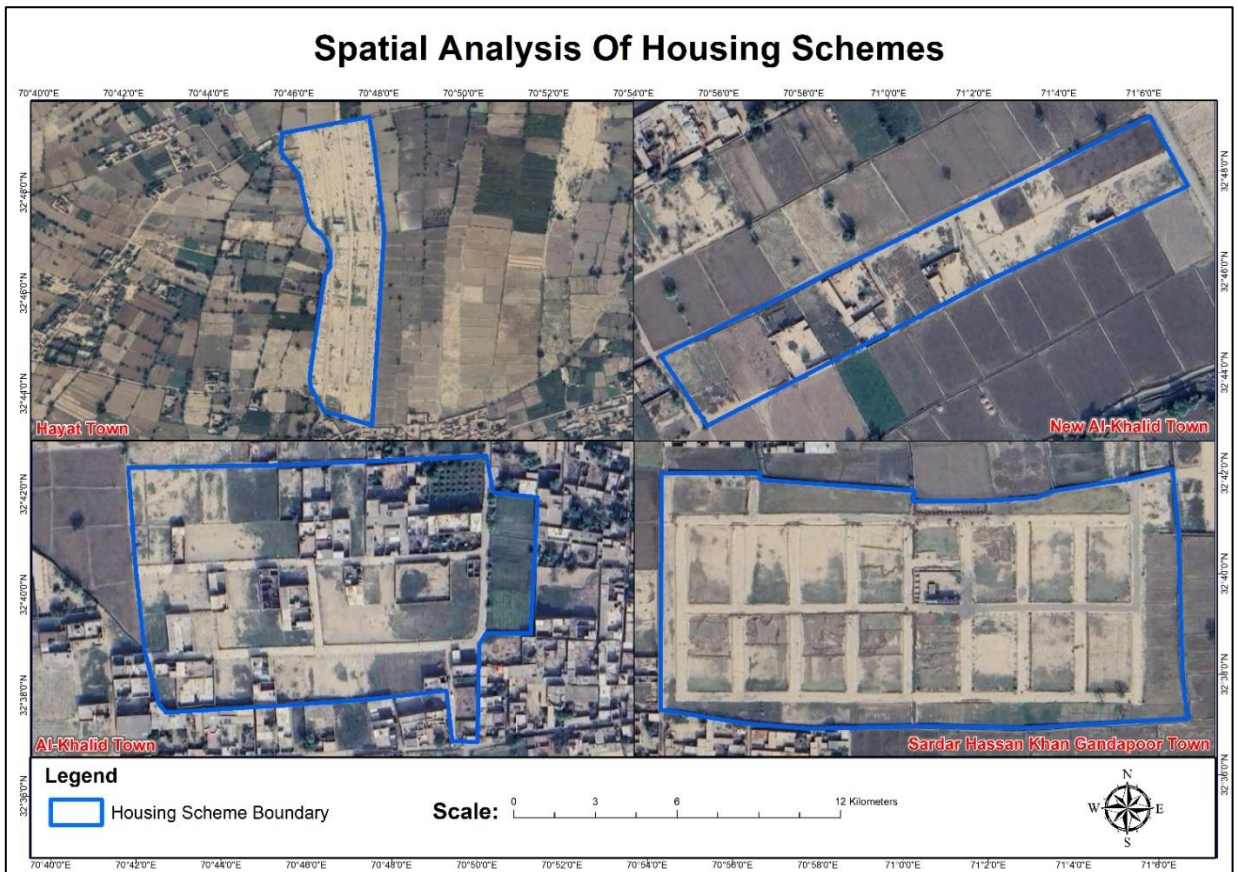


Figure 1-3: Spatial Analysis of Unapproved Housing Schemes

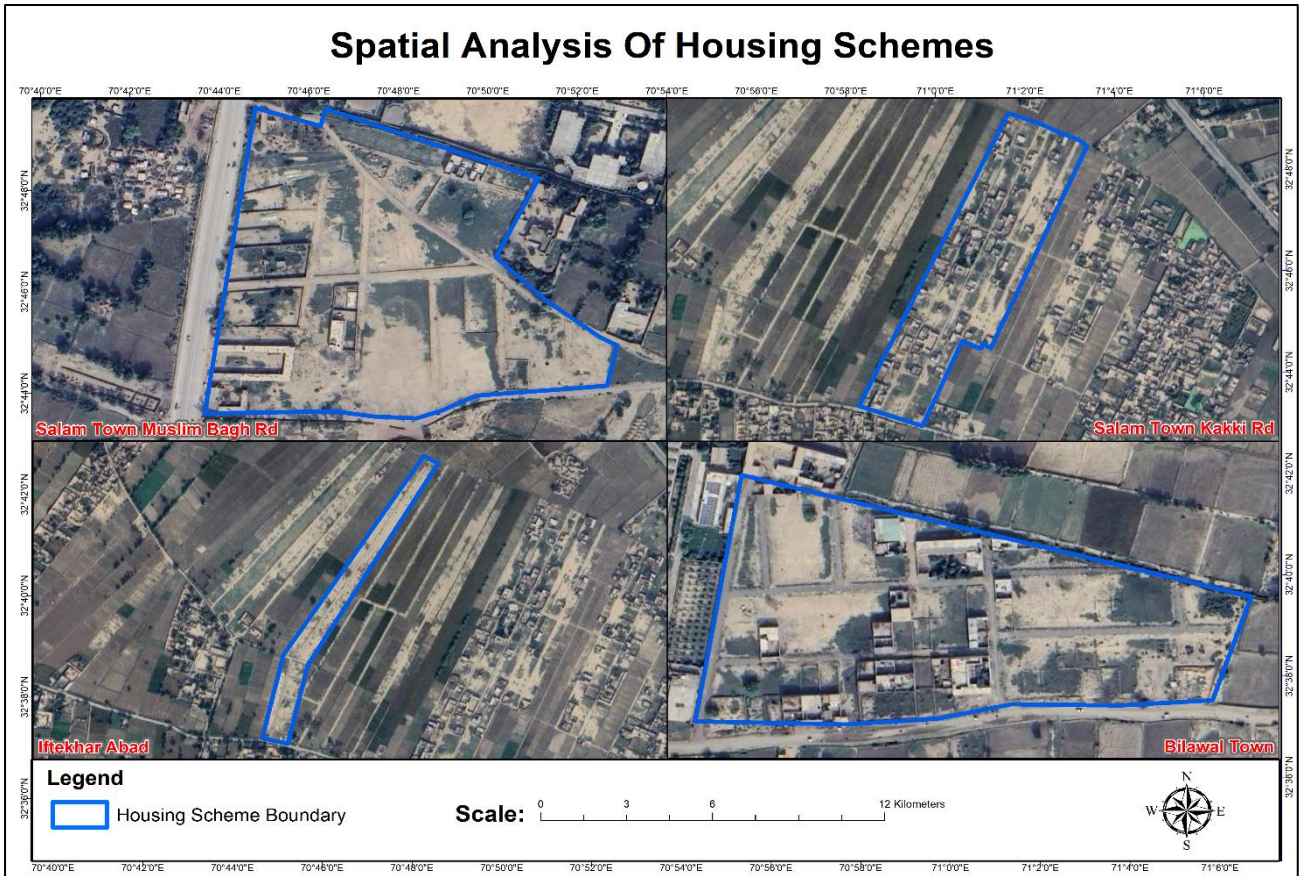


Figure 1-4: Spatial Analysis of Unapproved Housing Schemes

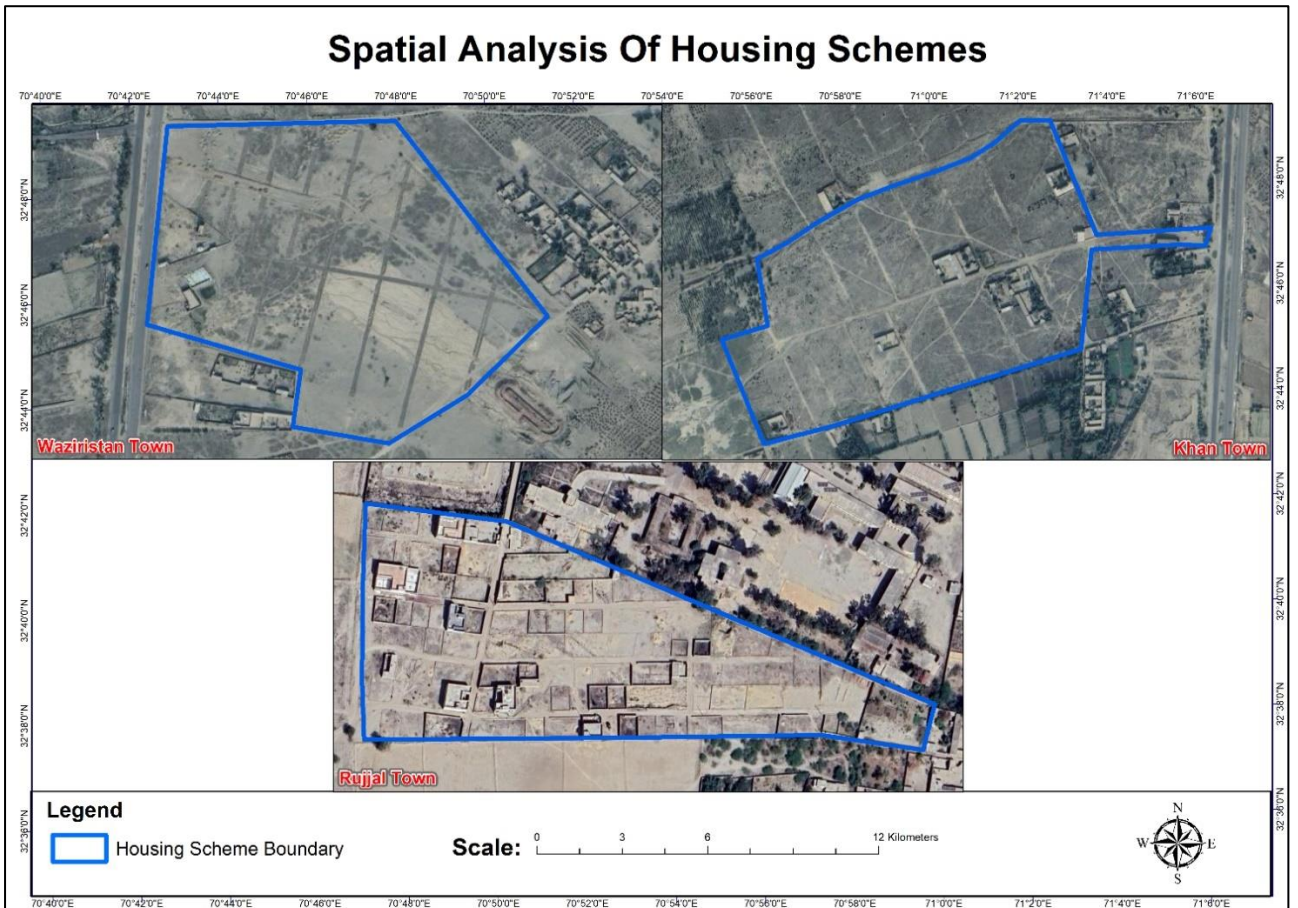


Figure 1-5: Spatial Analysis of Unapproved Housing Schemes

Spatial Analysis Of Housing Schemes

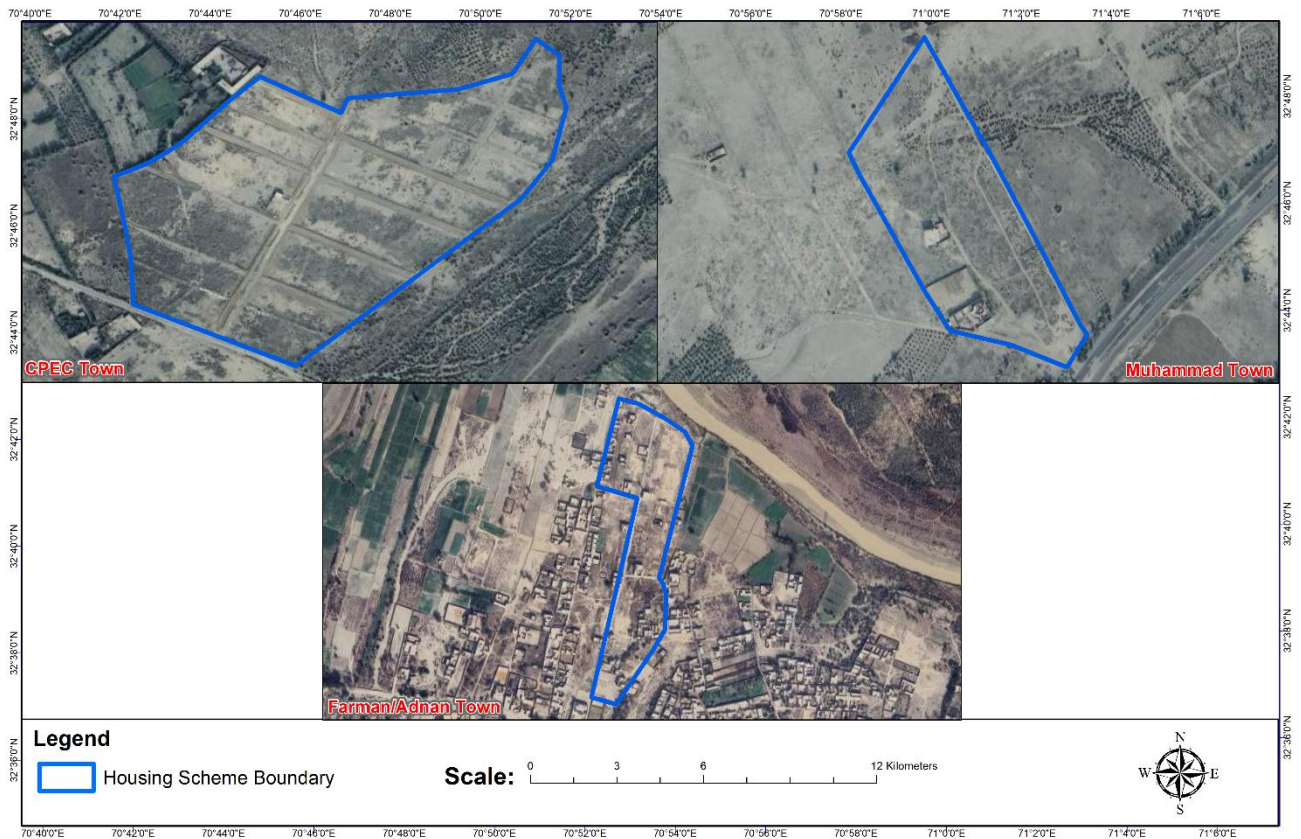


Figure 1-6: Spatial Analysis of Unapproved Housing Scheme

1.4.3 Proposed Framework for Illegal and Unapproved Housing Schemes

The way forward is focused on structured compliance and regularization within the provincial legal framework. Action should be taken in accordance with Chapter IX of The Khyber Pakhtunkhwa Housing Schemes (Planning, Development and Control) Regulations 2024, which outlines penalties for unauthorized developments. The consultant has formulated strategies and a way forward for addressing unapproved and illegal housing schemes as part of the housing scheme analysis:

1.4.4 Review and Assessment of illegal and unapproved schemes

DLUP&MC/TMAs to conduct technical review of unapproved and illegal housing schemes against KP Housing Regulations 2024 and categorize housing schemes as follows:

- **Non-Negotiable:** Demolition/Sealing of schemes located on prime agricultural land, floodplains, or hazard-prone areas. No NOCs to be considered. Initiate legal proceedings against repeat violators/developers as per KP Housing Schemes Regulations 2024.
- **Eligible for Regularization:** Schemes falling within designated **residential/mixed-use zones** of the DLUP, with full potential for compliance with KP Regulations 2024
- **Conditional Regularization:** Allow schemes on barren land or areas with feasible access that require redesign/infrastructure provision through land-use conversion rules.

Identify and document housing schemes where partial or full development has already taken place on barren land, less productive land, and prime agricultural land with feasible access, in the absence of an approved layout plan. For such schemes, detailed layouts should be prepared in line with planning standards to enable review, compliance, and possible regularization under the provisions of KP Housing Schemes Regulations 2024.

Prepare a GIS-based register of all unapproved schemes, with details on land title, location, infrastructure status, and level of conformity with the notified District Land Use Plan.

1.4.4.1 Fixed Compliance Period

The TMA shall specify a defined time period within which developers are required to fulfill all requirements for regularization. Schemes failing to comply within the given timeframe will automatically be classified as 'Illegal' and subjected to enforcement action.

1.4.4.2 Illegal Housing Schemes

For schemes that remain illegal based on the defined above criteria, a comprehensive enforcement strategy has been proposed. Key actions include:

- **Public Blacklisting:** Notify illegal schemes in gazettes, local press, and district websites to warn potential buyers.
- **Sealing & Demolition:** Stop ongoing unlawful construction, demolish built structures, and disconnect utility services.
- **Land Recovery:** Retrieve encroached state or agricultural land and restore it to its designated use.
- **No-Regularization Policy:** Apply strict cancellation unless land titles are clear, infrastructure costs are secured, and the scheme fully conforms to the Land Use Plan.
- **Community Protection:** Establish a grievance redressal mechanism to support affected buyers with guidance, compensation, and legal assistance.

1.5 Future Plan

Based on the residential zoning requirements for 2025–2045 in District Lakki Marwat, a comprehensive housing strategy has been developed for all 07 urban centers. Housing backlog figures show unmet current demand, with Naurang having the highest backlog (1402 units), followed by Lakki city with 180 units.

To calculate additional housing demand (80% of the total additional population is allocated to Lakki City and Naurang. The remaining 20% is considered for mixed-use development, whereas in other urban areas, 100% of the housing requirement will be fulfilled in the residential zone.

The future area requirements for residential development across District Lakki Marwat's urban centers reflect anticipated population growth and housing demand. Lakki City, as the district's largest urban center, requires 318 hectares of land to accommodate its projected housing needs, driven by a significant net housing demand of 11,127 units. It is followed by Naurang urban center with 8206 housing unit's requirements for which 274 hectares of land is required.

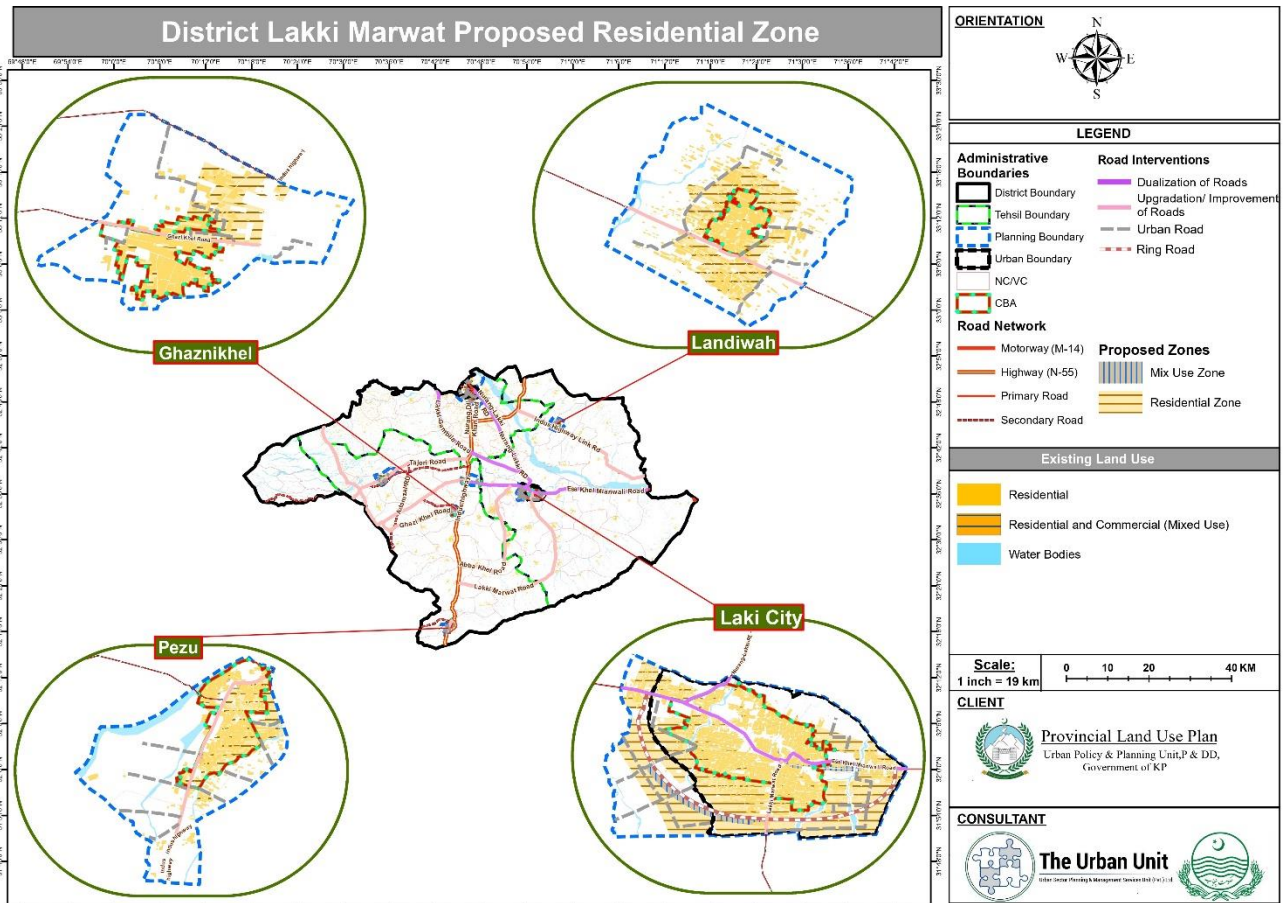
Smaller urban centers have proportionally lower requirements: Landiwa needs 57 hectares, Ghazni Khel requires 26 hectares, Tajori needs 46 hectares, Tajazai requires 39 hectares and Pezu 27 hectares. These estimates are based on proposed housing densities ranging from 20 to 35 housing units per hectare, tailored to local urban characteristics. To ensure the provision of essential infrastructure, services, and amenities, a 100% additional land allocation has been added to each center's base requirement as stated above. Infill development is subtracted from the required residential zone. The details of the residential zone requirement are **Tabulated** below.

Table 1-16: Residential Zone Calculation District Lakki Marwat

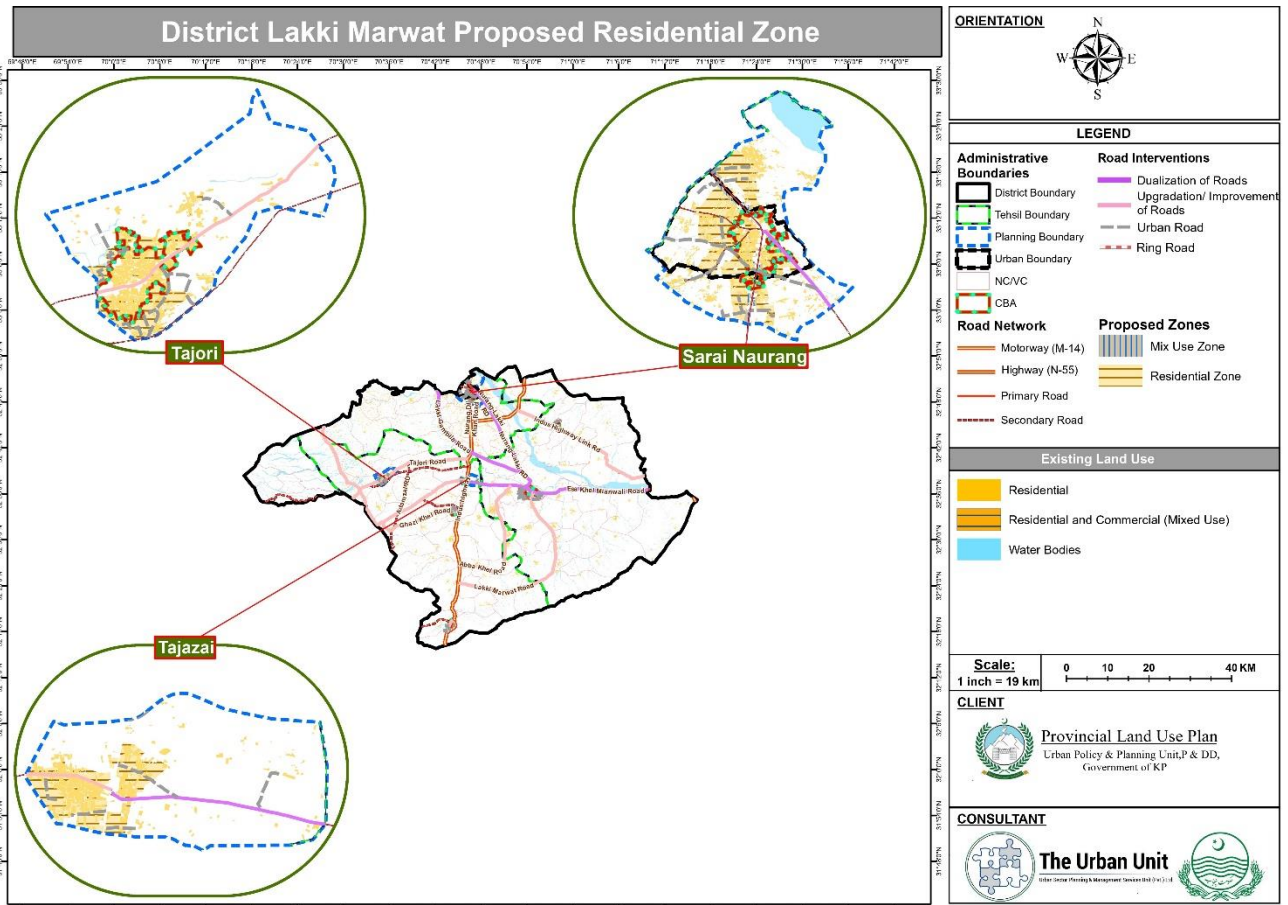
| Residential Zoning Requirements (2025-45) | Lakki City | Naurang | Landiwa | Ghazni Khel | Tajori | Tajazai | Pezu |
|--|--------------|-------------|-------------|-------------|-------------|------------|------------|
| Housing Backlog | 180 | 1402 | -162 | -239 | -1830 | -181 | -2067 |
| Additional Population 2025-45 (other than Mix Use) | 64263 | 47356 | 10823 | 3935 | 7369 | 8219 | 6505 |
| Additional Housing Demand 2025-45 | 10948 | 6804 | 1422 | 524 | 1141 | 973 | 928 |
| Net Housing Demand | 11127 | 8206 | 1422 | 524 | 1141 | 973 | 928 |
| Proposed Housing Density (Housing Unit Per Hectare) | 35 | 30 | 25 | 20 | 25 | 25 | 35 |
| Future Area Requirement | 318 | 274 | 57 | 26 | 46 | 39 | 27 |
| 100% Additional area for Services and Amenities | 318 | 274 | 57 | 26 | 46 | 39 | 27 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--|------------|------------|------------|-----------|-----------|-------------|-----------|
| Total Zone Area Required (A) | 636 | 548 | 114 | 52 | 92 | 78 | 54 |
| Infill Development (B) | 41.2 | 41 | 7.9 | 7.16 | 20 | 4.4 | 33.6 |
| Required Residential Zone (A-B) | 595 | 506 | 106 | 45 | 72 | 73.6 | 19 |



Map 1-3: District Lakki Marwat Proposed Residential Zones



Map 1-4: District Lakki Marwat Proposed Residential Zones

1.5.1 Residential Zone Locational Criteria

The allocation of residential zones across various urban centers of District Lakki Marwat is based on criteria, including accessibility, land availability, existing land use, proximity to employment centers, and access to basic utilities, amenities, and public services. Each proposed zone has been identified through a careful analysis of urban growth trends, current development patterns, and future infrastructural expansion.

1.5.1.1 Lakki City

The proposed residential zone within Lakki Marwat's planning boundary has been sited to follow the city's existing services and physical features, with particular attention to protecting agricultural land and maximizing access to infrastructure. By concentrating new housing toward the southwest and southeast sectors, the plan steers built-up growth away from the most productive farmland that rings the urban edge. This approach preserves rural livelihoods and food-producing capacity while still accommodating population growth within an orderly urban footprint.

The layout also aligns residential neighborhoods with established transport corridors and service networks to ensure efficient connectivity and service delivery. A continuous ring road functions as the primary mobility spine, providing direct links between the proposed housing areas, the city core, industrial and commercial districts, and regional routes. Locating industry and commerce along this corridor supports efficient logistics and creates a buffer between heavier land uses and quieter residential streets. Taken together, the scheme promotes phased, service-led expansion: it conserves prime agricultural soil, leverages existing infrastructure, and follows the city's historical growth directions to create a more accessible, balanced, and sustainable urban form for Lakki Marwat.

1.5.1.2 Naurang

The proposed residential zone for Sarai Naurang articulates a service-led and conservation-minded approach to urban expansion within the designated planning boundary. Residential development is concentrated around the existing built-up core and along established arterial corridors to leverage current utilities and reduce the need for extensive new infrastructure, while extensive tracts of prime agricultural land at the urban fringe are deliberately preserved to protect rural livelihoods and food production. A continuous ring and radial road network, together with a proposed bus terminal near the southern gateway, form the primary mobility spine that links neighborhoods to commercial and industrial nodes; locating higher-intensity economic uses along these corridors improves logistical efficiency and provides a buffer between heavy activities and residential areas. Overall, the scheme advances phased, accessible, and sustainable growth by aligning new housing with service capacity, minimizing encroachment on productive land, and guiding expansion along the city's historic development axes.

1.5.1.3 Ghazni Khel

In Ghazni Khel, we have identified a proposed residential zone that aligns with the current land use and connectivity. This area is conveniently connected through the Dera Ismail Khan Road and Ghazi Khel Road. It features a blend of existing residential development alongside some vacant and barren land, which has been set aside for future residential purposes to meet the growing needs of urban expansion. We appreciate any feedback or collaboration on this initiative.

1.5.1.4 Tajori

The Tajori residential proposal is anchored along Tajori Road and the Indus Highway, ensuring easy access from both routes. This layout aligns with the urban growth pattern of land use, promoting higher-density housing near the corridors and preserving green spaces on the periphery. Residents can conveniently reach essential services, schools, and commercial areas via the main thoroughfares, while pedestrian-friendly streets and transit links encourage sustainable mobility. The design integrates mixed-density blocks with lake/green buffers, maintaining scenic views and hillside protections as part of responsible development.

1.5.1.5 Pezu

The residential zone proposed in Dara Pezu is strategically located with direct connections to DI Khan/Lakki Marwat Road (south), Tank-Indus highway link road (north-west), and National highway-N 55 Road (north-east). Its proximity to the Central Business District (CBD) and the proposed industrial zone ensures accessibility to employment hubs. The area already contains significant built-up residential land, which justifies its inclusion in the residential zone.

1.5.1.6 Tajazai

The proposed residential zone for the Tajazai urban area is intended to encompass the existing built-up area to address housing needs across all subzones. In addition, accessibility to transportation has been considered to mitigate anticipated traffic congestion. The Tajazai proposed residential zone is situated along National Highway, intersecting Essa Khel Road and Marwat Canal Road, and provides a connection between Tajazai and Dera Ismail Khan.

1.5.1.7 Landiwa

The proposed residential zone in Landiwa is accessible via the National Highway and Landiwa Road. Existing land-use data indicate substantial built-up residential areas, rendering this location suitable for additional residential development. Furthermore, proximity to extensive barren land, dispersed existing industries, and an adjacent proposed industrial zone will offer employment opportunities for residents, thereby enhancing the economic viability of this residential zone.

1.5.2 Mixed Use Calculation of Urban Centers

The mixed-use zone has been allocated under the residential zone. The consultant also reviewed international examples of population distribution within mixed-use zones, where typically 10% to 40% of the population resides in such areas. These case studies provided valuable insights into the effectiveness and functionality of mixed-use development in diverse urban contexts^{12,13}. Based on this analysis, the consultant allocated **20%** of the additional population to mixed-use zones in Lakki City and Naurang Urban center due to their relatively higher populations.

The proposed density for mixed-use zones is determined based on existing residential density patterns and guided by the **KP Urban Policy (2022–2030)**, which recommends balanced allocations of 40–60% for economic use, 30–50% for residential, and 10–20% for public amenities. In line with these guidelines, the Consultant has adopted the following standards:

- 40% for residential usage
- 40% for mixed-use
- 20% for public amenities/utilities

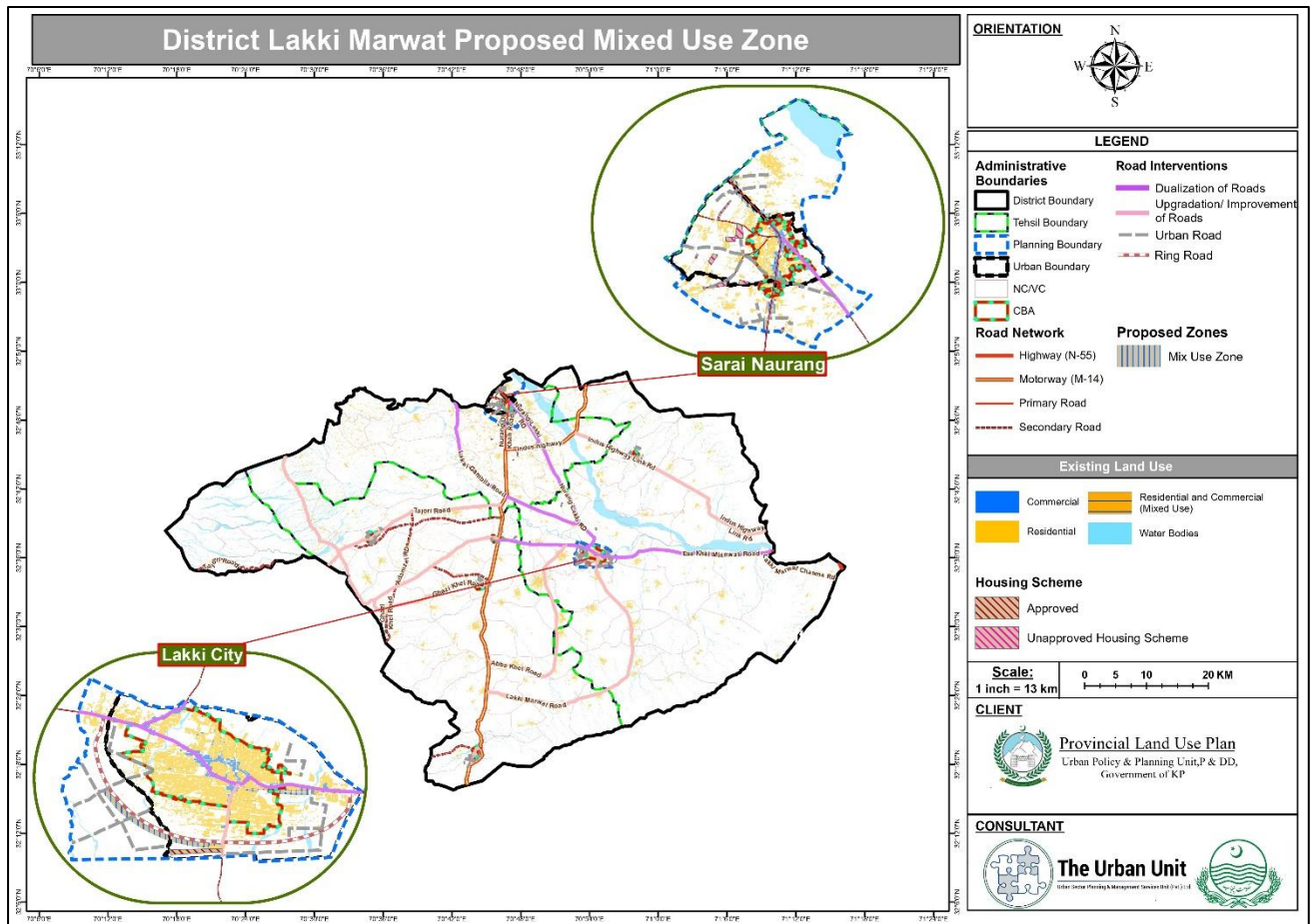
Accordingly, the proposed mixed-use density for Lakki Marwat District urban centers has been developed to reflect both local settlement patterns and policy directions. The **Table** below presents the allocation for mixed-use zones across the urban centers of Lakki Marwat District.

Table 1-17: District Lakki Marwat Mixed-Use zones

| Urban Center | Mixed-use Population (20% of additional population between 2025-2045) | Proposed Density (PPH) | Area Required (Hectares) |
|--------------|---|------------------------|--------------------------|
| Lakki City | 16066 | 300 | 53.55 |
| Naurang | 11839 | 250 | 47.36 |

¹² *Evaluating the challenges and impacts of mixed-use neighborhoods on urban planning: an empirical study of a megacity, Karachi, Pakistan*

¹³ *Evaluative structure of perceived residential environment quality in high-density and mixed-use urban settings: An exploratory study on Taipei City*



Map 1-4: District Lakki Marwat proposed Mixed-use Zones

1.5.2.1 Mixed Use Zone Locational Criteria

The allocation of mixed land use zones across District Lakki Marwat is based on key criteria, including accessibility from major roads, the existing pattern of mixed-use development, and the availability of suitable land.

In Lakki Marwat City, mixed land use zones are proposed at multiple strategic locations:

- A zone is proposed on the **southwestern side of the city** along the proposed ring road. The area consists of barren land and is surrounded by proposed residential, commercial, recreational, and health zones, making it a suitable location for mixed-use development.
- Another mixed-use zone is located on the **eastern side of the city** along the Essa Khan–Mianwali Road. This area already includes established residential and commercial activities, making it an ideal location for mixed-use development.

In Serai Naurang Urban Area, the proposed mixed land use zones are located on the northwestern and southwestern sides of the urban area:

- The **northwestern mixed-use zone** lies along both sides of the main **Bannu–Naurang Road**, where residential and commercial activities are already established, making it a prime location for mixed-use zoning.
- The **southwestern mixed-use zone**, also located along the **Bannu–Naurang Road**, features existing built-up areas with residential and commercial functions, making it a well-suited location for mixed use zoning.

1.5.2.2 Efficient Land Utilization through Mixed-Use Development

In the Lakki Marwat District Land Use Plan, mixed-use zones have been proposed in Lakki City and Naurang urban centers to promote compact growth and land preservation. By integrating residential and

commercial functions within the same area, mixed-use development enables higher densities, vertical expansion, and reduces the need for additional land. Accommodating 20% of the projected urban population through densification will substantially curtail outward sprawl.

The analysis of land requirements under existing versus proposed mixed-use densities demonstrates the efficiency of compact development. A total population of **27,905** persons is allocated to mixed-use zones across the two urban centers. Under existing population density levels, this would have required approximately **176 hectares** of land. However, through the adoption of higher mixed-use densities, only **103 hectares** are proposed, resulting in a net preservation of **73 hectares**. Naurang accounts for the largest share of savings (**42.4 hectares**). This reflects how mixed-use zoning not only accommodates projected population growth but also minimizes land consumption, supports compact urban form, and safeguards valuable agricultural and rural land resources.

The **Table** below presents the area allocated to mixed-use zones along with the land saved through densification.

Table 1-18: Efficient Land Utilization through Mixed-Use Development

| Urban Center | Population allocated for Mixed Use Zones | Existing PPH | Land area Required as per Existing PPH | Area allocated for Mixed-Use as per proposed mixed-use density | Land preserved due to densification |
|--------------|--|--------------|--|--|-------------------------------------|
| Lakki City | 16,066 | 194 | 82.81 | 52.18 | 30.63 |
| Naurang | 11,839 | 127 | 93.22 | 50.82 | 42.40 |
| Total | 27,905 | 159 | 176.03 | 103 | 73.03 |

1.6 Phase-wise Development

1.6.1 Short term (2025–30 years)

1. Governance and Permitting

The District Land Use Planning and Management Committee (DLUP&MC) shall remain fully functional to regulate and oversee urban growth in accordance with the approved District Land Use Plan. Its core responsibilities include:

- **Urban Expansion Control:** Ensure all post-2025 growth follows approved zoning; prohibit ribbon and leapfrog development outside designated schemes.
- **Proposal Screening:** Apply “No-Build” overlays on flood, canal, and high-tension buffers; vet all conversion and housing proposals for zoning compliance.
- **Enforcement:** Issue stop-work orders, demolish unauthorized structures, and mandate compliance or reconstruction where needed.
- **Developer Regulation:** Prevent developers from operating without valid approvals or in violation of planning permissions.
- **Inter-Agency Coordination:** DLUP&MC to coordinate with TMAs, WSSCs, and district bodies to align land use with infrastructure and services.

2. Regularization of Unapproved, and Illegal Housing schemes

The assessment of approved, unapproved, and illegal housing schemes highlights significant regulatory gaps that demand immediate corrective action. In accordance with the Khyber Pakhtunkhwa Housing Schemes (Planning, Development and Control) Regulations, 2024, and as detailed under Section 1.5.12, a framework for assessment and regularization has been established. To reinforce and operationalize this framework, the following measures are proposed:

- **Transparency & Accountability:** Establish and regularly update a district-level White List / Black List of schemes, published through TMAs and endorsed by the Provincial Authority, to provide clarity on compliant versus non-compliant projects.
- **Buyer Safeguards:** Mandate developer escrow accounts for all regularized schemes to guarantee that collected funds are used exclusively for the provision of infrastructure and services.
- **Public Information Access:** Develop a user-friendly online portal through designated government body) to publish the real-time status of housing schemes, enabling citizens to verify approvals and make informed decisions.

3. Regularization of Mixed-Use Zones

To support compact growth and reduce pressure on pure residential zones, selected corridors within urban areas will be promoted as mixed-use (Commercial cum residential zone). In line with the KP Urban Policy (2022–2030), land use within these zones shall be structured as: 40% Commercial, 40% Residential, and 20% Other Uses (institutional, recreational, civic amenities, etc.).

- **Zoning & Building Control Adjustments:** Apply KP Model Building Bye-Laws under chapter 4 to permit ground-floor commercial with upper-floor residential, ensuring that institutional and community uses occupy the mandated 20%. FAR, setbacks, and parking standards will be modified for compactness and walkability.
- **Incentivize Compliance:** Fast-track plan approvals and offer density bonuses for private developers.
- **Integrated Service Provision:** Ensure roads, drainage, waste management, street-lighting, and public transport stops are upgraded along these corridors to support higher density and activity.
- **Monitoring & Phasing:** DLUP&MC to track adherence to the 40:40:20 land-use balance.

4. Initiate Land Acquisition for Public Facilities

- Begin phased land acquisition for public buildings, community facilities, and service infrastructure (schools, hospitals, parks, internal access roads, and right-of-way) in newly declared urban centers, ensuring availability of civic amenities alongside housing development.

5. Landfill-to-Residential Conversion (Domel)

- **Closure & Capping:** Immediately close the existing landfill, apply engineered capping (compacted clay + geomembrane + topsoil) to prevent leachate and gas escape.
- **Environmental Remediation:** Conduct soil and groundwater testing; install leachate collection drains and methane venting wells to stabilize the site.
- **Buffer & Greenbelt:** Maintain a peripheral green buffer (minimum 50–100 m) planted with deep-rooted vegetation to absorb residual emissions.
- **Phased Rehabilitation:** Use the capped site initially for non-sensitive uses (e.g., open parks, community green spaces, sports grounds) for 5–7 years before allowing housing.
- **Monitoring & Certification:** Coordinate with KP-EPA and PHED for remediation certification before any residential conversion.

1.6.2 Long Term (2031–2045)

1. Urban Growth Boundary Management

- **Urban Growth Boundaries:** Notify the proposed urban growth boundaries. Any modification shall strictly follow the legal process under the KP Land Use & Building Control Act, 2021, including public notification, hearing of objections, and approval by the Provincial Land Use & Building Control Authority.
- **Periodic Land Use Reviews:** Institutionalize a 5-year review cycle by the DLUP&MC to reassess residential land allocations against updated population projections, housing demand, and service delivery capacity.

- **Legal Enforcement:** Enforce KP Private Housing Schemes Rules 2021 and KP Model Building Bye-Laws 2017 to prevent the emergence of informal colonies, unauthorized plot fragmentation, and non-compliant vertical construction. Integrate GIS-based monitoring and satellite imagery analysis to detect and act against violations.

2. Resilient & Livable Neighborhoods

- **Complete Neighborhoods:** Plan every new residential sector as a self-sufficient neighborhood with drainage systems, open/green spaces, schools, health centers, religious/community facilities, and commercial hubs within walking distance, consistent with KP Urban Policy 2022–2030.
- **Climate-Resilient Design:** Enforce climate-responsive layouts, including north–south street orientation for natural ventilation, shaded pedestrian routes, and heat-resilient building materials. All new housing schemes should incorporate flood-resilient drainage, earthquake-resistant structures, and heat-wave mitigation measures (e.g., reflective roofing, tree cover).
- **Infrastructure Integration:** Synchronize housing expansion with investments in trunk infrastructure, bulk water supply, solid waste management systems, power substations, planned public transit corridors, and sewerage treatment plants (STPs) in urban areas. No housing scheme should be approved without verified access to trunk infrastructure capacity.
- **Green Infrastructure:** Mainstream sustainable systems, including rooftop solar, rainwater harvesting, decentralized wastewater recycling, and urban forestry belts along highways, canals, and neighborhood peripheries.

2 Communication

Communications are an integral component of the socio-economic functions of an administered area, having direct and indirect impacts on quality of life, agriculture, tourism, commerce, industry, and security. The movement of people and goods within and throughout District Lakki Marwat is therefore highly influential to the quality of life, economy, and safety of its residents; thus, making transportation a critical component of any spatial intervention, particularly the Land Use Plan.

Communication infrastructure, such as highways, terminals, and bridges, consumes substantial amounts of land. In urban settings, roads alone comprise between 20% and 30% of land space. Therefore, it is necessary to optimize the quantity of land reserved for communications infrastructure such that long-term transportation needs are satisfied while leaving ample space for other land uses.

The communications plan has been prepared for the Lakki Marwat District to enhance the following in the district:

- Road Infrastructure
- Public and Goods Transport
- Rail Network
- Air Transport Facilities
- Postal services and
- Telecommunication Services

2.1 Baseline Data

This report utilized the collected primary and secondary data discussed herein to develop the communications context for District Lakki Marwat.

2.1.1 Primary Data

Two-way traffic counts and Origin-Destination (OD) Interviews surveys were conducted in the district. Further, Bus terminals, truck stands, telecommunication, postal services, and cellular towers were marked in the land-use survey.

2.1.1.1 Traffic Counts

Traffic counts were used to observe daily traffic volumes along the important roadways of District Lakki Marwat and identify existing roadway constraints and candidate roads for geometric improvements i.e., widening or dualizations.

The surveyed roads and their count locations were selected based on the following criteria in consultation with Client:

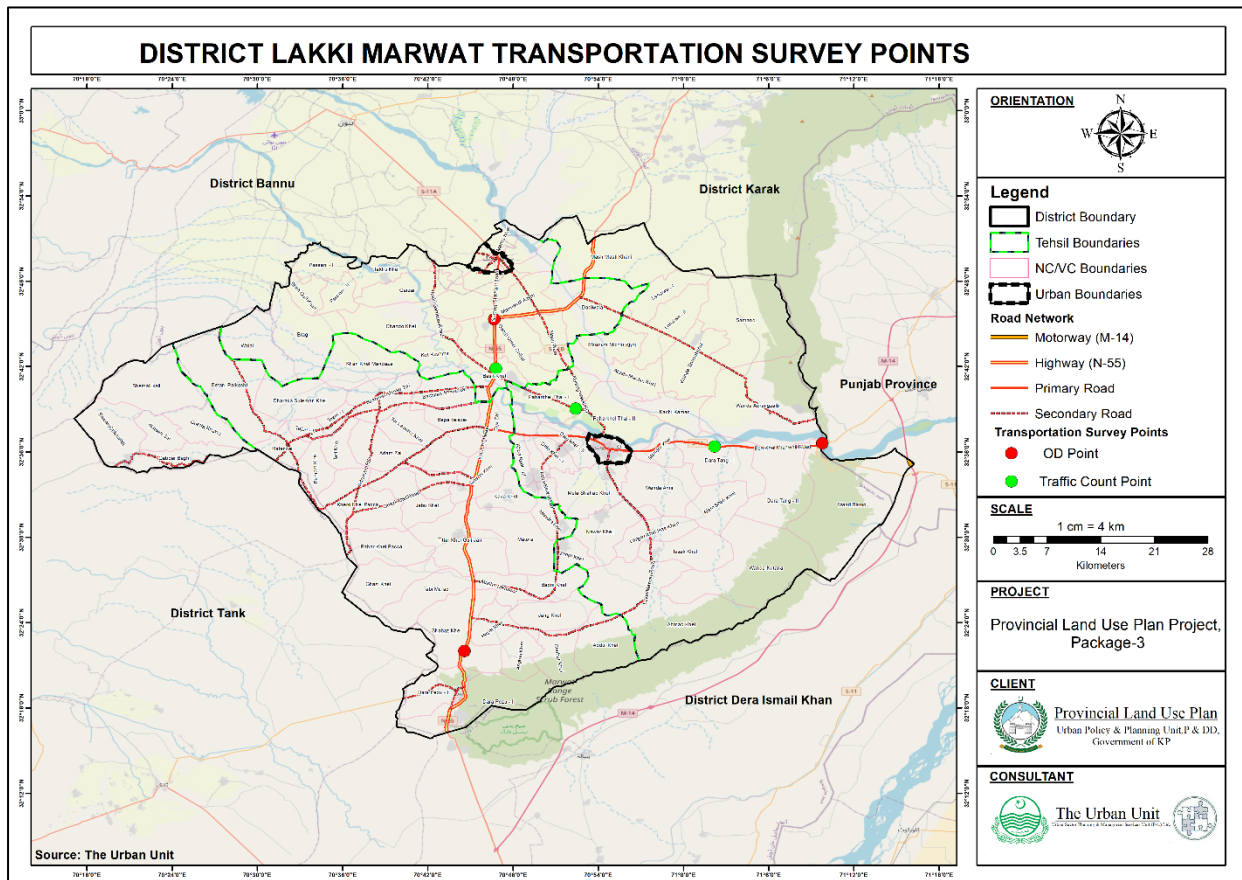
- a. The subject road is a major Provincial Transportation Corridor i.e. It is a primary road or provincial highway.
- b. Road is not a National Highway as traffic data can be obtained from the National Highway Authority.
- c. The road provides inter-district connectivity; and
- d. Road provides access to major settlements.

Nine (9) hour-Traffic counts were conducted over a period of 6 days at 30-minute Intervals from 8 am to 5 pm to capture typical weekday and weekend conditions. Due to the area's emphasis on industry, commerce and trade, both weekday and weekend patterns have been considered.

2.1.1.2 Origin-Destination Interviews

Roadside interviews were conducted near Lakki Marwat's inter-district boundaries to determine the popular origins and destinations of travelers in and out of District Lakki Marwat.

The locations for the traffic count and Origin Destination surveys are shown in Map 2-1. These locations were approved by the Client prior to initiation of the survey activities.



Map 2-1: Transportation Survey points of District Lakki Marwat

2.1.2 Secondary Data

In addition to the primary traffic and infrastructure data collected from the traffic counts and land use surveys, the following secondary data sources were consulted to develop the communications context of District Lakki Marwat:

- i. Existing Road inventory and ongoing and future development plans from the respective departments:
 - a. Communication & Works
 - b. National Highway Authority
 - c. Pakhtunkhwa Highway Authority
- ii. Published Annual Development Program from the *KP Planning & Development Website*
- iii. Bus and Truck Stand data along with route permits and goods forwarding agency information from:
 - a. District Regional Transport Authority.
 - b. Provincial Transport Authority.
- iv. Airport Facilities Layouts from Satellite Imagery.
- v. Airport Operational Data from Civil Aviation Authority.
- vi. Post Office Locations from Pakistan Post Master General.
- vii. Ongoing and Future Development Plans for Railway Infrastructure from Pakistan Railways (Divisional Office Peshawar).
- viii. Existing Telephone Exchanges and Network Data from Pakistan Telecommunication Company Limited (PTCL).

The secondary data sources were used to develop the maps in the following sections for determining the spatial coverage of the various communications services. Gaps and unserved areas were identified accordingly.

2.1.3 Data Limitations

While the obtained secondary data was utilized to develop the necessary study area context and growth projections, the limitations of the obtained data are summarized in **Table**.

Table 2-1: Limitations of Obtained Secondary Data

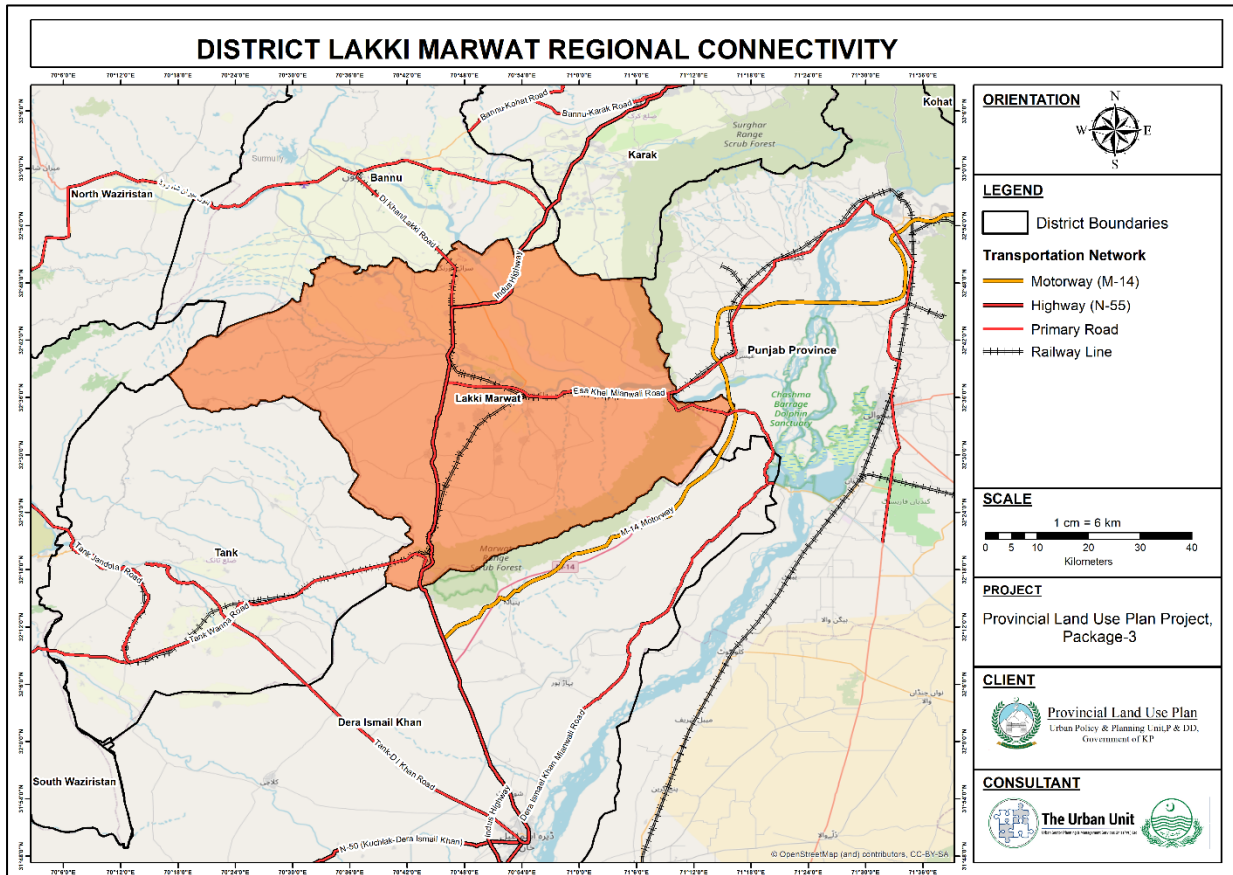
| Secondary Data Type | Year | Limitations |
|---|------|--|
| Existing Road inventory and ongoing and future development plans from the respective departments: <ul style="list-style-type: none"> - Communication & Works - National Highway Authority - Pakhtunkhwa Highway Authority | 2023 | <ul style="list-style-type: none"> i. Ongoing road improvement data provided by the PKHA only identifies the name of the subject roads. ii. Nature of works is not explicitly mentioned. Assumed to be general improvement works. iii. Ongoing schemes provided by NHA do not have expected completion dates or status. However, they have still been included for reference. |
| Published Annual Development Program from KP Planning & Development Website | 2023 | <ul style="list-style-type: none"> i. Available Data does not provide expected completion dates. |
| Bus and Truck Stand data along with route permits and goods forwarding agency information from: District Regional Transport Authority. Provincial Transport Authority; | 2023 | <ul style="list-style-type: none"> i. Data provided by DRTA contains no information about any existing truck stands in its jurisdiction. |
| Airport Facilities Layouts from Satellite Imagery; | N/A | <ul style="list-style-type: none"> i. No Commercial Airport exists in Lakki Marwat. |
| Airport Operational Data from Civil Aviation Authority; | N/A | <ul style="list-style-type: none"> i. No Commercial Airport exists in Lakki Marwat. |
| Post Office Locations from Pakistan Post Master General; | 2014 | <ul style="list-style-type: none"> i. Provide data is from 2014, which is 9 years old ii. Post office locations obtained by the Post Offices in Lakki Marwat only contain post office names without addresses or coordinates. iii. Locations of existing post offices have been inferred from the post office names. |
| Ongoing and Future Development Plans for Railway Infrastructure from Pakistan Railways (Regional Office Peshawar); | 2022 | <ul style="list-style-type: none"> i. Future Plans provided by Pakistan Railways were general to province and not specific to District Lakki Marwat. |
| Existing Telephone Exchanges and Network Data from Pakistan Telecommunication Company Limited (PTCL); | 2023 | <ul style="list-style-type: none"> i. Telephone Exchange Names were provided without any other information. |

2.2 District Transportation & Communication Network Overview

2.2.1 Road Infrastructure

District Lakki Marwat, spanning 3150 square kilometers, strategically borders D.I. Khan and Bannu District. It also shares boundaries with District Karak, Tank, Mianwali (Punjab), and the Tribal belt of F.R, Bhattani area. The district features a substantial 1830-kilometer road network, but investment opportunities in sectors like oil and gas exploration, agri-business, mineral value addition, and livestock. Nonetheless, local authorities manage the infrastructure, including the vital Isa Khel-Mianwali Road connecting to Indus Highway (N-55) and DI-Khan-Hakla Motorway (M-14). The District Land Use Plan

emphasizes the Karakoram Highway's alignment and accessibility, bolstering economic prospects and enhancing residents' quality of life. The key map showing District Lakki Marwat, its major roadways, and neighboring districts is provided in **Map**.



Map 2-2: District Lakki Marwat Regional connectivity

The district features an extensive road network, encompassing Highways, Expressways, Primary Roads, Secondary Roads, Local Roads, and Unpaved tracks. This network is vital for connectivity within and between neighboring districts such as Karak, Mianwali, Tank, and D.I Khan, spanning over 1830 kilometers. The management of this road infrastructure involves Federal (e.g. National Highway Authority), Provincial (Government of Khyber Pakhtunkhwa), and Local entities

Key roadways, particularly N-55 (Indus Highway), serve as lifelines for residents, facilitating both intra-district connectivity and access to neighboring districts, Karak, Mianwali, Tank, and D.I Khan.

In this section, Road geometry adequacy is evaluated by comparing the existing road widths to the recommended road widths for corresponding traffic volume criteria. Adequacy of connectivity is assessed by overlaying the road network on existing land use data. This helps identify missing links between regions, transportation routes and related land uses.

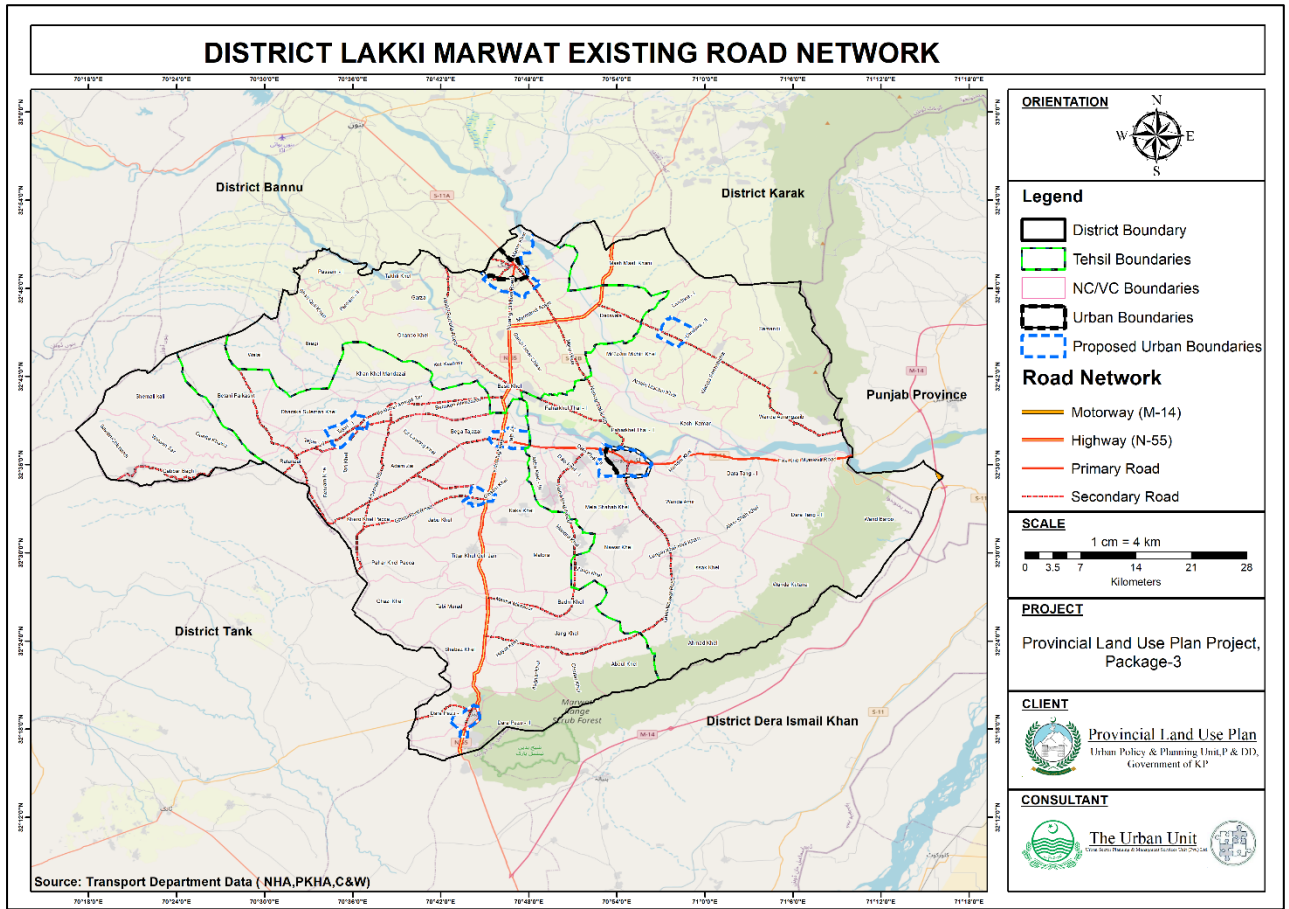
Further, the road network data collected from secondary sources and land use surveys are presented in vector format consisting of lines and polylines. These data are included in land use base maps to assess community connectivity and identify gaps. Maps highlight areas in need of new connections and exact locations are determined during the land use development phase.

The Khyber Pakhtunkhwa Annual Development Program was also referred to for identifying on-going road improvement projects in the district. These were shown on the road network map for context development. Likewise, future prospects of the road projects are also proposed in this report to develop a portrait of District Lakki Marwat's current and future connectivity with consideration to background developments.

In addition to above, the level of service of the road network was determined using the obtained traffic count data for the major transportation corridors.

2.2.2 Existing Road Network

The road network map of District Lakki Marwat is shown below in **Map** which has been developed using the digitized road inventory obtained and digitized during the Land Use survey.



Map 2-3: Road Network of District Lakki Marwat

A breakdown of District Lakki Marwat Road network is provided in the **Table** below.

Table 2-2: District Lakki Marwat Road Inventory

| Road Type | Length (km) |
|--------------------------------|-------------------|
| National Highways | 75 |
| Provincial Highways | 70 |
| Primary Roads | 1 |
| Secondary Roads | 360 |
| Local Roads | 1273 |
| Unpaved Tracks / Shingle Roads | No Data Available |
| Total | 1830 |

2.2.3 Observed Traffic Patterns

The results of the traffic count surveys, and Origin Destination surveys discussed in above section are summarized in this section.

2.2.3.1 Major Origins and Destinations

The Origin Destination survey helped identify the major trip generators and attractors for District Lakki Marwat along with trip purpose. For this analysis, popular origins, and destinations to and from Lakki Marwat have been tabulated as shown in Table 3. The purpose of the trip is indicative of whether these areas possess commercial or tourism-oriented attractors that would require improved road infrastructure for utilizing their potential.

Table 2-3: Prominent Trip Purpose for O-D Pairs with Sum of Trip Counts

| OD-Pair | Sum of Occupant Counts | Trip Purpose |
|----------------------------|------------------------|--|
| D.I. Khan -Lakki Marwat | 20 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Isa Khel-Darra Tang | 101 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Isa Khel-Lakki Marwat | 199 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Islamabad-Lakki Marwat | 95 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Kamar Mashani-Lakki Marwat | 38 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Lahore-Lakki Marwat | 137 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Mianwali-Lakki Marwat | 299 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Pezu -Lakki Marwat | 20 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Rawalpindi-Lakki Marwat | 107 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Sargodha-Lakki Marwat | 28 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Sheikh Abad-Darra Tang | 40 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Sheikh Abad-Lakki Marwat | 24 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Tank -Lakki Marwat | 48 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Dara Tang-Isa Khel | 215 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Dara Tang-Sheikh Abad | 131 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Gambila-Naurang | 180 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Gandi Chowk-Naurang | 493 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |

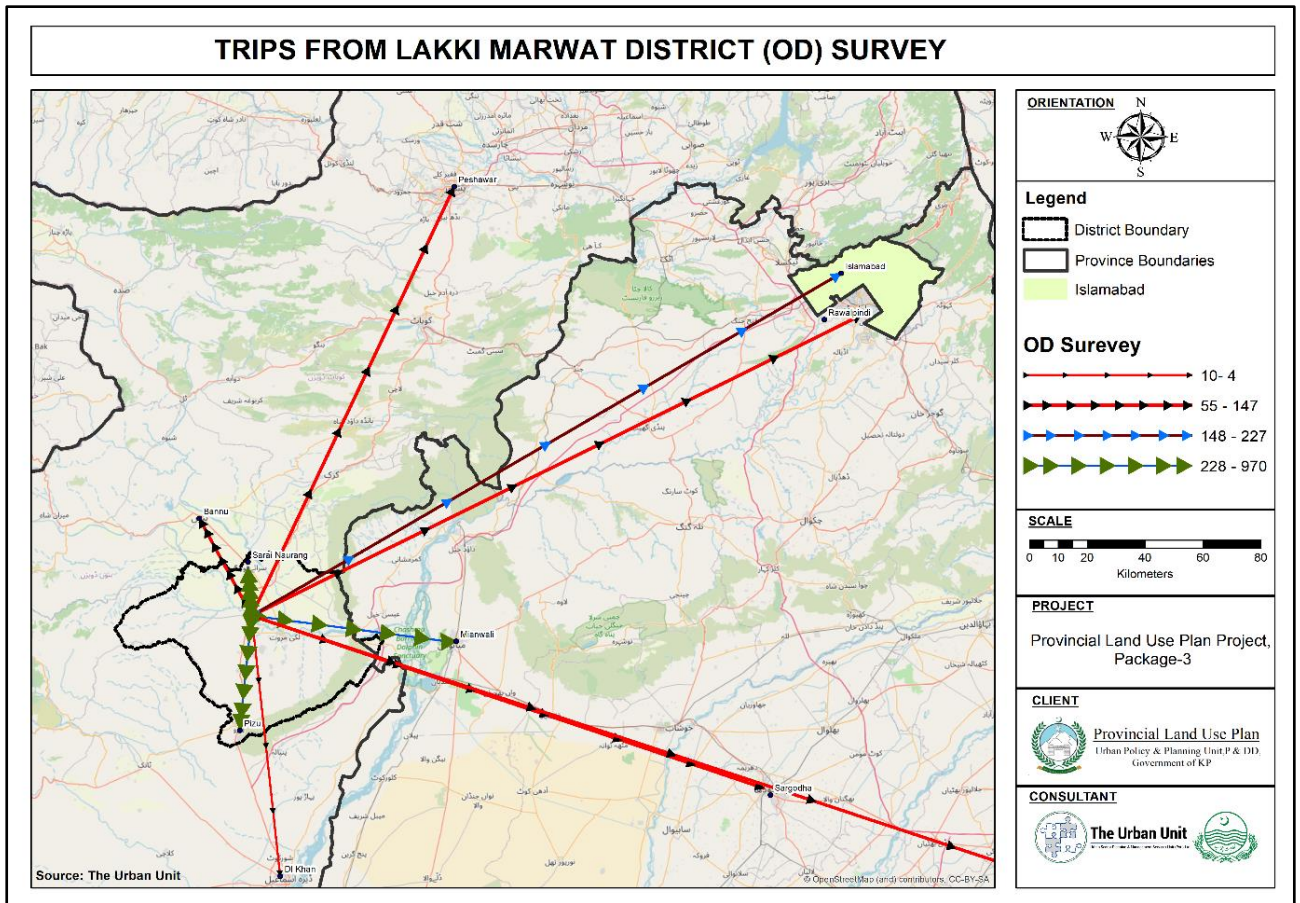
Task-C: Draft Land Use Plan of District Lakki Marwat

| | | |
|-------------------------|-----|--|
| Lakki Marwat-Bannu | 127 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Lakki Marwat-D.I Khan | 54 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Lakki Marwat-Isa Khel | 270 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Lakki Marwat-Islamabad | 227 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Lakki Marwat-Mianwali | 275 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Lakki Marwat-Naurang | 210 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Lakki Marwat-Pezu | 79 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Lakki Marwat-Rawalpindi | 114 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Lakki Marwat-Sargodha | 147 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Manjiwala-Naurang | 87 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Naurang-Pezu | 75 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Shahbaz Khel-Pezu | 444 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Tattar Khel-Pezu | 184 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| D.I.Khan -Kohat | 26 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| D.I.Khan -Peshawar | 91 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Isa Khel-Bannu | 301 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Islamabad-Bannu | 532 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Lahore-Bannu | 317 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Mianwali-Bannu | 564 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Rawalpindi-Bannu | 833 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |

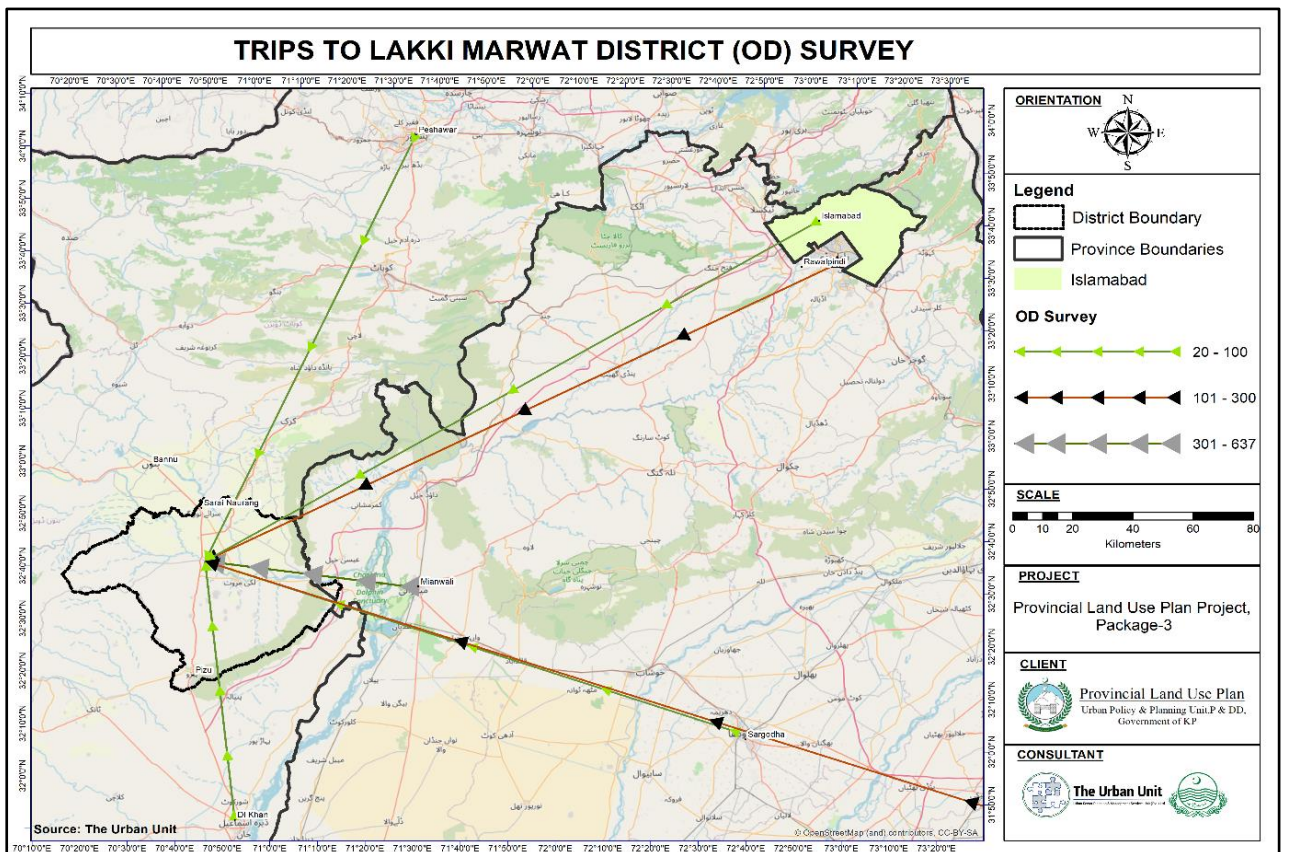
Task-C: Draft Land Use Plan of District Lakki Marwat

| | | |
|---------------------------|-----|--|
| Rawalpindi-Tank | 269 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Sargodha-Bannu | 152 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Tank -Kohat | 36 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Tank -Peshawar | 132 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Tank -Rawalpindi | 43 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Bannu-D.I Khan | 73 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Bannu-Dera Ismail Khan | 97 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Bannu-Isa Khel | 51 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Bannu-Islamabad | 204 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Bannu-Lahore | 98 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Bannu-Pezu | 68 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Bannu-Rawalpindi | 214 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Bannu-Tank | 90 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| D.I Khan-Bannu | 112 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Karak-Naurang | 62 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Kurram-Naurang | 86 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Peshawar-D.I Khan | 58 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Peshawar-Dera Ismail Khan | 101 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |
| Peshawar-Tank | 80 | From work to home/Goods Transport/Private/Personal Affairs/To Serve Passengers/To Work |

Trip purpose is used to determine the factors that influence travel in and out of a given district and help identify whether the provision and improvement of a local facility within the district could reduce the need for people to make external trips. More than 7000 Origin-Destination records were used to produce the pie charts in below Figure.

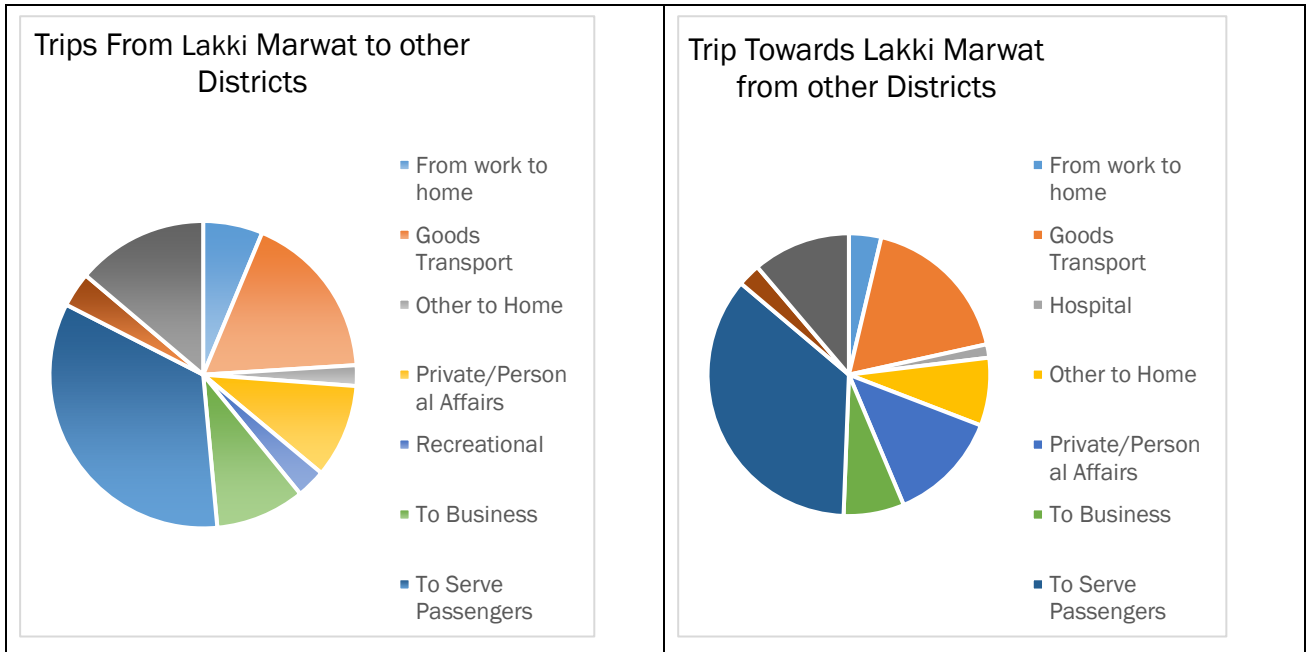


Map 2-4: Origin Destination Trips from Lakki Marwat District



Map 2-5: Origin Destination Trips to District Lakki Marwat

Figure 2-1: Trip Purpose Analysis



Trip purpose analysis for District Lakki Marwat shows that the most common reason for people to travel to and from Lakki Marwat is work or business. The trip purpose patterns for people travelling to Lakki Marwat from other districts or from other districts to Lakki are relatively the same.

2.2.3.2 Traffic Volumes

A brief overview of traffic volume is provided in the **Table**. Mode wise highest directional traffic volume on the three traffic count points in district Lakki Marwat has been summarized in the **Table**. Passenger car Unit (PCU) was calculated for various modes of traffic. Notably, the maximum traffic volume was observed on Monday, Wednesday and Thursday respectively over a period of six days.

Roads have been determined as adequate or inadequate based on the common thresholds for widening and dualization stipulated by the Punjab Planning & Development Board. **For roads having Daily Traffic Volume (VPD) of more than 800 vehicles, widening to 20/24 ft is recommended. Roads exhibiting a VPD of more than 8000 may be considered for dualization.** The traffic count analysis showing calculation of VPD, PCU and peak hour for the maximum daily traffic volume observed over a period of 6 days for each survey points.

Table 2-4: Summary of traffic volumes

| Point No | Day | Peak Hour Volume | Peak Hour | Total Volume | | Expected volume of 8000 (PCU) by the year |
|----------|-----------|------------------|---------------|--------------|------|---|
| | | | | Vehicle | PCU | |
| Point 1 | Monday | 1924 | 09:30 – 10:30 | 5494 | 7530 | 2028 |
| Point 2 | Wednesday | 350 | 08:30 – 09:30 | 2703 | 5263 | 2030 |
| Point 3 | Thursday | 452 | 08:30 – 09:30 | 2616 | 4612 | 2035 |

Table 2-5 Mode Wise Daily Traffic Volume

| Sr No | Vehicle Class | Point 1 | | Point 2 | | Point 3 | |
|-------|---------------|----------------------|-----------------|----------------------|---------------|---------------------|----------------------|
| | | 19/12/2022 Monday | | 21/12/22 Wednesday | | 22/12/2022 Thursday | |
| | | Towards Gandhi Chowk | Towards Gambila | Towards Lakki Marwat | Towards Bannu | Towards Mianwali | Towards Lakki Marwat |
| | | | | | | | |

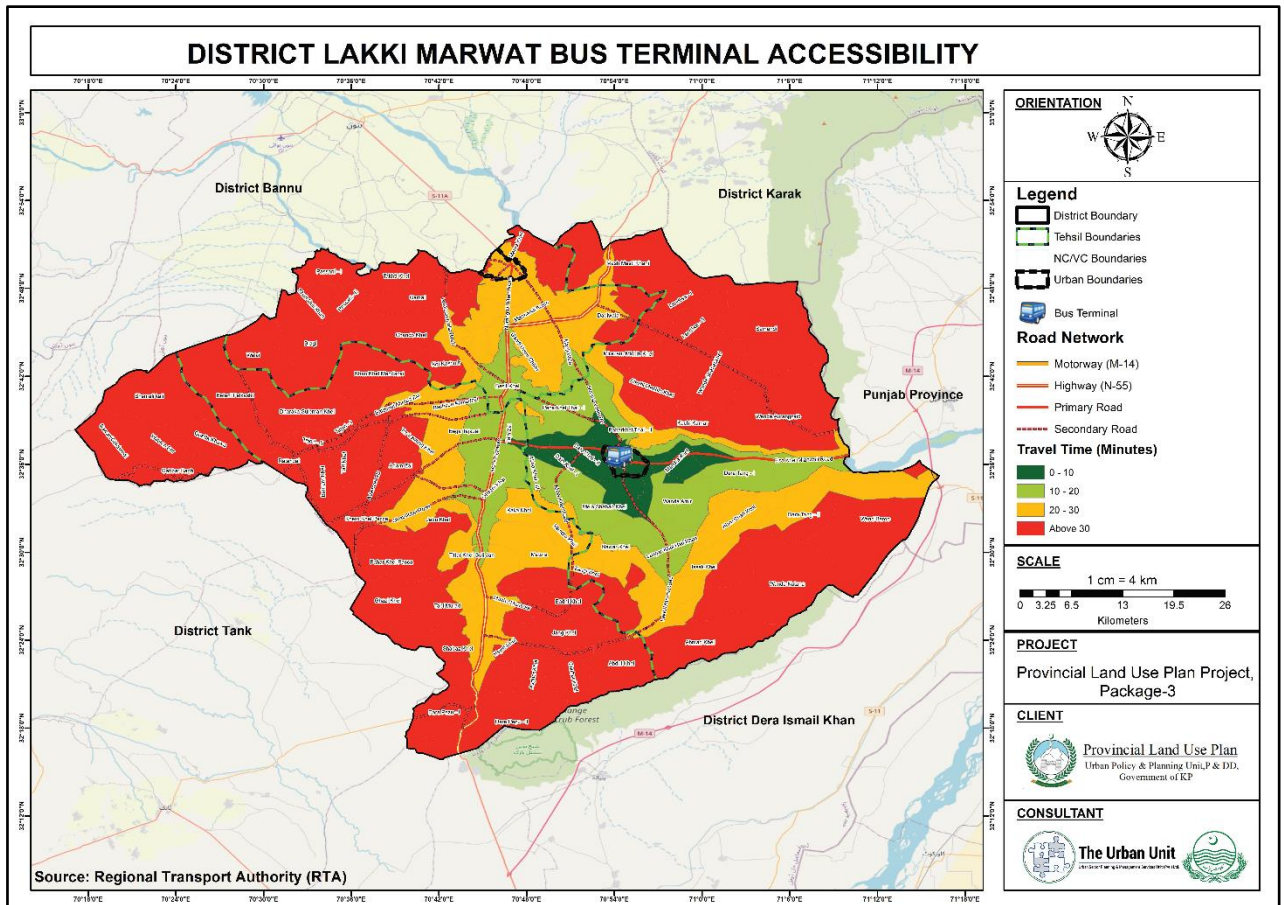
| | | | | | | | |
|---------------------------|--------------------------|------|------|------|------|------|------|
| 1 | Motorcycle/ Scooter | 995 | 590 | 630 | 619 | 1313 | 1244 |
| 2 | Rickshaw/Qi ngqi | 391 | 275 | 103 | 120 | 628 | 504 |
| 3 | Car/Jeep/Tax i | 479 | 527 | 257 | 251 | 294 | 277 |
| 4 | Suzuki/Bola n | 38 | 40 | 47 | 43 | 34 | 28 |
| 5 | Pick Up/ Hi- Ace | 403 | 364 | 102 | 125 | 148 | 174 |
| 6 | Bus/Coaster | 107 | 66 | 4 | 10 | 25 | 22 |
| 7 | Loader/Suzu ki | 140 | 125 | 100 | 75 | 121 | 109 |
| 8 | Pick up/Shezore | 59 | 193 | 34 | 50 | 97 | 74 |
| 9 | Tractor Trolley/Truck | 357 | 345 | 85 | 48 | 103 | 68 |
| Total Volume (vehicle) | | 2969 | 2525 | 1362 | 1341 | 2763 | 2500 |
| Total Volume (PCU) | | 3909 | 3621 | 1357 | 1259 | 2462 | 2149 |

2.2.4 Bus and Truck Terminals

The existing public and freight (bus and truck respectively) terminals are evaluated for coverage in terms of the cities or settlements that can access them. Those settlements that do not have any terminals in their drivable vicinity were identified based on spatial analytics.

2.2.4.1 Bus Service Accessibility

Each neighborhood in District Lakki Marwat has been analyzed for bus terminal accessibility in terms of drive time to the nearest terminal. Those areas have a bus terminal within a 0-10-minute drive, 10-20-minute drive 20-30-minute and above 30 minutes. Areas lying within the 20-30-minute and 30- minutes are deemed to be underserved and may be candidate localities for new terminals. Map illustrates the existing bus terminals' accessibility in District Lakki Marwat.



Map 2-6: Existing District Lakki Marwat Bus Terminals Accessibility Map

2.2.4.2 Truck Terminal

Due to the unavailability of reliable truck stand data, truck stand accessibility for the district has not been conducted. However, some recommendations have been made to improve Lakki Marwat’s trucking-related infrastructure.

2.2.5 Rail Network

Currently, the nearest operation railway station is Mari Indus that connects via rail to Daud Khel and onwards to Mianwali in the South, and Jand Junction Railway Station in the North. In addition, Kohat Railway Station is also nearby, which provides another option to connect Bannu to the rest of the country via Rail. However, establishing rail connection with Kohat might not be as easy as it is with Mari Indus due to absence of a previous rail connection between the two cities (Kohat and Lakki Marwat).

2.2.6 Air Transportation

The nearest operational airports to Lakki Marwat are the Bacha Khan Airport in Peshawar and the Islamabad International Airport in Fateh Jang. Figure 2-2 illustrates the distance and travel time between Lakki Marwat and the airports.

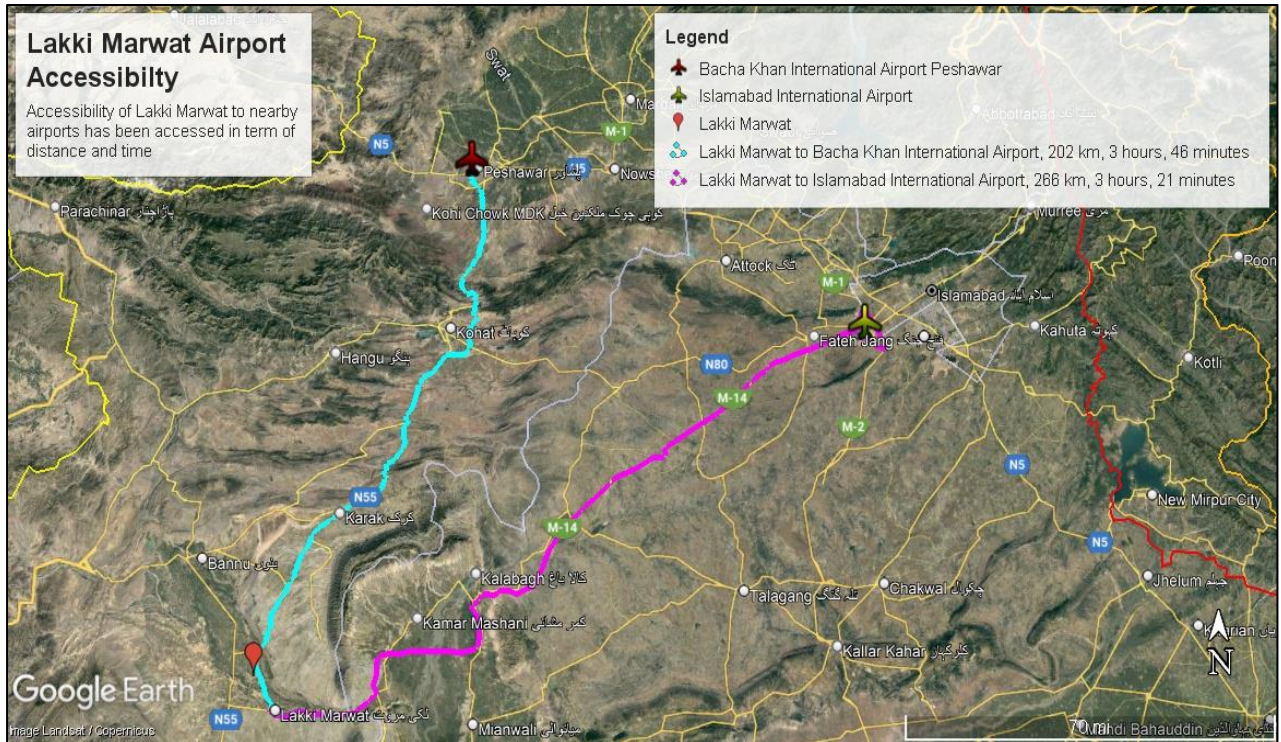


Figure 2-2: Distance and Travel Time between Lakki Marwat and Airports

2.2.7 Ongoing Projects

The ongoing road network and transportation related initiatives in the study area have been extracted from the Annual Development Program of Khyber Pakhtunkhwa for the year 2025-2026.

The **Table** below summarizes the development schemes in District Lakki Marwat.

Table 2-6: Ongoing Transportation Schemes

| Code | Name of the Scheme | Status (Forum & Date of Last Approval) |
|------|--|--|
| 1162 | Construction of road from: a. Ghazi Khel to Phar Khel Pacca (5.156 Km), b. Zangi Khel to Mela Mandra Khel (3 Km), c. Gambilla Phar Khel to Wanda Pashan (2.5 Km), d. Ghani Khel to Tajori road & Barham Khel to Pahar Khel Pacca (29 Km), Lakki Marwat | PDWP / 17-03-2020 |
| 1221 | Improvement & Rehabilitation of road from Sakhi/Malang Adda to Tajori via link road to Khan Killa and village Landi Mir Salam Sukeman Khel, District Lakki Marwat | PDWP / 16-06-2022 |
| 1256 | Construction & Upgradation of B/T Road from Dalo Khel to Abba Khel, District Lakki Marwat | DDWP / 01-12-2021 |
| 1387 | F/S for Construction of Internal Roads at Matora, District Lakki Marwat | PDWP |
| 1417 | Construction of Mandi Road to Lakki Marwat, District Lakki Marwat | DDWP |

2.2.8 Key Findings

Roads: The Indus Highway (N-55), Essa Khel–Mianwali Road, Lakki–Gambila Road and Sarai Naurang are important routes for Lakki Marwat, linking the district with nearby cities and trade routes. With traffic increasing each year, these single carriageway roads are facing congestion and safety problems. It is therefore recommended to dualize these roads to improve traffic flow, enhance safety, and strengthen regional connectivity. Upgradation and improvement of intra-district links and urban roads will enhance local connectivity, reduce travel time, and support balanced urban growth in the proposed areas.

Bus & Truck Terminal: The Origin–Destination (OD) survey shows that most trips either originate from or pass through Lakki Marwat, Sarai Naurang, and Daulat Tajazai. The accessibility analysis further reveals that several areas have limited access to bus stands, with residents needing to travel long distances to reach the nearest facility. Large portions of the district remain underserved and need the development of new bus stands to improve accessibility and connectivity. The lack of reliable data on truck terminals in District Lakki Marwat has limited the ability to accurately assess truck terminal accessibility.

Railways and Airways: The dismantling of the narrow-gauge railway line that once connected Bannu to Mari Indus has restricted direct rail access for residents. The nearest operational station is Mari Indus, linking to Daud Khel and Mianwali in the south and Jand Junction in the north. While Kohat Railway Station offers another connection option, establishing a direct link between Kohat and Bannu is complicated due to the absence of a prior rail connection. Engaging Pakistan Railways authorities and stakeholders will be vital for garnering support for these infrastructure improvements. The documentation of nearby airports related to Lakki Marwat serves as inventory information for the district. No improvements are recommended in terms of air transportation in this report.

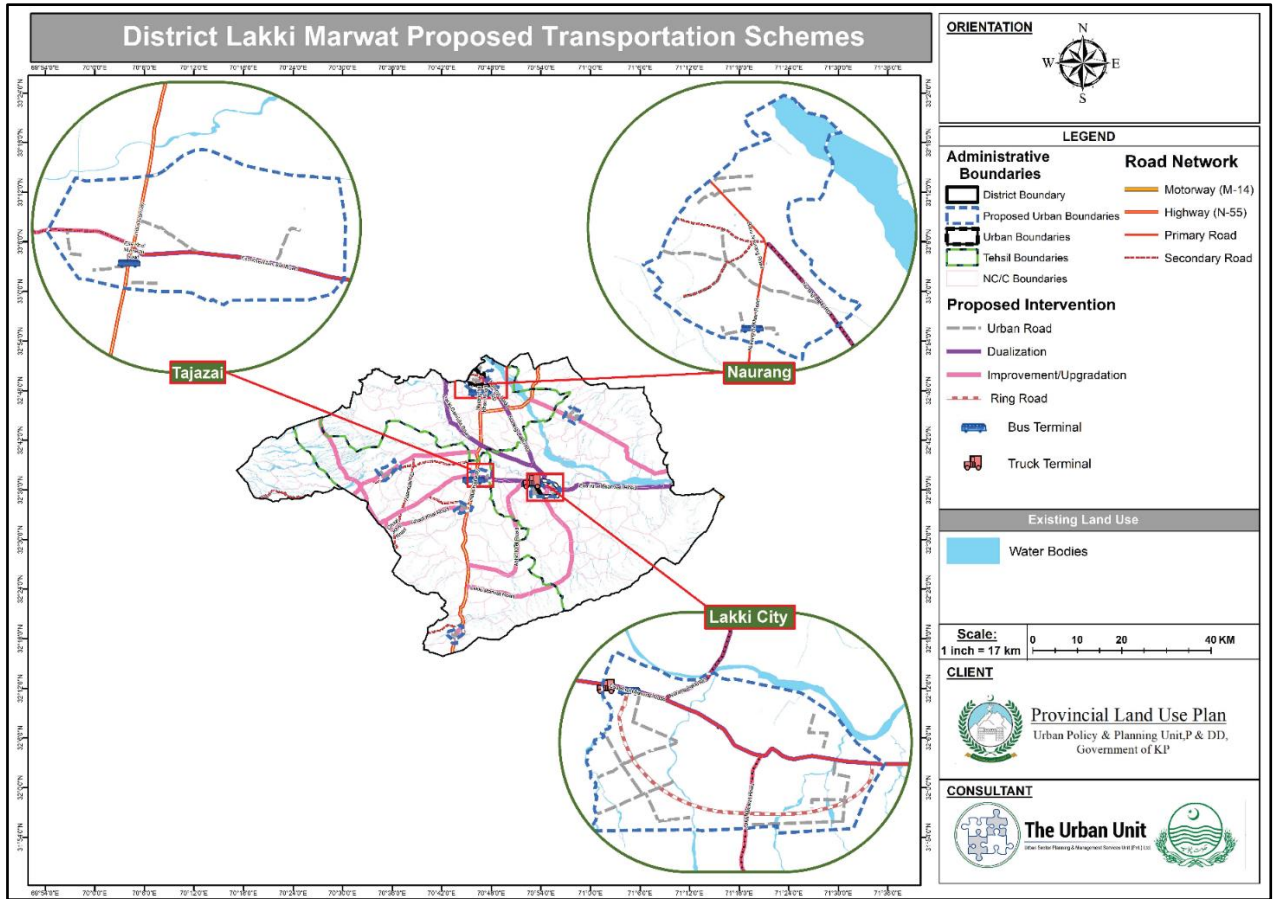
2.3 Proposals: Transportation Network

The proposal includes dualization and upgradation of major roads such as the Indus Highway (N-55), Essa Khel–Mianwali Road, Lakki–Gambila Road, and Sarai Naurang Road to ease congestion, improve safety, and strengthen connectivity across the district. It also covers the improvement of intra-district links and urban roads to enhance local mobility and support balanced urban growth.

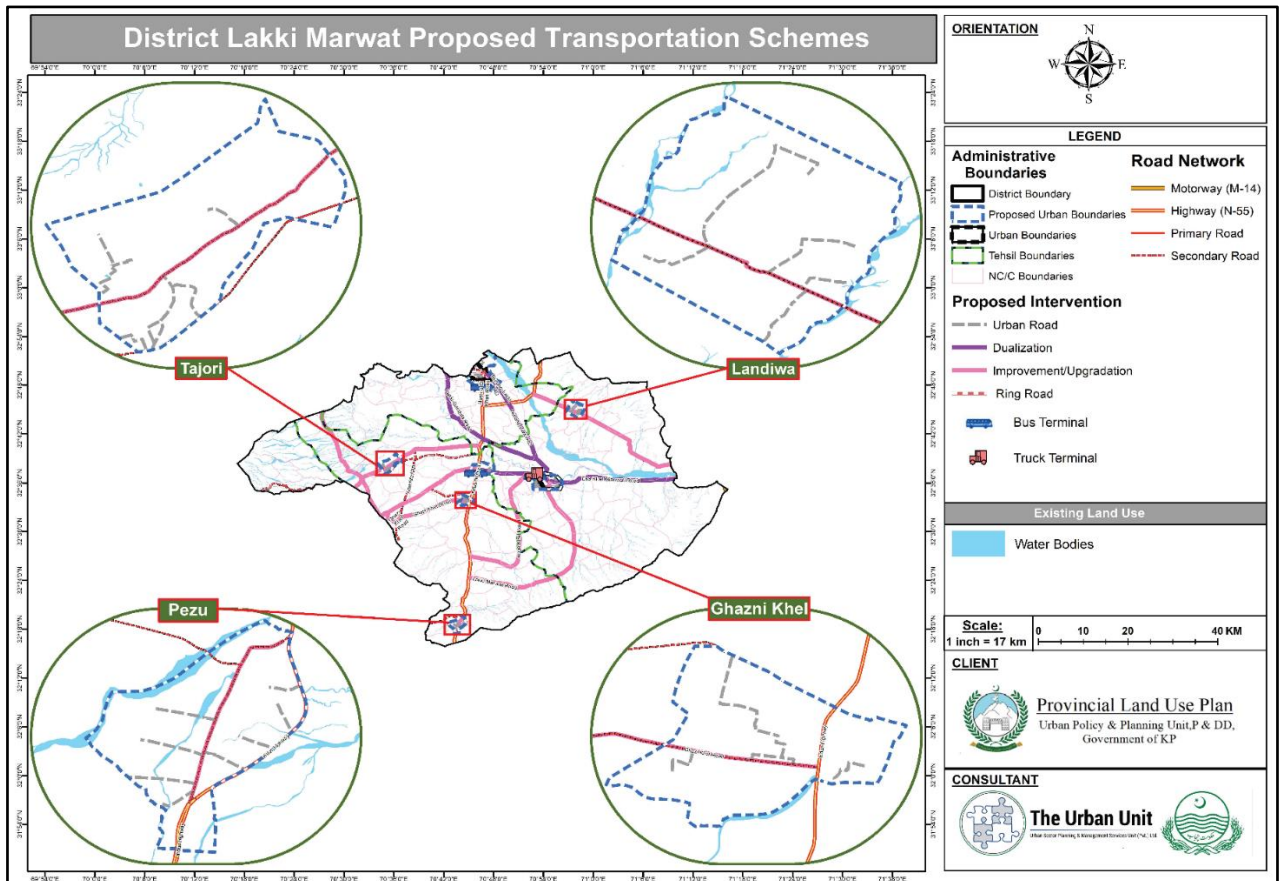
Furthermore, the proposal recommends the construction of new bus terminals in underserved areas to improve public transport access and development of a truck terminal to facilitate goods movement and strengthen freight operations in District Lakki Marwat.

District Lakki Marwat once had a 71.46 km narrow-gauge railway track connecting Lakki Marwat to Mari Indus. This line, which also provided branch connectivity to Bannu and Tank, was later dismantled by Pakistan Railways. Currently, no new railway projects are included in the land use plan. However, future studies may consider the possibility of restoring the rail link to improve transportation options and strengthen regional connectivity.

There is currently no operational airport in District Lakki Marwat, and no specific proposal for air infrastructure is included in the land use plan. However, future considerations may involve evaluating the need for improved air connectivity to support regional mobility and economic expansion. Any future airport development would align with national aviation policies and regulatory frameworks to ensure compliance and feasibility. The summaries of projects proposed for improvement of District Transportation and Communications Network are depicted in Table.



Map 2-7: Transport Proposals of Tajazai, Naurang and Lakki Marwat Urban Centers



Map 2-8: Transport Proposals of Tajori, Landiwa, Pezu and Ghazni Khel Urban Centers

Table 2-7: Proposed Road Projects of District Lakki Marwat

| Road Projects | | | | |
|---|---|-------|---------|-----------------------------|
| Dualization of Road and Southern Bypass | | | | |
| Sr. No | Project | Km | Year | Right of Way to be Reserved |
| 1 | Dualization of Essa Khel-Mianwali Road from Tajazai to District Boundary | 38 | 2025-30 | 60-90 ft (Variable) |
| 2 | Dualization of Lakki-Gambila Road from Gambila to Paharkhel | 11 | 2025-30 | 60-90 ft (Variable) |
| 3 | Dualization of Lakki-Gambila Road from Gambila to District Boundary | 18.5 | 2025-30 | 60-90 ft (Variable) |
| 4 | Dualization of Road from Lakki Marwat to Sarai Naurang Railways Station | 27.8 | 2030-35 | 60-90 ft (Variable) |
| 5 | Construction of Lakki Marwat Southern Bypass | 7.5 | 2025-30 | 60-90 ft (Variable) |
| Upgradation and Improvement of Roads | | | | |
| Sr. | Project | Km | Year | Right of Way to be Reserved |
| 6 | Upgradation/Improvement/ of Lakki Marwat Road from Lakki Marwat City to Shahbaz Khel | 44.80 | 2025-42 | Up to 60 ft (Variable) |
| 7 | Upgradation/Improvement of Marwat Kanal Road from Daulat Tajazai to Daryub Ali Khel up to District Boundary | 55.10 | 2025-42 | Up to 60 ft (Variable) |
| 8 | Upgradation/Improvement of Indus Highway Link Road from Marwat Dadiwala to Armatay Wala | 37.00 | 2025-42 | Up to 60 ft (Variable) |
| 9 | Upgradation/Improvement of Tajori Road from Malang adda up to District Boundary | 26.10 | 2025-42 | Up to 60 ft (Variable) |
| 10 | Upgradation/Improvement of Sarai Naurang-Lakki Marwat Road from Sarai Naurang Railway Phatak to Manjiwala Chowk | 8.20 | 2025-42 | Up to 60 ft (Variable) |
| 11 | Upgradation/Improvement of Ghazi Khel Road from Ghazni Khel Kheru Khel Pakka up to District Boundary | 18.40 | 2025-42 | Up to 60 ft (Variable) |
| 12 | Upgradation/Improvement of Pezu City Road | 3.40 | 2025-42 | Up to 60 ft (Variable) |
| Upgradation and Improvement of Roads | | | | |
| Sr. | Project | Km | Year | Right of Way to be Reserved |
| 13 | Lakki Marwat_Urban Road 1 | 1.90 | 2025-42 | Up to 60 ft (Variable) |
| 14 | Lakki Marwat_Urban Road 2 | 1.23 | 2025-42 | Up to 60 ft (Variable) |
| 15 | Lakki Marwat_Urban Road 3 | 1.70 | 2025-42 | Up to 60 ft (Variable) |
| 16 | Lakki Marwat_Urban Road 4 | 3.60 | 2025-42 | Up to 60 ft (Variable) |
| 17 | Lakki Marwat_Urban Road 5 | 1.00 | 2025-42 | Up to 60 ft (Variable) |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | |
|----|-----------------------------|------|---------|---------------------------|
| 18 | Lakki Marwat_Urban Road 6 | 1.40 | 2025-42 | Up to 60 ft (Variable) |
| 19 | Lakki Marwat_Urban Road 7 | 1.30 | 2025-42 | Up to 60 ft (Variable) |
| 20 | Lakki Marwat_Urban Road 8 | 1.60 | 2025-42 | Up to 60 ft (Variable) |
| 21 | Landiwa_Urban Road 1 | 1.40 | 2025-42 | Up to 60 ft (Variable) |
| 22 | Landiwa_Urban Road 2 | 0.70 | 2025-42 | Up to 60 ft (Variable) |
| 23 | Landiwa_Urban Road 3 | 0.90 | 2025-42 | Up to 60 ft (Variable) |
| 24 | Landiwa_Urban Road 4 | 0.92 | 2025-42 | Up to 60 ft (Variable) |
| 25 | Landiwa_Urban Road 5 | 1.90 | 2025-42 | Up to 60 ft (Variable) |
| 26 | Landiwa_Urban Road 6 | 0.82 | 2025-42 | Up to 60 ft (Variable) |
| 27 | Sarai Naurang_Urban Road 1 | 1.00 | 2025-42 | Up to 60 ft (Variable) |
| 28 | Sarai Naurang_Urban Road 2 | 0.80 | 2025-42 | Up to 60 ft (Variable) |
| 29 | Sarai Naurang_Urban Road 3 | 3.00 | 2025-42 | Up to 60 ft (Variable) |
| 30 | Sarai Naurang_Urban Road 4 | 1.17 | 2025-42 | Up to 60 ft (Variable) |
| 31 | Sarai Naurang_Urban Road 5 | 2.00 | 2025-42 | Up to 60 ft (Variable) |
| 32 | Sarai Naurang_Urban Road 6 | 1.96 | 2025-42 | Up to 60 ft (Variable) |
| 33 | Sarai Naurang_Urban Road 7 | 1.29 | 2025-42 | Up to 60 ft (Variable) |
| 34 | Sarai Naurang_Urban Road 8 | 1.00 | 2025-42 | Up to 60 ft (Variable) |
| 35 | Sarai Naurang_Urban Road 9 | 0.65 | 2025-42 | Up to 60 ft (Variable) |
| 36 | Sarai Naurang_Urban Road 10 | 1.13 | 2025-42 | Up to 60 ft (Variable) |
| 37 | Daulat Tajazai_Urban Road 1 | 0.52 | 2025-42 | Up to 60 ft (Variable) |
| 38 | Daulat Tajazai_Urban Road 2 | 1.00 | 2025-42 | Up to 60 ft (Variable) |
| 39 | Daulat Tajazai_Urban Road 3 | 0.40 | 2025-42 | Up to 60 ft (Variable) |
| 40 | Daulat Tajazai_Urban Road 4 | 0.60 | 2025-42 | Up to 60 ft (Variable) |
| 41 | Daulat Tajazai_Urban Road 5 | 0.51 | 2025-42 | Up to 60 ft (Variable) |
| 42 | Daulat Tajazai_Urban Road 6 | 0.82 | 2025-42 | Up to 60 ft (Variable) |
| 43 | Tajori_Urban Road 1 | 1.50 | 2025-42 | Up to 60 ft (Variable) |
| 44 | Tajori_Urban Road 2 | 0.95 | 2025-42 | Up to 60 ft (Variable) |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | |
|----|--------------------------|------|---------|------------------------|
| 45 | Tajori_Urban Road 3 | 0.61 | 2025-42 | Up to 60 ft (Variable) |
| 46 | Tajori_Urban Road 4 | 0.51 | 2025-42 | Up to 60 ft (Variable) |
| 47 | Tajori_Urban Road 5 | 0.60 | 2025-42 | Up to 60 ft (Variable) |
| 48 | Tajori_Urban Road 6 | 0.57 | 2025-42 | Up to 60 ft (Variable) |
| 49 | Tajori_Urban Road 7 | 0.62 | 2025-42 | Up to 60 ft (Variable) |
| 50 | Tajori_Urban Road 8 | 0.53 | 2025-42 | Up to 60 ft (Variable) |
| 51 | Pezu_Urban Road 1 | 0.84 | 2025-42 | Up to 60 ft (Variable) |
| 52 | Pezu_Urban Road 2 | 0.94 | 2025-42 | Up to 60 ft (Variable) |
| 53 | Pezu_Urban Road 3 | 0.89 | 2025-42 | Up to 60 ft (Variable) |
| 54 | Pezu_Urban Road 4 | 0.54 | 2025-42 | Up to 60 ft (Variable) |
| 55 | Pezu_Urban Road 5 | 0.65 | 2025-42 | Up to 60 ft (Variable) |
| 56 | Pezu_Urban Road 6 | 0.52 | 2025-42 | Up to 60 ft (Variable) |
| 57 | Pezu_Urban Road 7 | 0.54 | 2025-42 | Up to 60 ft (Variable) |
| 58 | Pezu_Urban Road 8 | 0.50 | 2025-42 | Up to 60 ft (Variable) |
| 59 | Ghazni Khel_Urban Road 1 | 1.62 | 2025-42 | Up to 60 ft (Variable) |
| 60 | Ghazni Khel_Urban Road 2 | 0.58 | 2025-42 | Up to 60 ft (Variable) |
| 61 | Ghazni Khel_Urban Road 3 | 0.62 | 2025-42 | Up to 60 ft (Variable) |
| 62 | Ghazni Khel_Urban Road 4 | 0.41 | 2025-42 | Up to 60 ft (Variable) |
| 63 | Ghazni Khel_Urban Road 5 | 0.63 | 2025-42 | Up to 60 ft (Variable) |

Bus Terminal

| Sr. | Project | Year | Land Required | Concerned Departments |
|-----|--|---------|---------------|---|
| 64 | Construction of Class-C Bus Terminal in Tehsil Lakki Marwat (Urban Area) | 2025-30 | 32 Kanals | Transport Department / Provincial/ District Regional Transportation Authority |
| 65 | Construction of Class-C Bus Terminal Daulat Tajazai (Urban Area) | 2030-35 | | |
| 66 | Construction of Class-C Bus Terminal in Sarai Naurang (Urban Area) | 2030-35 | | |

Truck Terminal

| Sr. | Project | Year | Land Required | Concerned Departments |
|-----|---------|------|---------------|-----------------------|
|-----|---------|------|---------------|-----------------------|

| | | | | |
|----|---|---------|-----------|---|
| 67 | Construction of a Truck Terminal/Logistics Facility in Lakki Marwat | 2025-30 | 32 Kanals | Transport Department / Provincial/ District Regional Transportation Authority |
|----|---|---------|-----------|---|

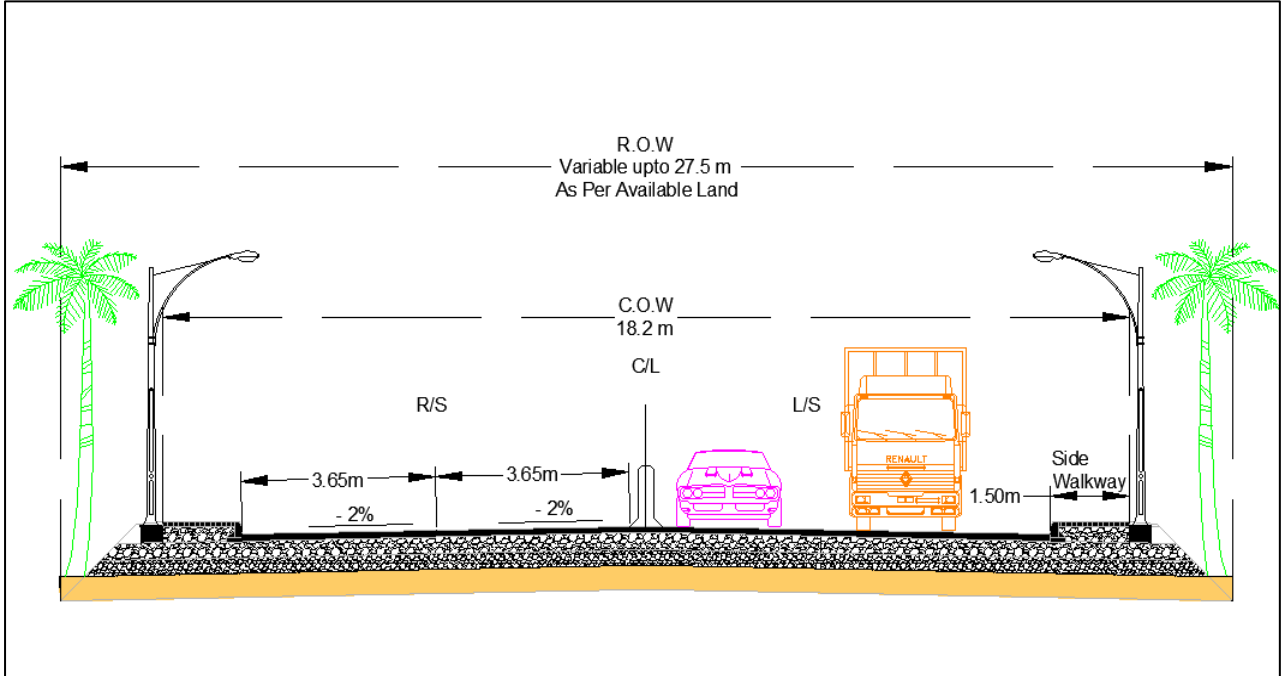


Figure 2-3: Proposed Typical Section of Urban Dual Carriageway

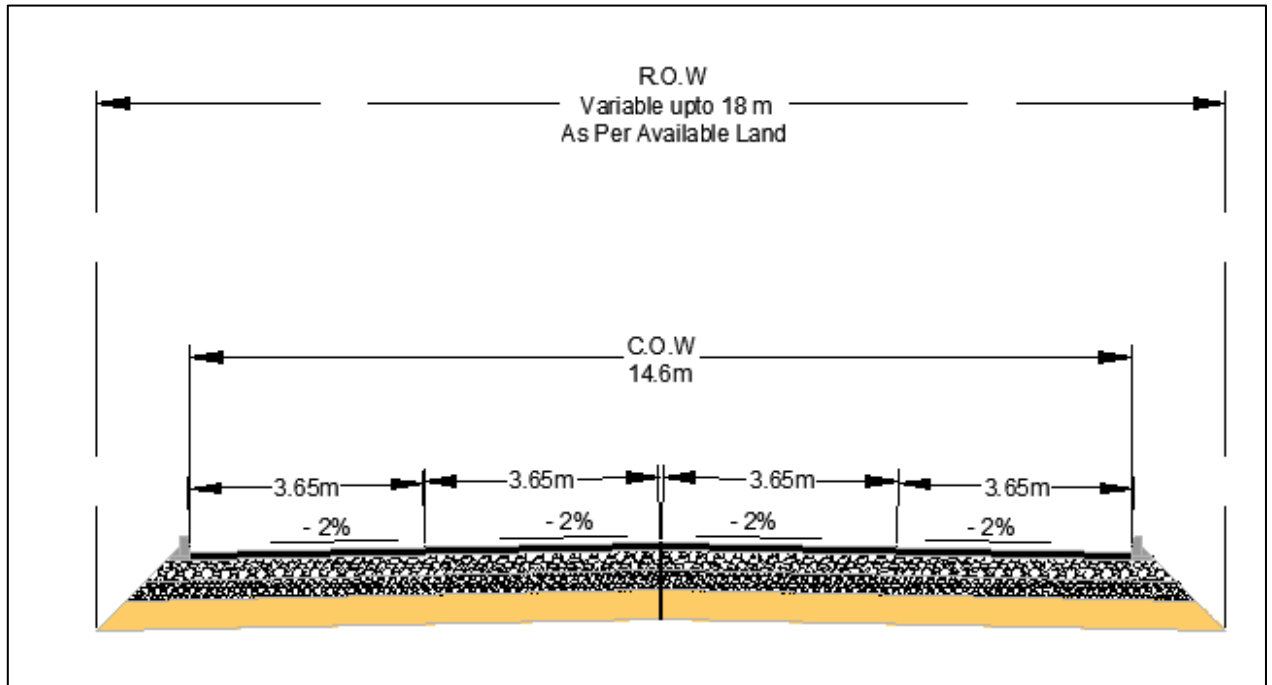


Figure 2-4: Proposed Road Cross Section for Upgradation/Improvement

Depending on the road classification and ownership, the following rights-of-way (Table below) shall be reserved for each type of cross section.

Table 2-8: Right-of-Way for Road Classes

| Owner Class | Cross-section Type | Right-of-Way |
|------------------|----------------------------|---------------------------------|
| Provincial Roads | Single Carriageway (24 ft) | Variable |
| | Dual Carriageway (60 ft) | 110 ft or 55 ft from Centerline |
| National Highway | Single Carriageway | Variable |
| | Dual Carriageway (60 ft) | 220 ft from Centerline |

In accordance with the KP Model Building Byelaws 2023, road category wise building setbacks will be implemented as specified in Chapters 4, 5, 6, and 7 while the maximum permissible building heights for each road category will be regulated in line with the same byelaws.

2.4 Postal and Telecommunication Services

District Lakki Marwat's Postal Services coverage has been explored by mapping the existing postal infrastructure locations and determining their coverage with respect to populated settlements.

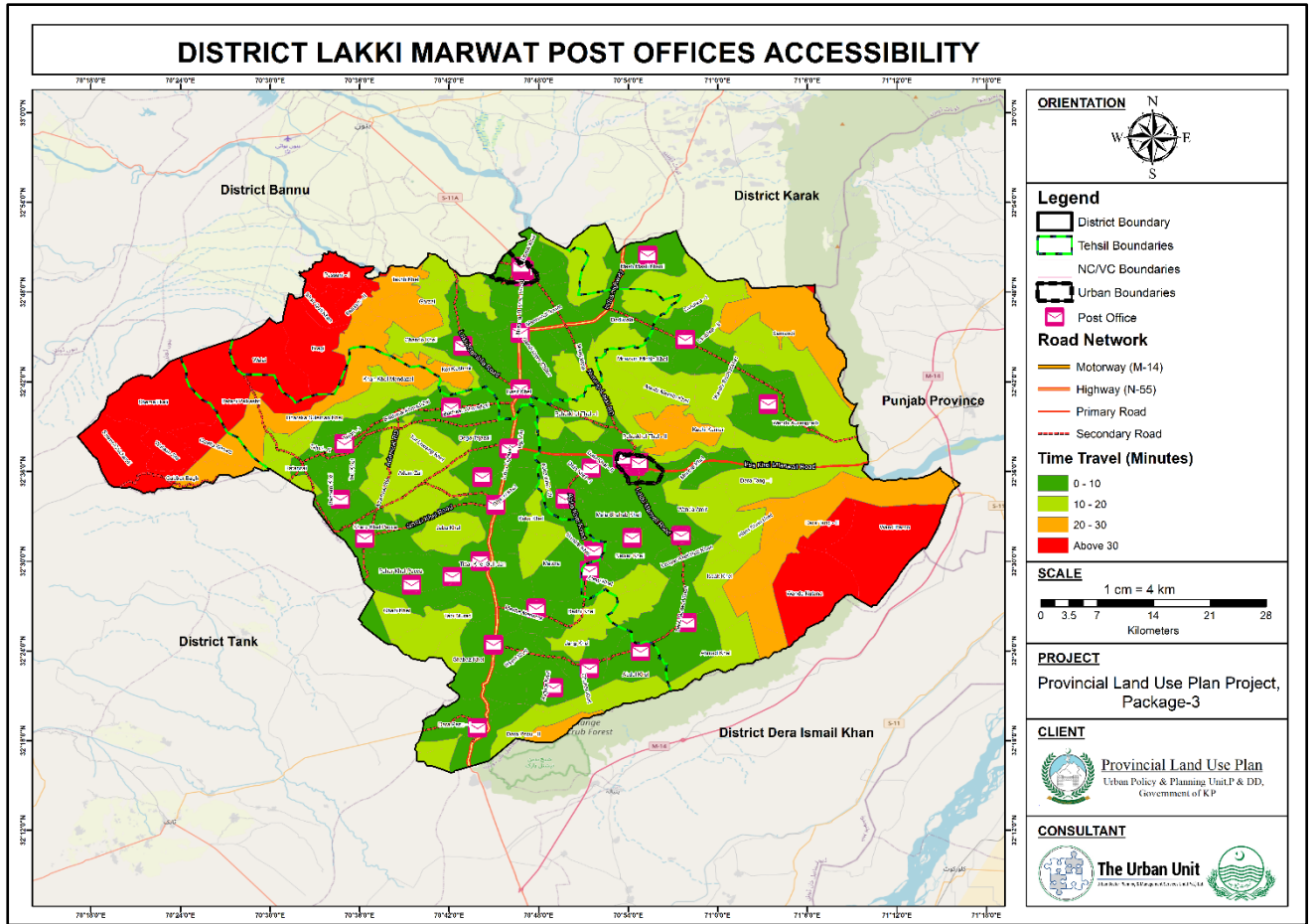
To briefly describe the postal system; parcels dispatched from post offices or mailboxes are collected at the sender's local General Post Offices (GPOs) of a region for sorting and forwarding. GPOs then forward parcels to the recipient's local GPOs based on the addressee's District or City. From there, the GPO distributes the letters to the addressee's town or city's local (or nearest) post office, from where it is delivered to its final destination via postman.

2.4.1 Postal Network Coverage

The existing postal services have been mapped using the Pakistan Postal Code Directory available on the Pakistan Post Website and overlaid on maps of settlements obtained from the Land Use survey. To understand District Lakki Marwat's postal services, all post offices within the district boundary have been marked.

2.4.1.1 Accessibility Analysis

The accessibility map of Post Offices in District Lakki Marwat shows that most central and southern areas have good access, with post offices located within a short travel time of 10–20 minutes. These well-connected areas are mainly along major roads and within urban centers (proposed urban centers). However, the northern, eastern, and western parts of the district face limited accessibility, where people need to travel more than 30 minutes where population settlements are scattered. The post office accessibility analysis is provided in **Map** below.



Map 2-9: Lakki Marwat Post Office Accessibility Analysis

2.4.2 Land Line Coverage

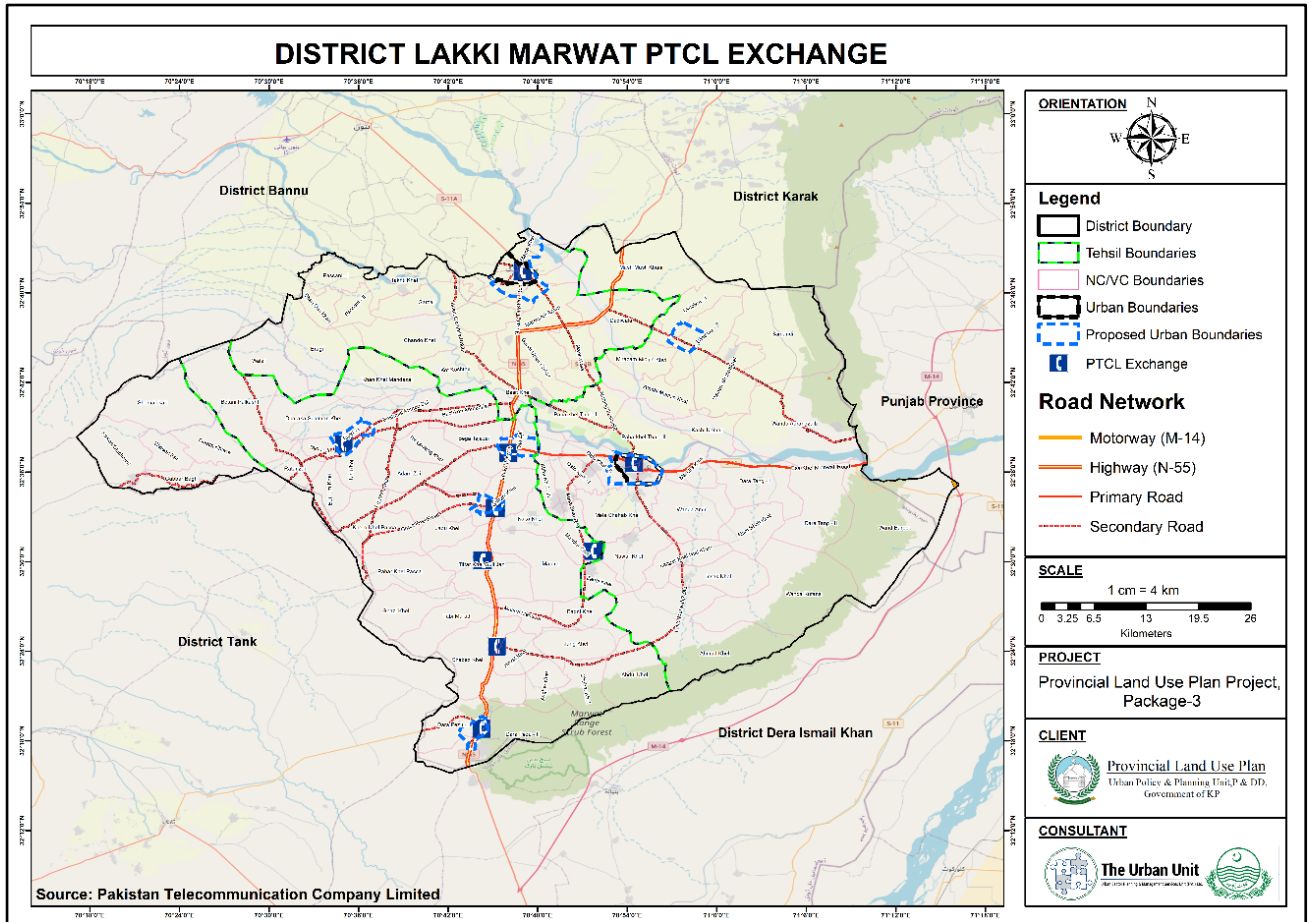
The land line services data as obtained from the Pakistan Telecommunication Company Limited (PTCL) includes information on the existing telephone Exchanges for District Lakki Marwat.

Table 9 lists the existing telephone exchanges in District Lakki Marwat as provided by PTCL. The same telephone exchanges are mapped as shown in Figure 15 using the Main Feeding Area information for reference.

Table 2-9: List of Telephone Exchanges in District Lakki Marwat

| Region | Exchange Name | Type (Exchange/MSAG) | Address | Main Feeding Area | PSTN | BB |
|--------|------------------|----------------------|--------------------|--------------------------|------|-----|
| NTR-II | ABBA KHEL | DSLAM | ABBA KHEL | Village ABA Khel | 24 | 15 |
| NTR-II | DARA PEZU | DSLAM | Pezu | pezu village | 88 | 38 |
| NTR-II | GHAZNI KHEL | MSAN | Ghaznikheil | Ghaznikheil bazar | 26 | 24 |
| NTR-II | MELA MANDRA KHEL | DSLAM | mela mandra kheil | mela mandra kheil | 10 | 3 |
| NTR-II | SHAHBAZ KHEL | MSAN | Shabazkheil lakki | Shahbaz kheil bazar | 15 | 11 |
| NTR-II | TAJAZAI | MSAN | Tajazai Lakki | Tajazi bazar and complex | 138 | 118 |
| NTR-II | TAJORI | DSLAM | EWSD-TAJORI-T | EWSD-TAJORI-T | 17 | 11 |
| NTR-II | TITTER KHEL MWT | DSLAM | EWSD-TITTER KHEL-T | EWSD-TITTER KHEL-T | 1 | 0 |

| Region | Exchange Name | Type (Exchange/MSAG) | Address | Main Feeding Area | PSTN | BB |
|--------|---------------|----------------------|---------------|----------------------|------|-----|
| NTR-II | LAKKI MARWAT | DSLAM | LAKKI MARWAT | Data Marwat Village | 573 | 417 |
| NTR-II | S. NAURANG | DSLAM | SARAI NAURANG | Data Naurang Village | 311 | 280 |

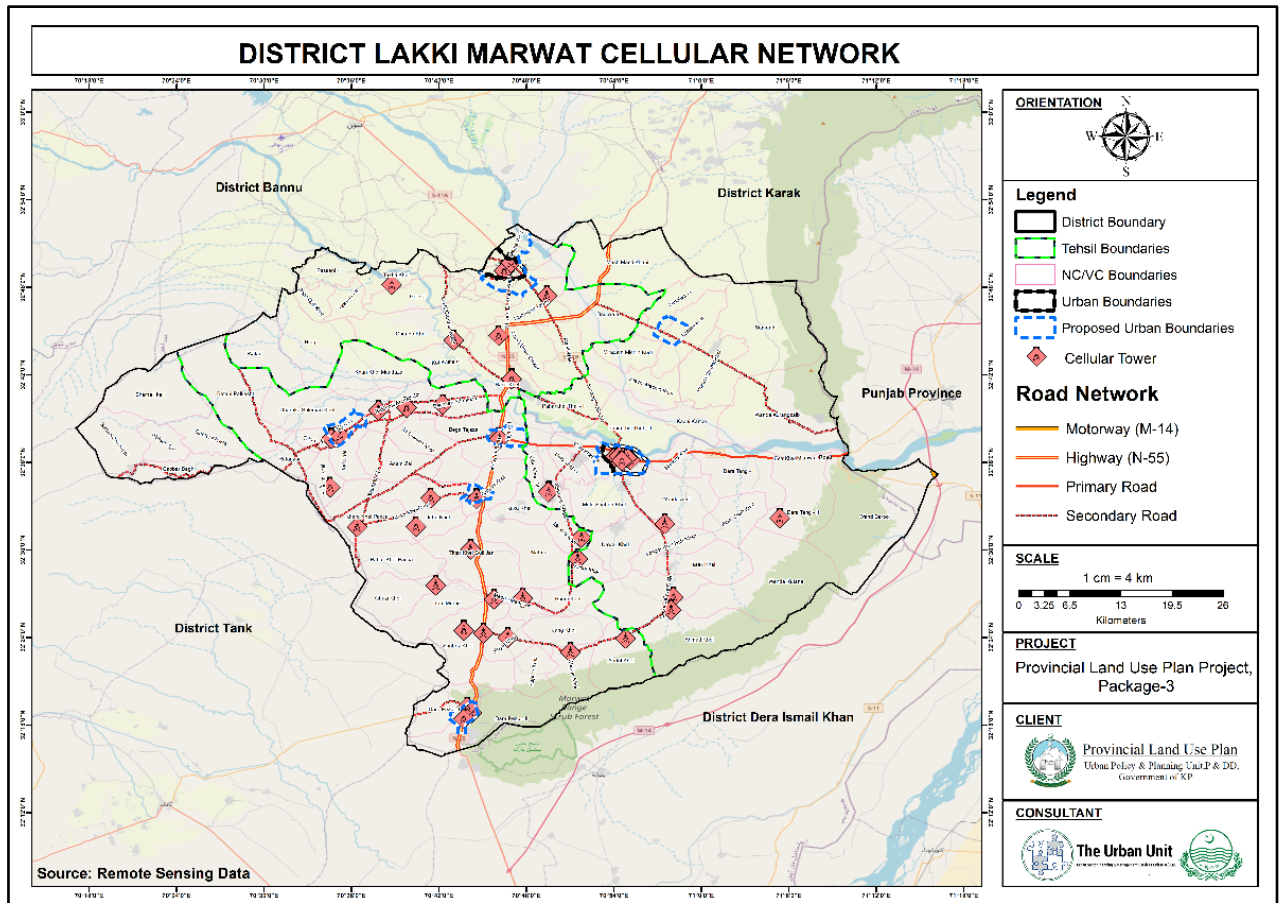


Map 2-10: District Lakki Marwat PTCL Exchange

2.4.3 Existing Tower Infrastructure

The locations of the existing cellphone towers in District Lakki Marwat were obtained during the land use survey. The respective service provider for each tower has not been identified in this study as the Pakistan Telecommunication Authority and Private Cellular Operators have not furnished any data regarding their assets. However, for land inventory purposes, the obtained locations of existing Cellular Towers have been mapped.

Below **Map** illustrates the location of District Lakki Marwat’s telecommunication infrastructure including Cellular towers and telephone exchanges.



Map 2-11: Existing Telecommunication Infrastructure

2.4.4 Findings of Postal and Telecommunication Services

The accessibility analysis shows that central and southern parts of District Lakki Marwat have good access to post offices within 10–20 minutes, mainly along major roads and urban zones. In contrast, the northern, eastern, and western areas show limited access, with travel times exceeding 30 minutes due to scattered settlements of the population.

Data from PTCL indicates the presence of telephone exchanges in the district, while locations of cellular towers were identified during the land use survey. However, details of service providers were unavailable as the Pakistan Telecommunication Authority and private operators did not share relevant data. The evaluation of telecommunication facilities in District Lakki Marwat did not reveal any major concerns, and thus, no upgrades have been proposed in the Land Use Plan. However, the lack of provider-specific data on cellular towers restricts the ability to comprehensively assess network coverage and service quality, making it challenging to pinpoint potential connectivity gaps. Despite this, available studies and stakeholder consultations did not indicate any major issues with cellular network infrastructure in the district.

2.5 Proposal for Postal and Telecommunication Services

The analysis of postal and telecommunication facilities in District Lakki Marwat shows no major deficiencies that require new interventions. Post office accessibility is satisfactory in central and southern areas, while limited access in peripheral regions mainly results from scattered population patterns rather than infrastructural shortages. Any future site selection for post offices will be based on population needs and land requirements, with the relevant department identified in Table 10 as per the National Reference Manual for development considerations. No proposals have been made regarding landline communication coverage. The documentation of the existing telecommunication infrastructure in this chapter serves as an inventory resource for the district.

No proposals have been made regarding Cellular Tower communication coverage. The documentation of the existing telecommunication infrastructure in this chapter serves as an inventory resource for the district.

Table 2-10: Criteria of Establishment of New Post Offices, Land Required and Stakeholder

| Criteria for Provision of New Post Offices as Per National Reference Manual | | | | |
|--|---|-------------|--------------------------------------|------------------------------|
| Sr. | Project | Year | Land Required | Concerned Departments |
| 1 | Sub Post Offices, Tehsils HQ (Higher Selection Grade) | 2025-30 | As per the National Reference Manual | Pakistan Post |
| 2 | Sub Post Offices, Smaller Towns of Tehsils HQ (Lower Selection Grade) | 2025-30 | | |
| 3 | Provision of a Time-scale-Post offices in Smaller Towns /Large Villages /Neighborhoods (Having Population around 50,000) | 2030-45 | | |

3 Social Infrastructure

3.1 Education

Education is one of the important components of human development. It is considered a powerful instrument to reduce poverty, and inequality and promote employment. It also helps to improve health, economic stability, and overall living standards. Therefore, investing in education should be a key priority for any development plan.

As per the Annual Statistical Report of Government Schools 2021-2022, there are 34,183 government schools in Khyber Pakhtunkhwa, of which 33,405 are functional and 778 are non-functional. There are 9,021 registered private schools in Khyber Pakhtunkhwa, out of which 600 are boys' schools, 173 are girls' schools, and 8,248 are co-education. By level, there are 1,848 Primary, 3,144 Middle, 2,803 High, and 1,226 Higher Secondary Schools/Inter Colleges, and most of them have Primary and Middle Sections. Overall enrolment in Khyber Pakhtunkhwa government schools is 5.974 million, out of which 0.8322 million are enrolled in the Nursery, 3.456 million (67.22%) in Primary, and 1.685 million (32.77%) are enrolled in Secondary Schools including 1.077 million (20.96%) in Middle, 0.485 million (9.44%) in High and 0.1219 million (2.37%) in Higher Secondary schools. The total number of working teachers in Khyber Pakhtunkhwa government schools is 174,278 (111,260 male teachers, 63,018 female teachers), and out of these, 111,297 teachers are in Boys' Schools and 62,981 teachers are in Girls' Schools. The number of teachers in registered Private Schools in Khyber Pakhtunkhwa is 126,475, out of which 12,965 teachers are working in Primary Schools, 32,522 in Middle Schools, 51,637 in High Schools, and 29,351 in Higher Secondary Schools¹⁴.

3.1.1 Literacy Ratio

The Pakistan Bureau of Statistics, during its population and housing census, considers a person as literate if they can read a newspaper or a journal of the same standard and can write a simple letter in any language. Literacy is measured as the ratio, in percentages, of the literate population to the corresponding population aged 10 and over.

3.1.1.1 Literacy Ratio from Population Census-2017

According to the 2017 population census, the total population of District Lakki Marwat is 902,541 out of which 89,420 lived in urban areas and 813,121 in rural areas. Whereas 258,212 persons are literate (aged 10 years and above), this means that the literacy ratio of District Lakki Marwat as per the census of 2017 is 43.41%

The district-wise breakdown of the literacy ratio by age and sex group is given in the table below and represented in the graph below:

Table 3-1: District Lakki Marwat Literacy Ratio by Age and Sex Group from Population Census 2017¹⁵

| Age Group | Male | Female | Transgender | All Sexes |
|-----------|--------|--------|-------------|-----------|
| 10-14 | 80.38% | 40.95% | 0.00% | 61.79% |
| 15-19 | 81.08% | 33.79% | 0.00% | 57.92% |
| 20-24 | 75.27% | 24.09% | 0.00% | 48.43% |
| 25-29 | 69.68% | 18.22% | 0.00% | 41.60% |

¹⁴ Khyber Pakhtunkhwa Education Monitoring Authority (KPEMA). (2023). Annual Statistical Report of Government Schools 2021-2022. Executive Summary

¹⁵ Pakistan Bureau of Statistics. (2021, April 12). Final Results of Sixth Population and Housing Census-2017. Table-12: Population (10 Years and Above) By Literacy, Sex, Age Group and Rural/ Urban

| | | | | |
|-----------------------|--------|--------|--------|--------|
| 30-34 | 66.95% | 15.12% | 0.00% | 39.19% |
| 35-39 | 65.37% | 10.46% | 0.00% | 36.53% |
| 40-44 | 56.14% | 6.67% | 33.33% | 29.93% |
| 45-49 | 45.70% | 4.70% | 0.00% | 24.58% |
| 50-54 | 43.03% | 3.62% | 0.00% | 23.66% |
| 55-59 | 40.36% | 2.86% | 0.00% | 22.88% |
| 60-64 | 34.54% | 2.25% | 0.00% | 19.36% |
| 65-69 | 28.62% | 2.69% | 0.00% | 16.85% |
| 70-74 | 26.85% | 1.63% | 0.00% | 15.50% |
| 75 and above | 21.39% | 2.08% | 0.00% | 11.60% |
| Overall Literacy Rate | 66.27% | 20.95% | 25.00% | 43.41% |

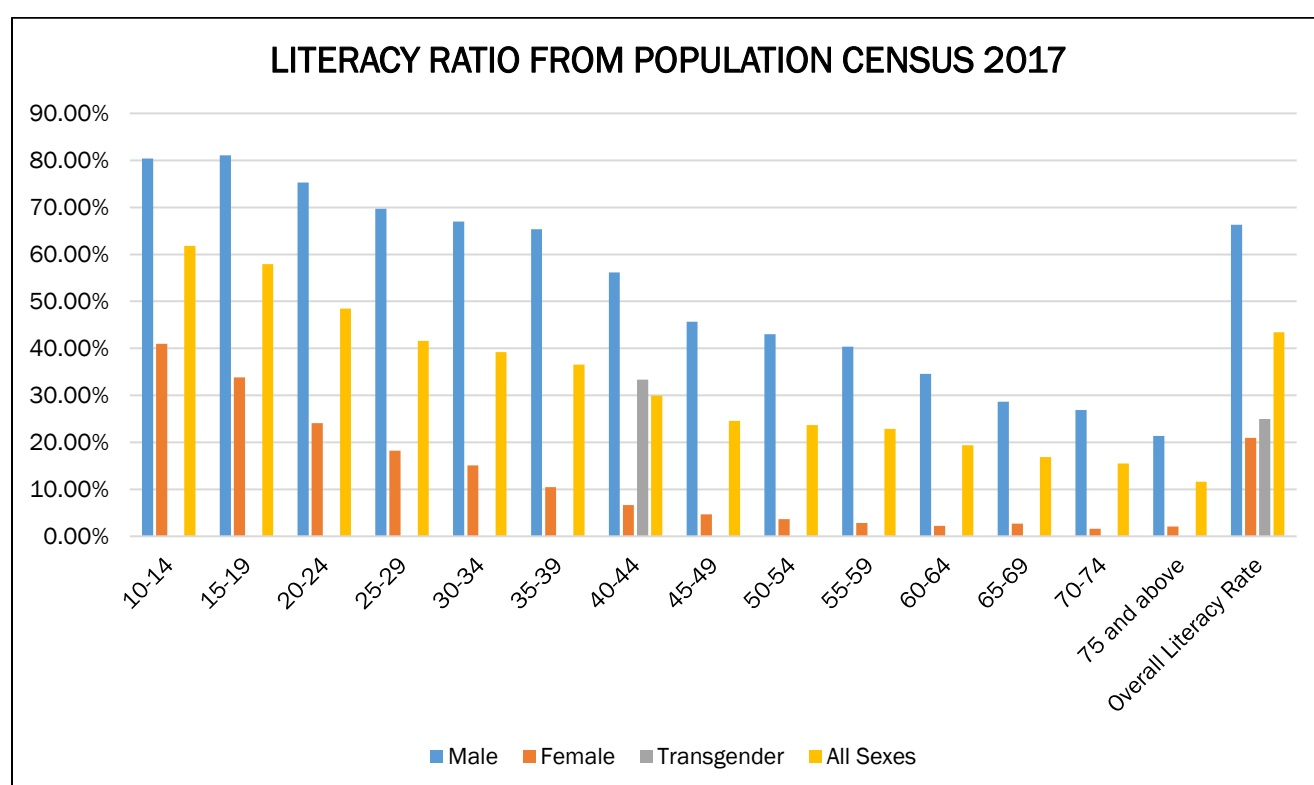


Figure 3-1: District Lakki Marwat Literacy Ratio by Age and Sex Group from Population Census 2017

The data shows that as people get older, literacy rates generally decrease, underlining the significance of early educational support. Males consistently have higher literacy rates than females and transgender individuals across all age groups. The age group 10-14 stands out with the highest literacy rates, reaching 61.79%, while those aged above 75 have the lowest rates at 11.60%. Looking at gender disparities, males consistently outperform females and transgender individuals in literacy. The overall literacy rate for all genders is 43.41%, indicating room for improvement in education across various age groups and genders.

3.1.1.2 Literacy Ratio from Household Information Survey

A household information survey was conducted by the consultant to gather information related to the socio-economic situation of the households in District Lakki Marwat. The sample size for this survey was 1%, which meant that information would have been collected from 1% of the households in each NC/VC. As per the Provisional Block-Wise Census-2017 of District Lakki Marwat, the sum of the 1% of households of each NC/VC

was 1250. The data was supposed to be collected from 1250 households spread across 117 NCs/VCs, but due to various issues faced in the field, the data could only be collected from 1041 households, which means that 83.28% of the intended sample was covered.

As per the data collected in the household information survey, the literacy ratio by age and sex group is given in the table below and represented in the graph below:

Table 3-2 District Lakki Marwat Literacy Ratio by Age and Sex Group from HIS¹⁶

| Age Group | Male | Female | Transgender | All Sexes |
|--------------|--------|--------|-------------|-----------|
| Below 10 | 66.67% | 46.55% | 0.00% | 56.78% |
| 11-20 | 94.03% | 43.14% | 100.00% | 72.27% |
| 21-30 | 87.88% | 30.95% | 0.00% | 65.74% |
| 31-40 | 80.72% | 27.59% | 0.00% | 66.96% |
| 41-50 | 68.09% | 18.75% | 0.00% | 55.56% |
| 51-60 | 46.15% | 0.00% | 0.00% | 38.71% |
| 61 and above | 28.57% | 0.00% | 0.00% | 20.00% |
| Overall | 76.97% | 35.78% | 100.00% | 62.03% |

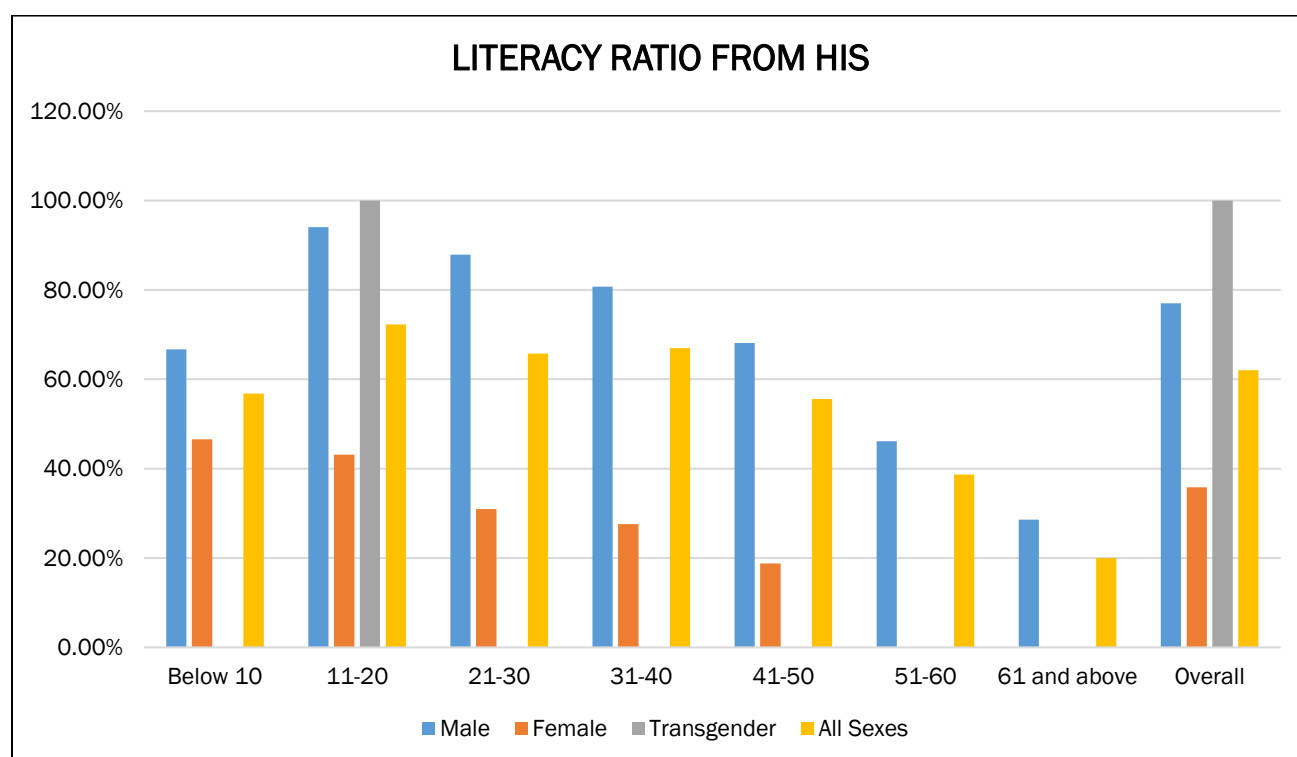


Figure 3-2 District Lakki Marwat Literacy Ratio by Age and Sex Group from HIS

While, as per the analysis of the household information survey, the overall literacy rate is 62.03%. Similar to the literacy rate in the population census, males tend to have higher literacy rates across all age groups. The age group 11-20 years shows the highest literacy rates at 72.27%, while the "Above 60 years" category has the lowest rates at 20%.

The overall literacy rates for both genders differ slightly between the data sets; the overall literacy rate is 43.41% according to the population census, whereas it is 62.03% as per the household information survey. This indicates a variation in the calculated overall literacy rates, which is due to the difference in sample sizes:

¹⁶ Calculated from the Household Survey conducted by the Consultant in January, 2023.

The Census data uses a 100% sample size, whereas the HIS data uses a 1% sample size. This indicates a variation in the calculated overall literacy rates, which is due to differences in the age groupings and the specific data points included in each table.

3.1.2 Existing Educational Institutes

Education infrastructure refers to a suitable place to learn, and it is very important to achieve your objective. Educational infrastructure includes the number of school buildings, teachers, laboratories, playgrounds, etc., at different levels. Vertical hierarchy is a basic feature in the delivery of formal education. It may be visualized as a pyramid, its base comprising many hundreds of primary schools, while at the top may be universities providing specialized education to a much lesser number of postgraduate students. Specialized institutions such as universities are virtually limited to metropolitan cities.

3.1.2.1 Government Institutes

According to the National Reference Manual for Planning and Infrastructure Standards, a unit at each level is fed by a catchment comprising 3-7 facilities of the next lower level. The next lower level in the case of universities is degree colleges. Government education institutes in District Lakki Marwat are divided into primary, middle, high, and higher secondary schools, degree colleges, universities, and technical colleges.

In total, the district has 974 primary schools, 113 middle schools, 91 high schools, 16 higher secondary schools, 14-degree colleges, 1 university, and 3 technical colleges. These institutes are divided between urban and rural areas, with a significantly higher concentration in rural regions.

In urban areas, there are 121 primary schools, 15 middle schools, 18 high schools, 6 higher secondary schools, and 6-degree colleges, 1 university and 3 technical colleges. Boys have a slightly higher number of primary schools (67) compared to girls (54), while girls have more high schools (12) than boys (6). The rural areas, in contrast, have a much larger number of educational institutes with 853 primary schools, 98 middle schools, 73 high schools, 10 higher secondary schools and 8-degree colleges. Rural areas show a greater provision for boys in almost all categories except for higher secondary schools, where the disparity is less pronounced.

Table 3-3: Government Educational Institutes in District Lakki Marwat¹⁷

| Administrative Area | Gender | Level | | | | | | |
|---------------------|--------|---------|--------|------|----------------|---------|------------|-------------------|
| | | Primary | Middle | High | High Secondary | College | University | Technical College |
| District Overall | Boys | 615 | 58 | 60 | 14 | 10 | 1 | 3 |
| | Girls | 359 | 55 | 31 | 2 | 4 | | 0 |
| Urban Area | Boys | 67 | 5 | 6 | 5 | 4 | 1 | 3 |
| | Girls | 54 | 10 | 12 | 1 | 2 | | 0 |
| Rural Area | Boys | 548 | 53 | 54 | 9 | 6 | 0 | 0 |
| | Girls | 305 | 45 | 19 | 1 | 2 | | 0 |
| Urban Area | | | | | | | | |
| Lakki Marwat MC | Boys | 15 | 2 | 2 | 1 | 1 | | 0 |
| | Girls | 11 | 2 | 4 | 0 | 1 | | 0 |
| Serai Nurrang TC | Boys | 24 | 2 | 1 | 1 | 1 | | 0 |
| | Girls | 22 | 3 | 4 | 0 | 1 | | 0 |
| Landiwa | Boys | 11 | 0 | 0 | 1 | 0 | | 0 |

¹⁷ Secondary data were collected from the Khyber Pakhtunkhwa Education Monitoring Authority (KPEMA); Directorate of Higher Education; Directorate of Social Welfare, Special Education, and Women Empowerment; and Khyber Pakhtunkhwa Technical Education and Vocational Training Authority in January 2023.

| | | | | | | | | |
|----------------------|-------|-----|----|----|---|---|---|---|
| | Girls | 7 | 2 | 1 | 0 | 0 | | 0 |
| Ghazni Khel | Boys | 3 | 0 | 1 | 0 | 1 | | 2 |
| | Girls | 4 | 0 | 0 | 1 | 0 | | 0 |
| Tajori | Boys | 5 | 0 | 2 | 0 | 1 | | 0 |
| | Girls | 4 | 2 | 1 | 0 | 0 | | 0 |
| Pezu | Boys | 3 | 1 | 0 | 1 | 0 | | 0 |
| | Girls | 2 | 1 | 1 | 0 | 0 | | 0 |
| Tajazai | Boys | 6 | 0 | 0 | 1 | 0 | 1 | 1 |
| | Girls | 4 | 0 | 1 | 0 | 0 | | 0 |
| Rural Area | | | | | | | | |
| Tehsil Lakki Marwat | Boys | 174 | 20 | 19 | 2 | 3 | 0 | 0 |
| | Girls | 77 | 13 | 5 | 0 | 0 | 0 | 0 |
| Tehsil Serai Nurrang | Boys | 145 | 9 | 16 | 1 | 0 | 0 | 0 |
| | Girls | 80 | 13 | 7 | 0 | 0 | 0 | 0 |
| Tehsil Ghazni Khel | Boys | 202 | 20 | 18 | 6 | 3 | 0 | 0 |
| | Girls | 117 | 16 | 5 | 1 | 2 | 0 | 0 |
| Bettani | Boys | 27 | 5 | 1 | 0 | 0 | 0 | 0 |
| | Girls | 31 | 3 | 2 | 0 | 0 | 0 | 0 |

3.1.3 Spatial Distribution of Government Education Institutes

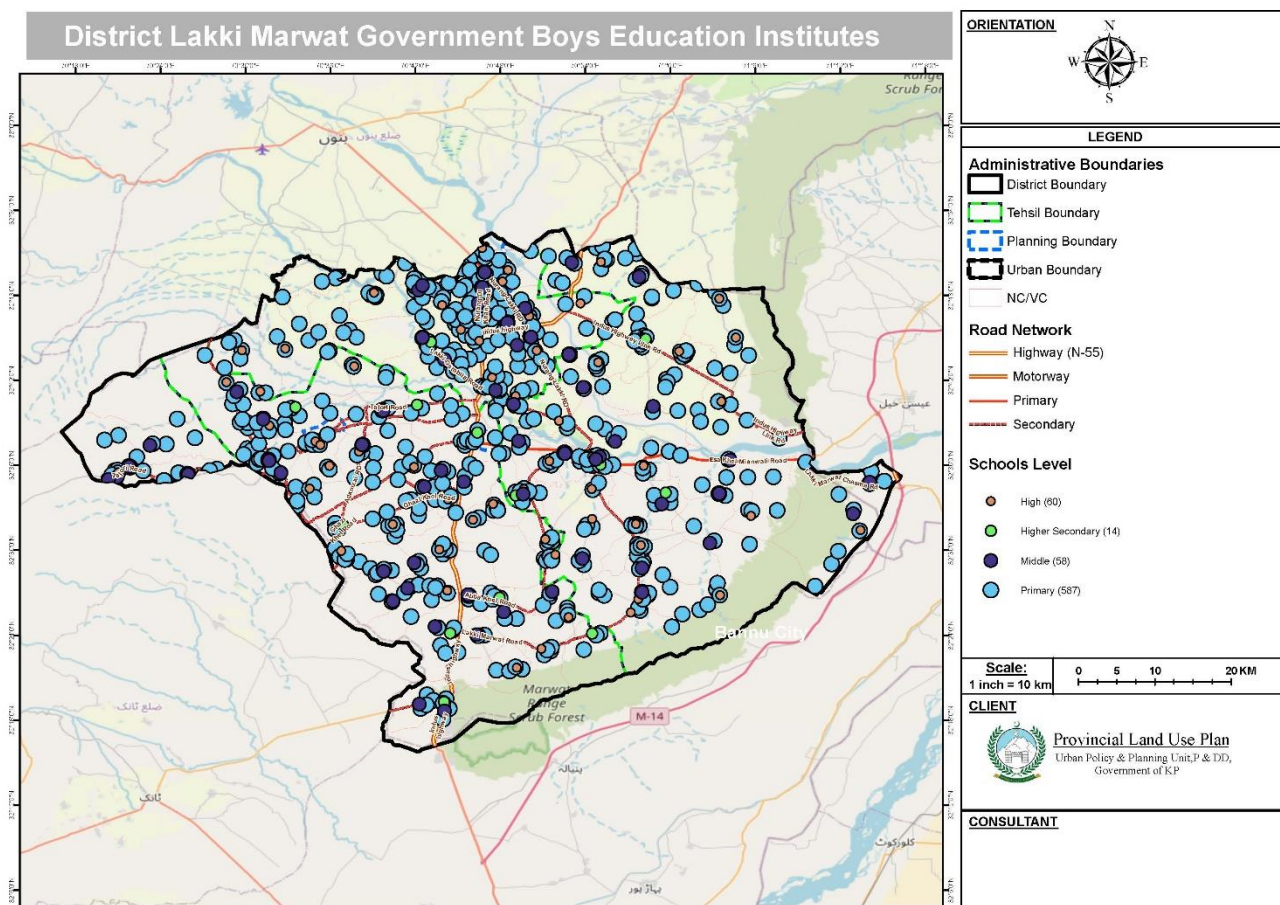
District Lakki Marwat has a total of 1,212 government educational institutes, categorized by gender and educational levels as outlined in the table above. To provide a clearer spatial understanding, these institutes are divided into schools and higher education facilities. Given the large number of schools and the gender-based division, the spatial distribution of schools is further analyzed separately for boys and girls.

1 Boys Schools

The distribution of government boys' schools in District Lakki Marwat has been comprehensively analyzed using secondary data collection and spatial mapping techniques. The district comprises 615 primary schools, 58 middle schools, 60 high schools, and 14 higher secondary schools for boys.

The analysis reveals a notable concentration of boys' schools in Tehsils Lakki Marwat and Ghazni Khel, which can be attributed to their strategic demographic positions, better connectivity to major roads, availability of facilities, and higher population density. These tehsils show a higher density of boys' schools due to these factors. In contrast, the Bettani tehsil shows a significantly lower concentration of boys' schools, reflecting its more rural and less densely populated character.

Notably, the rural areas of Lakki Marwat Tehsil have the highest number of boys' schools, which indicates a focused effort to provide educational infrastructure in less urbanized regions. The spatial distribution of government boys' schools across the district is depicted in the map below, highlighting areas of higher and lower school density.



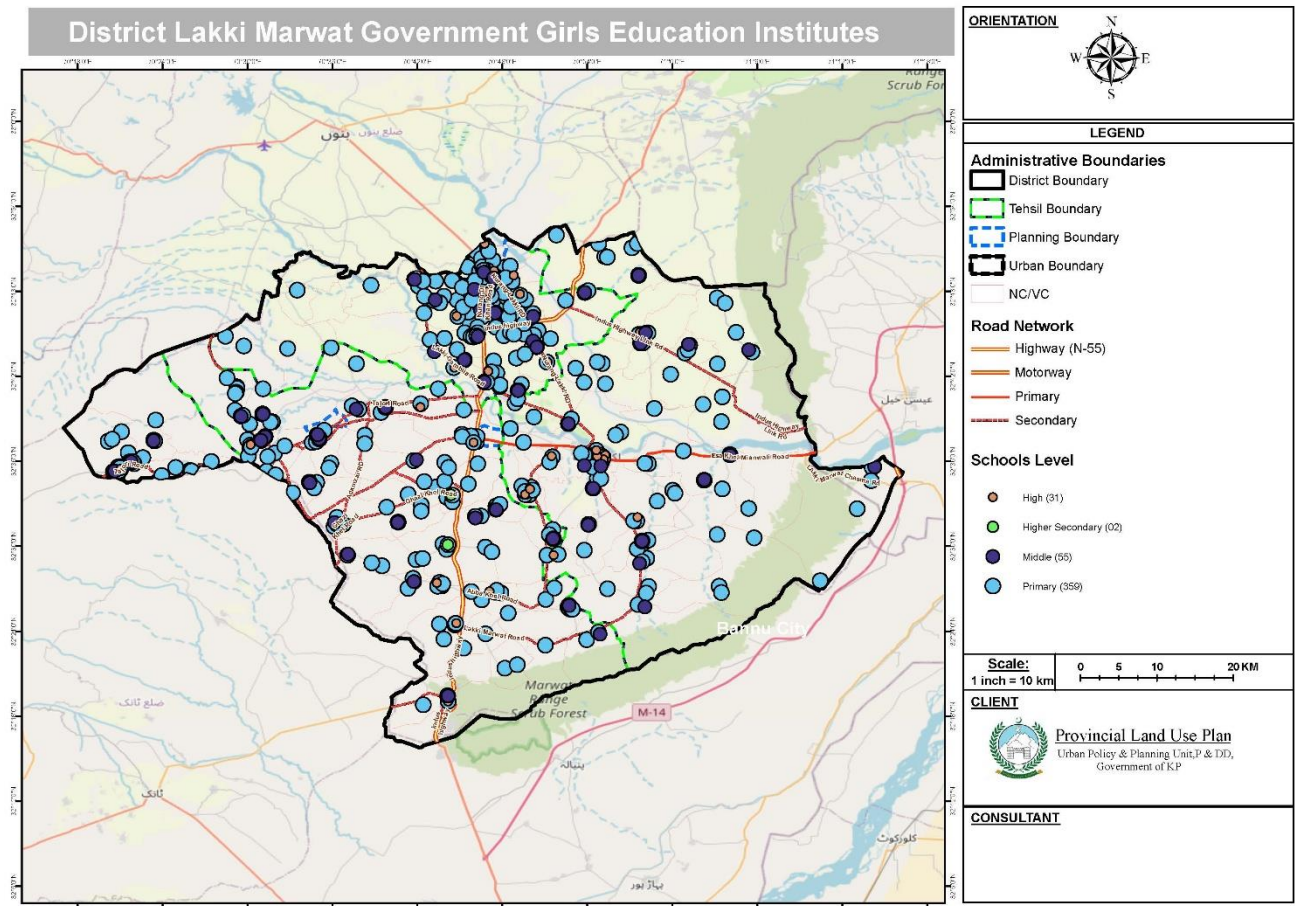
Map 3-1: District Lakki Marwat Boys' Public Sector School

2 Girls' Schools

District Lakki Marwat has a total of 359 government primary schools, 55 middle schools, 31 high schools, and 2 higher secondary schools for girls.

The analysis reveals a significant concentration of girls' schools in Ghazni Khel and Tehsil Lakki Marwat. This concentration is driven by strategic demographic factors, including favorable locations, good road connectivity, the availability of educational facilities, and higher population density. These factors contribute to a higher density of girls' schools in these tehsils.

In contrast, Bettani Tehsil shows a noticeably lower number of girls' schools, reflecting its more remote and sparsely populated nature. The distribution of schools across other tehsils corresponds with their demographic importance, with Tehsils Serai Nurrang and Ghazni Khel also displaying a fair distribution of girls' schools. Overall, the spatial distribution of government girls' schools across District Lakki Marwat is illustrated in the map below, highlighting areas with both high and low concentrations of schools.



Map 3-2: District Lakki Marwat Girls' Public Sector School

3.1.3.1 Private Institutes

The total number of private educational institutions in District Lakki Marwat is 196. Among the 196 educational institutes, 120 are located in rural areas while 76 are located in urban areas. This includes 130 primary schools, 9 middle schools, 35 high schools, 21 higher secondary schools, and 1-degree colleges. Out of the 130 primary schools, 79 are in rural areas while 51 are in urban areas. Similarly, 6 out of 9 middle schools are in rural areas, serving only 3 in urban areas. Of the 35 higher secondary schools, 20 are in rural areas, while 15 are in urban areas. There is only a 1-degree college in Lakki, located in a rural area. Spatially, 162 out of 196 educational institutes have been located through GIS analysis, while the coordinates of the remaining 34 are unknown and could not be determined.

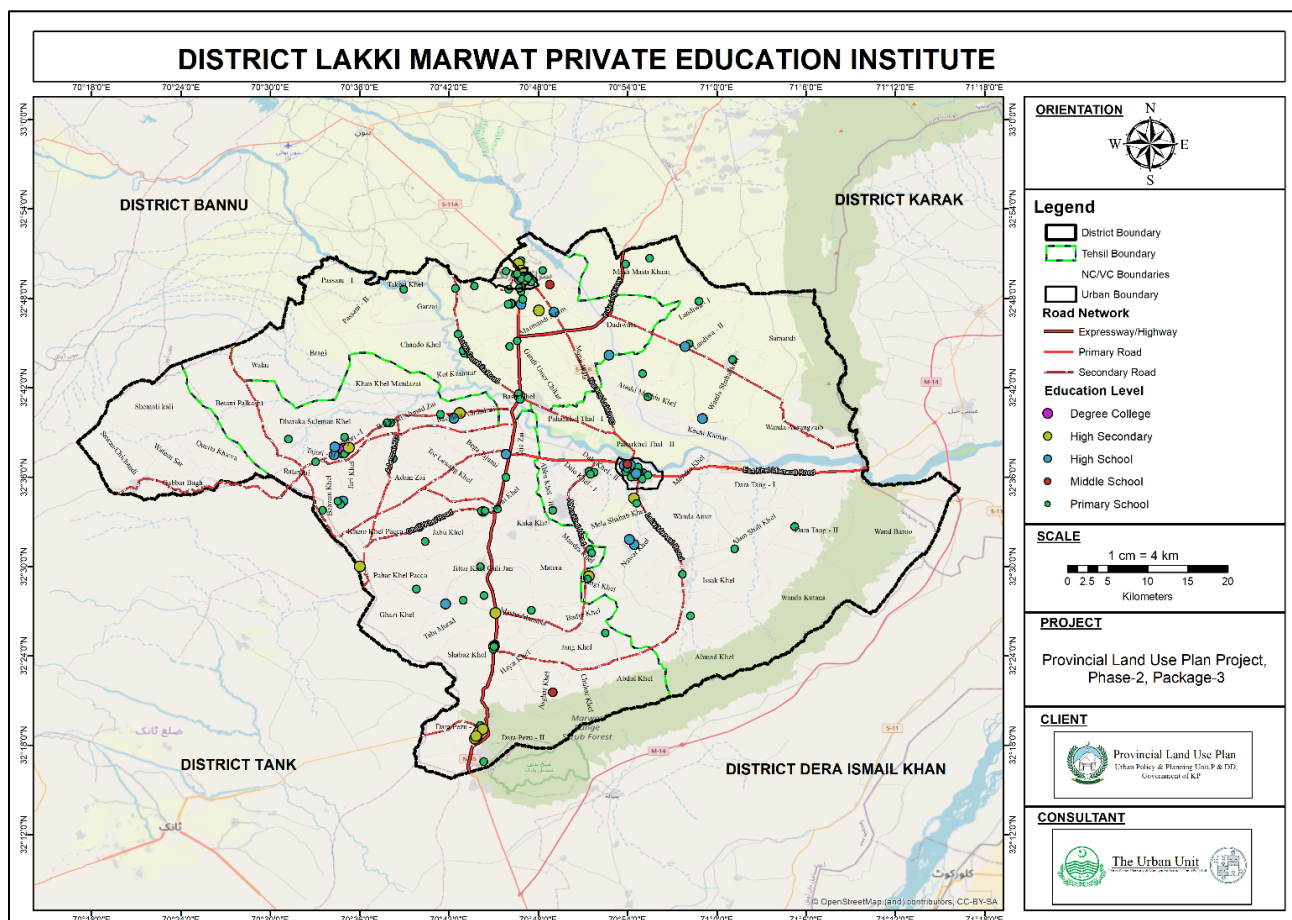
In total, 120 out of the 196 private educational institutions (approximately 61%) are located in rural areas, while only 76 (about 39%) are in urban areas. The detailed distribution of these institutions is shown in the table below.

Table 3-4: Private Educational Institutes in District Lakki Marwat¹⁸

| Administrative Area | Primary Schools | Middle Schools | High Schools | Higher Secondary Schools | Degree Colleges | Universities | Total |
|---------------------|-----------------|----------------|--------------|--------------------------|-----------------|--------------|-------|
| Urban | 51 | 3 | 15 | 7 | | 0 | 76 |
| Rural | 79 | 6 | 20 | 14 | 1 | | 120 |

¹⁸ Secondary data were collected from the Khyber Pakhtunkhwa Private School Regulatory Authority (PSRA), and Higher Education Regulatory Authority (HERA) in January 2023.

| | | | | | | | |
|-----------------------|-----|---|----|----|---|---|-----|
| District Lakki Marwat | 130 | 9 | 35 | 21 | 1 | 0 | 196 |
|-----------------------|-----|---|----|----|---|---|-----|



Map 3-3: District Lakki Marwat Existing Private Education Institutes

3.1.4 Enrollments and Dropout Rates

3.1.4.1 Gross and Net Enrollment Rates

In District Lakki Marwat, the enrollment rates provide insights into the educational landscape, comparing the performance of government and private institutes at both the primary and secondary education levels.

For primary schools, government institutes have a Gross Enrollment Rate (GER) of 79% for boys and 74% for girls. The Net Enrollment Rate (NER) stands at 55% for boys and 58% for girls. This indicates that girls slightly outperform boys in terms of enrollment at both the gross and net levels in government primary schools. In comparison, private institutes show a much lower GER of 27% for boys and only 7% for girls, with corresponding NERs of 20% for boys and 6% for girls. This disparity highlights the dominant role of government institutes in primary education, with private institutes capturing a much smaller portion of the student population.

At the secondary level, including middle, high, and higher secondary schools, government institutes again demonstrate a stronger performance with a GER of 41% for boys and 20% for girls. The NERs for this level are 33% for boys and 16% for girls. While these figures show a significant drop from primary school enrollment, government institutes still maintain a clear lead over private ones. Private institutes record a GER of 16% for boys and 3% for girls, with NERs of 15% for boys and 2% for girls, indicating that private education is less prevalent at this level.

Overall, District Lakki Marwat's total GER for primary schools is 95%, with a NER of 70%, indicating a relatively high enrollment at this foundational level. For middle, high, and higher secondary schools, the total GER drops to 41%, with a NER of 34%, reflecting the challenges in retaining students as they progress to higher levels of education.

This analysis underscores the significant role of government institutes in providing education at both the primary and secondary levels in District Lakki Marwat, particularly for girls. Private institutes, while present, cater to a much smaller segment of the student population, particularly at the secondary level. The distribution of enrollment across these institutions suggests that while access to education is relatively strong at the primary level, there is a need for improved retention and outreach at the secondary level to ensure that more students, particularly girls, continue their education.

Table 3-5: District Lakki Marwat Gross and Net Enrollment Rates¹⁹

| Type of Institutes | | Primary Schools | | Middle, High, and Higher Secondary Schools | |
|-----------------------|-------|---------------------|-----------------------|--|-----------------------|
| | | Net Enrollment Rate | Gross Enrollment Rate | Net Enrollment Rate | Gross Enrollment Rate |
| Government Institutes | Boys | 55% | 79% | 33% | 41% |
| | Girls | 58% | 74% | 16% | 20% |
| | Total | 56% | 77% | 25% | 31% |
| Private Institutes | Boys | 20% | 27% | 15% | 16% |
| | Girls | 6% | 7% | 2% | 3% |
| | Total | 14% | 18% | 9% | 10% |
| District Lakki Marwat | Boys | 76% | 107% | 47% | 57% |
| | Girls | 63% | 82% | 18% | 22% |
| | Total | 70% | 95% | 34% | 41% |

3.1.4.2 Dropout Rate, Promotion Rate, and Repetition Rate

Evaluating educational status in District Lakki Marwat involves examining key indicators such as the dropout rate, promotion rate, and repetition rate across different educational levels, with the sum of these indicators totaling 100%.

Primary Schools:

- **Promotion Rate:** The promotion rate for boys in primary schools is 71.10%, while for girls, it is slightly lower at 67.51%. The overall promotion rate for primary schools stands at 72.51%. This suggests that a higher percentage of boys are promoted compared to girls, although the difference is relatively small.
- **Repetition Rate:** The repetition rate for boys is 0.21%, which is lower than the rate for girls at 0.54%. The overall repetition rate in primary schools is 0.40%. This indicates that repetition rates are generally low but slightly higher for girls.
- **Dropout Rate:** The dropout rate for boys is 22.26%, while for girls, it is significantly higher at 31.95%. The overall dropout rate in primary schools is 27.10%, highlighting a more pronounced challenge for girls in continuing their education at this level.

Middle and High Schools:

- **Promotion Rate:** In middle and high schools, the promotion rate for boys is 81.36%, whereas for girls, it is considerably lower at 44.41%. The overall promotion rate for these levels is 79.36%. This indicates a significant disparity between boys and girls in terms of progression to the next grade.

¹⁹ Khyber Pakhtunkhwa Education Monitoring Authority (KPEMA). (2023). *Annual Statistical Report of Government Schools 2021-2022. Gross Enrolment Ratios in Govt., Non-Govt. and Deeni Madaris Institutions and Net Enrolment Ratios in Govt., Non-Govt. and Deeni Madaris Institutions.*

- **Repetition Rate:** The repetition rate is very low for both boys (0.09%) and girls (0.14%), resulting in an overall repetition rate of 0.10%. This shows that repetition is not a major issue at these educational levels.
- **Dropout Rate:** The dropout rate for boys at the middle and high school levels is 18.55%, whereas for girls, it is much higher at 55.44%. The overall dropout rate is 20.54%, revealing a stark contrast in dropout tendencies between boys and girls, with girls facing more significant challenges in continuing their education.

Overall, District Lakki Marwat's educational indicators reveal critical disparities, particularly at the middle and high school levels, where girls face significantly lower promotion rates and higher dropout rates compared to boys. The primary education level also shows notable differences in dropout rates between genders. These findings underscore the need for targeted interventions to address gender disparities and improve educational retention and progression, especially for girls in both primary and secondary education.

Table 3-6: District Lakki Marwat Promotion, Repetition, and Dropout Rate²⁰

| Indicators | Primary Schools | | | Middle and High Schools | | |
|-----------------|-----------------|--------|---------|-------------------------|--------|---------|
| | Boys | Girls | Overall | Boys | Girls | Overall |
| Promotion Rate | 71.10% | 67.51% | 72.51% | 81.36% | 44.41% | 79.36% |
| Repetition Rate | 0.21% | 0.54% | 0.40% | 0.09% | 0.14% | 0.10% |
| Dropout Rate | 22.26% | 31.95% | 27.10% | 18.55% | 55.44% | 20.54% |

3.1.5 Teacher-Student Ratio

The teacher-student ratio in District Lakki Marwat provides valuable insights into the distribution of educational resources across various levels. At the primary school level, the ratio for boys is 1:28, while for girls, it is 1:58, resulting in an overall ratio of 1:37. This suggests a more favorable ratio for boys, with girls experiencing a higher student-to-teacher ratio. In middle schools, the teacher-student ratio is 1:13 for boys and slightly better for girls at 1:09, with an overall ratio of 1:11. This indicates a manageable workload for teachers in middle schools, with a slight advantage for girls. At the high school level, the ratio is 1:19 for boys and 1:19 for girls, leading to an overall ratio of 1:19. This shows a relatively balanced distribution. For higher secondary schools, the ratio is 1:19 boys and 1:17 for girls, reflecting a consistent distribution. Degree colleges have a ratio of 1:19 for boys and 1:16 for girls, with an overall ratio of 1:18, indicating a somewhat better ratio for girls at this level. At universities, the ratio is 1:21. Technical colleges show a ratio of 1:16 for boys.

Table 3-7: District Lakki Marwat Teacher-Student Ratio of Government Education Institutes²¹

| Type of Institute | | Primary Schools | Middle Schools | High Schools | Higher Secondary Schools | Degree Colleges | Universities | Technical Colleges |
|-------------------|------------------|-----------------|----------------|--------------|--------------------------|-----------------|--------------|--------------------|
| Enrolled Students | Boys Institutes | 54186 | 4562 | 16338 | 9862 | 5,331 | 577 | 62 |
| | Girls Institutes | 49254 | 2934 | 8585 | 702 | 2,340 | | 0 |
| Working Teachers | Boys Institutes | 1,905 | 353 | 863 | 506 | 276 | 27 | 4 |

²⁰ Khyber Pakhtunkhwa Education Monitoring Authority (KPEMA). (2023). Annual Statistical Report of Government Schools 2021-2022. Student Flow Analysis in Districts at Primary and Secondary Levels

²¹ Khyber Pakhtunkhwa Education Monitoring Authority (KPEMA). (2023). Annual Statistical Report of Government Schools 2021-2022. Enrollment in Government Schools and Teaching Staff in Government Schools.

Bureau of Statistics, Planning & Development Department, Government of Khyber Pakhtunkhwa. Development Statistics of Khyber Pakhtunkhwa 2023. Table No. 79, 80, 81, 83, 84, 85, and 86

| | | | | | | | | |
|-----------------------|------------------|------|------|------|------|------|------|------|
| | Girls Institutes | 854 | 309 | 452 | 42 | 146 | | 0 |
| Teacher-Student Ratio | Boys Institutes | 1:28 | 1:13 | 1:19 | 1:19 | 1:19 | 1:21 | 1:16 |
| | Girls Institutes | 1:58 | 1:09 | 1:19 | 1:17 | 1:16 | | 0 |
| | Overall | 1:37 | 1:11 | 1:19 | 1:19 | 1:18 | 1:21 | 1:16 |

In private institutes, the ratios are generally more favorable compared to government schools at the primary and middle school levels. Private primary schools have a teacher-student ratio of 1:22, and middle schools have a ratio of 1:16. However, private high schools have a less favorable ratio of 1:26, and higher secondary schools have a ratio of 1:26. This suggests that while private institutions offer better ratios in some areas, challenges remain, particularly at the higher secondary level. Overall, District Lakki Marwat's data highlights areas where teacher distribution could be optimized, particularly for girls and at higher educational levels.

Table 3-8: District Lakki Marwat Teacher-Student Ratio of Private Education Institutes²²

| Type of Institute | Primary | Middle | High Schools | Higher Secondary Schools |
|-----------------------|---------|--------|--------------|--------------------------|
| Enrolled Students | 23653 | 957 | 11526 | 7601 |
| Working Teachers | 1072 | 61 | 451 | 292 |
| Teacher-Student Ratio | 1:22 | 1:16 | 1:26 | 1:26 |

3.1.6 Need for New Education Institutes (Current Backlog and Future Projection)

3.1.6.1.1 Primary Schools (Current Backlog and Future Projection)

3.1.6.1.2 Planning Standards for Backward & Hilly Areas for Establishment & Upgradation of Primary Schools (Government of K.P Elementary & Secondary Education Department)

1. Establishment of Primary School

- Primary School will be established in those places where population of the catchments area is at least 800. This will ensure the admission of 80 students in the school.
- A Primary School should not exist within radius of 1.5 Kilometer of the settlement/village for which a Primary School is established. However, this condition will be waived off if the existing Primary/Primary Portion of the nearest Middle School is overcrowded and does not have capacity for additional enrolment.
- Land requirements

Urban: Minimum 1-2 Kanal land

Rural: Minimum 02 Kanal land

Note: Vertical construction with maximum of 50% covered area

- The land should be centrally located, accessible and technically feasible for a School Building and free from encumbrance. If the land is not available free of cost, then the land may be purchased.
- In case a village has more than 5000 population, the existing school is overcrowded and space in it for additional construction does not exist, then another primary school will be established in the same locality and the condition of distance will be waived off.

²² Secondary data were collected from the Khyber Pakhtunkhwa Private School Regulatory Authority (PSRA) in January 2023.

- f. Primary schools will consist of 6 classrooms with 8" height boundary wall, lavatory block, water supply and electricity/solar system, Admin Block (1 Headmaster office, 1 Staffroom and 1 Storeroom) and Play Area with all its requirements.

3.1.6.2 Integration of NRM Standards with KP Guidelines for Primary Schools

The methodology adopted was aligned with KP standards for the establishment of primary schools, while NRM standards were applied for future projections. Both frameworks use population thresholds as the key determinant for school planning. Under KP standards, a minimum catchment population of 800 is required to ensure viable enrolment, whereas the NRM approach applies an average threshold of one school per 7,850 people (based on boys' and girls' standards). In both cases, population remains the central criterion for establishing new schools in response to demographic needs. By further distributing the projected requirement into boys' and girls' schools according to the existing ratio, the approach ensures gender-sensitive access in line with KP's emphasis on equitable provision of educational facilities.

The need for new primary schools was determined using NRM standards: one boys' school per 7,500 population and one girls' school per 8,200. The backlog was calculated by dividing each settlement's population by these thresholds and then subtracting existing schools to find the shortfall.

Future School Requirement:

- Step 1: Since the future population projections don't distinguish by gender, an average of the NRM standards is used: $(\text{boys} + \text{girls}) / 2$
- $(7,500 + 8,200) / 2 = 7,850$ people per school (approx.)
- Step 2: The difference between projected population of 2045 and existing population 2025 is divided by this average (7,850) to calculate the required number of schools needed.
- Step 3: This number is then distributed into boys' and girls' schools based on the current ratio of male to female schools in the area, to maintain consistency with the existing educational infrastructure distribution.

The detailed analysis has been conducted at the NC/VC (Neighbourhood Council/Village Council) level. In District Lakki Marwat, the number of existing primary schools in urban area for boys and girls are 67 and 54 schools respectively. The future requirement of primary schools in district Lakki Marwat are 7 schools for boys and 13 for girls. In rural areas, the total number of existing schools for both boys and girls are 853, requiring 18 schools for boys and 75 for girls. Overall, the district has a total of 974 primary schools, reflecting a well-established educational infrastructure. Further details on the existing and future projections are presented in the table below.

Table 3-9: District Lakki Marwat Primary School Current Backlog & Future Projection

| NC/VC | Tehsil | Name_NC_VC | Populati on 2025 | Existing Primary Schools | | Populati on 2045 | Population Difference | Requirem ent 7850 | Requirement 5000 (KP Standards) | Required Primary Schools 2045 | |
|-------|----------------------|---------------|------------------|--------------------------|-------|------------------|-----------------------|-------------------|---------------------------------|-------------------------------|-------|
| | | | | Boys | Girls | | | | | Boys | Girls |
| Urban | Lakki Marwat | Lakki Marwat | 79553 | 15 | 11 | 159882 | 80329 | 10 | 16 | 4 | 6 |
| | Lakki Marwat | Landiwa | 14953 | 11 | 7 | 25776 | 10823 | 1 | 2 | 0 | 1 |
| | Tehsil Serai Naurang | Serai Naurang | 62042 | 24 | 22 | 121237 | 59195 | 7 | 11 | 3 | 4 |

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| | | | | | | | | | | | |
|--------------|--------------------|-----------------------|-------|----|-------|-------|-------|---|---|---|---|
| | Tehsil Ghazni Khel | Ghazni Khel | 5437 | 3 | 4 | 9372 | 3935 | 0 | 0 | 0 | 0 |
| | Tehsil Ghazni Khel | Pezu | 8989 | 3 | 2 | 15494 | 6505 | 1 | 1 | 0 | 1 |
| | Tehsil Ghazni Khel | Tajori | 8125 | 5 | 4 | 14006 | 5881 | 0 | 1 | 0 | 0 |
| | Tehsil Ghazni Khel | Taja Zai | 11356 | 6 | 4 | 19575 | 8219 | 1 | 1 | 0 | 1 |
| Rural | Lakki Marwat | Paharkhel Thal - II | 8359 | 5 | 4 | 14409 | 6050 | 1 | 1 | 0 | 1 |
| | Lakki Marwat | Paharkhel Thal - I | 12961 | 8 | 3 | 22341 | 9380 | 1 | 2 | 0 | 1 |
| | Lakki Marwat | Mash Masti Khani | 18411 | 19 | 7 | 31737 | 13326 | 2 | 2 | 0 | 2 |
| | Lakki Marwat | Zangi Khel | 10345 | 5 | 2 | 17832 | 7487 | 1 | 1 | 0 | 1 |
| | Lakki Marwat | Ahmad Khel | 15671 | 13 | 4 | 27014 | 11343 | 1 | 2 | 0 | 1 |
| | Lakki Marwat | Dalo Khel - II | 5045 | 3 | 1 | 8696 | 3651 | 0 | 1 | 0 | 0 |
| | Lakki Marwat | Dalo Khel - I | 4428 | 3 | 1 | 7632 | 3204 | 0 | 0 | 0 | 0 |
| | Lakki Marwat | Dara Tang - II | 10370 | 6 | 1 | 17875 | 7505 | 1 | 1 | 0 | 1 |
| | Lakki Marwat | Dabak Mandra Khel | 8838 | 0 | 0 | 15234 | 6396 | 1 | 1 | 1 | 0 |
| | Lakki Marwat | Landiwa - II | 1163 | 1 | | 2005 | 842 | 0 | 0 | 0 | 0 |
| | Lakki Marwat | Wanda Kalan | 9860 | 3 | 2 | 16996 | 7136 | 1 | 1 | 0 | 1 |
| | Lakki Marwat | Mirazam Michin Khel | 8441 | 6 | 2 | 14551 | 6110 | 1 | 1 | 0 | 1 |
| | Lakki Marwat | Atashi Machin Khel | 5467 | 3 | 3 | 9424 | 3957 | 0 | 1 | 0 | 0 |
| | Lakki Marwat | Issak Khel | 13183 | 4 | 2 | 22725 | 9542 | 1 | 2 | 0 | 1 |
| | Lakki Marwat | Langar Khel Hati Khan | 4723 | 7 | 4 | 8142 | 3419 | 0 | 0 | 0 | 0 |
| | Lakki Marwat | Nawar Khel | 8818 | 6 | 2 | 15200 | 6382 | 1 | 1 | 0 | 1 |
| | Lakki Marwat | Begu Khel | 5969 | 5 | 2 | 10290 | 4321 | 0 | 0 | 0 | 0 |
| | Lakki Marwat | Alam Shah Khel | 4387 | 2 | | 7561 | 3174 | 0 | 0 | 0 | 0 |
| | Lakki Marwat | Wanda Kutana | 15885 | 7 | 4 | 27382 | 11497 | 1 | 2 | 0 | 1 |
| | Lakki Marwat | Dara Tang - I | 8012 | 6 | 4 | 13811 | 5799 | 0 | 1 | 0 | 0 |
| | Lakki Marwat | Wanda Aurangzaib | 8404 | 6 | 2 | 14486 | 6082 | 1 | 1 | 0 | 1 |
| | Lakki Marwat | Samandi | 17269 | 8 | 5 | 29768 | 12499 | 1 | 2 | 0 | 1 |
| Lakki Marwat | Wand Baroo | 9636 | 10 | 4 | 16610 | 6974 | 1 | 1 | 0 | 1 | |
| Lakki Marwat | Abba Khel - II | 8010 | 4 | 3 | 13807 | 5797 | 0 | 1 | 0 | 0 | |
| Lakki Marwat | Abba Khel - III | 6698 | 5 | 1 | 11546 | 4848 | 0 | 1 | 0 | 0 | |
| Lakki Marwat | Abba Khel - IV | 6942 | 1 | 1 | 11966 | 5024 | 0 | 1 | 0 | 0 | |

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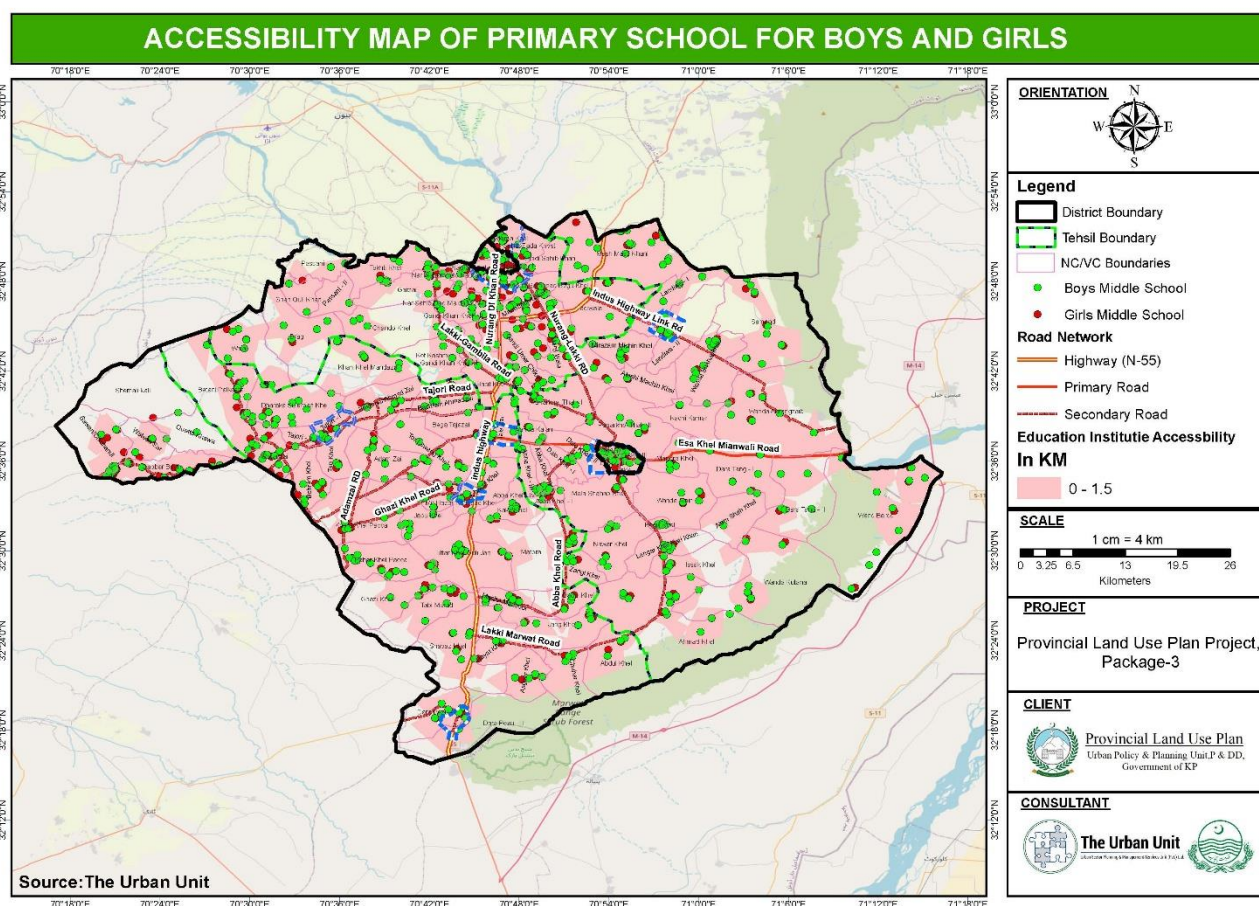
| | | | | | | | | | | |
|---------------|----------------------------|-------|----|----|-------|-------|---|---|---|---|
| Lakki Marwat | Wanda Amir | 8325 | 4 | 3 | 14351 | 6026 | 1 | 1 | 0 | 1 |
| Lakki Marwat | Kachi Kamar | 4599 | 3 | 1 | 7928 | 3329 | 0 | 0 | 0 | 0 |
| Lakki Marwat | Wanda Shahabkhel | 12054 | 11 | 5 | 20779 | 8725 | 1 | 2 | 0 | 1 |
| Lakki Marwat | Landiwa - I | 4760 | 6 | | 8206 | 3446 | 0 | 0 | 0 | 0 |
| Lakki Marwat | Mela Shahab Khel | 5282 | 2 | 3 | 9105 | 3823 | 0 | 1 | 0 | 0 |
| Lakki Marwat | Abba Khel - I | 5831 | 2 | 1 | 10052 | 4221 | 0 | 1 | 0 | 0 |
| Sarai Naurang | Manji Wala | 30606 | 11 | 7 | 63296 | 32690 | 4 | 6 | 0 | 4 |
| Sarai Naurang | Gandi Khan Khel - II | 20045 | 9 | 6 | 41455 | 21410 | 3 | 4 | 1 | 2 |
| Sarai Naurang | Gandi Khan Khel - I | 11832 | 7 | 2 | 24471 | 12639 | 1 | 2 | 0 | 1 |
| Sarai Naurang | Nar Sahib Dad Maidad Khel | 16703 | 14 | 10 | 34544 | 17841 | 2 | 3 | 0 | 2 |
| Sarai Naurang | Takhti Khel | 10918 | 12 | 3 | 22579 | 11661 | 1 | 2 | 0 | 1 |
| Sarai Naurang | Gandi Umer Chikar | 22594 | 11 | 8 | 46727 | 24133 | 3 | 5 | 1 | 2 |
| Sarai Naurang | Nar Abud Samanad Begu Khel | 9480 | 4 | 5 | 19606 | 10126 | 1 | 2 | 0 | 1 |
| Sarai Naurang | Sahib Zada Khost | 17913 | 4 | 2 | 37047 | 19134 | 2 | 4 | 0 | 2 |
| Sarai Naurang | Dadiwala | 7522 | 4 | 3 | 15557 | 8035 | 1 | 1 | 0 | 1 |
| Sarai Naurang | Marmandi Azam | 21081 | 18 | 13 | 43599 | 22518 | 3 | 4 | 0 | 3 |
| Sarai Naurang | Chando Khel | 9901 | 9 | 1 | 20477 | 10576 | 1 | 2 | 0 | 1 |
| Sarai Naurang | Kot Kashmir | 13243 | 4 | 1 | 27389 | 14146 | 2 | 3 | 0 | 2 |
| Sarai Naurang | Garzai | 23963 | 7 | 4 | 49559 | 25596 | 3 | 5 | 0 | 3 |
| Sarai Naurang | Basit Khel | 20871 | 9 | 7 | 43164 | 22293 | 3 | 4 | 1 | 2 |
| Sarai Naurang | Walai | 8719 | 7 | 2 | 18032 | 9313 | 1 | 2 | 0 | 1 |
| Sarai Naurang | Bragi | 14475 | 4 | 1 | 29936 | 15461 | 2 | 3 | 0 | 2 |
| Sarai Naurang | Passani - II | 7917 | 1 | | 16373 | 8456 | 1 | 1 | 0 | 1 |
| Sarai Naurang | Shah Quli Khan | 10875 | 2 | | 22491 | 11616 | 1 | 2 | 0 | 1 |
| Sarai Naurang | Gandi Sahib Khan | 14813 | 2 | 2 | 30636 | 15823 | 2 | 3 | 1 | 1 |
| Sarai Naurang | Passani - I | 13130 | 2 | 1 | 27154 | 14024 | 2 | 3 | 1 | 1 |
| Sarai Naurang | Nar Muhammad Naurang | 21072 | 4 | 2 | 43579 | 22507 | 3 | 4 | 1 | 2 |
| Ghazni Khel | Khan Khel Mandazai | 10504 | 6 | 2 | 18106 | 7602 | 1 | 1 | 0 | 1 |
| Ghazni Khel | Adam Zai | 16498 | 12 | 3 | 28439 | 11941 | 1 | 2 | 0 | 1 |
| Ghazni Khel | Bachken Ahmadzai | 18094 | 7 | 3 | 31191 | 13097 | 1 | 2 | 0 | 1 |
| Ghazni Khel | Ghazni Khel | 5888 | 4 | 3 | 10149 | 4261 | 0 | 1 | 0 | 0 |

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| | | | | | | | | | | |
|-------------|------------------------|-------|----|----|-------|-------|---|---|---|---|
| Ghazni Khel | Pahar Khel Pacca | 12879 | 15 | 5 | 22200 | 9321 | 1 | 2 | 0 | 1 |
| Ghazni Khel | Shabaz Khel | 14981 | 7 | 5 | 25824 | 10843 | 1 | 2 | 0 | 1 |
| Ghazni Khel | Masha Mansoor | 11444 | 6 | 4 | 19727 | 8283 | 1 | 1 | 0 | 1 |
| Ghazni Khel | Ratanzai | 5677 | 7 | 6 | 9786 | 4109 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Betani Palkasht | 13106 | 14 | 16 | 22592 | 9486 | 1 | 2 | 0 | 1 |
| Ghazni Khel | Jang Khel | 8403 | 6 | 5 | 14484 | 6081 | 1 | 1 | 0 | 1 |
| Ghazni Khel | Dharaka Suleman Khel | 12604 | 15 | 4 | 21726 | 9122 | 1 | 2 | 0 | 1 |
| Ghazni Khel | Badni Khel | 4807 | 3 | 2 | 8286 | 3479 | 0 | 0 | 0 | 0 |
| Ghazni Khel | Bakhmal Ahmad Zai | 9815 | 4 | 4 | 16919 | 7104 | 1 | 1 | 1 | 0 |
| Ghazni Khel | Tari Khel | 9126 | 2 | 2 | 15732 | 6606 | 1 | 1 | 0 | 1 |
| Ghazni Khel | Behram Khel | 11945 | 6 | 4 | 20590 | 8645 | 1 | 1 | 0 | 1 |
| Ghazni Khel | Bega Tajazai | 5585 | 2 | 2 | 9628 | 4043 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Jabu Khel | 7873 | 5 | 3 | 13571 | 5698 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Mir Hazar Khanzad Khel | 7300 | 6 | 4 | 12583 | 5283 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Khero Khel Pacca | 11562 | 8 | 6 | 19930 | 8368 | 1 | 1 | 0 | 1 |
| Ghazni Khel | Tittar Khel Guli Jan | 14465 | 10 | 5 | 24935 | 10470 | 1 | 2 | 0 | 1 |
| Ghazni Khel | Ghazi Khel | 5506 | 5 | 3 | 9490 | 3984 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Tabi Murad | 6294 | 6 | 4 | 10849 | 4555 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Dara Pezu - I | 1999 | 4 | 1 | 3446 | 1447 | 0 | 0 | 0 | 0 |
| Ghazni Khel | Dara Pezu - II | 15615 | 1 | | 26917 | 11302 | 1 | 2 | 0 | 1 |
| Ghazni Khel | Asghar Khel | 5590 | 4 | 2 | 9636 | 4046 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Hayat Khel | 4920 | 2 | 2 | 8481 | 3561 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Matora | 6048 | 0 | 0 | 10425 | 4377 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Kaka Khel | 8180 | 6 | 5 | 14101 | 5921 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Tajori - II | 16228 | 3 | 1 | 27974 | 11746 | 1 | 2 | 0 | 1 |
| Ghazni Khel | Mela Mandra Khel | 12092 | 9 | 5 | 20843 | 8751 | 1 | 2 | 0 | 1 |
| Ghazni Khel | Taja Zai | 4664 | 3 | | 8039 | 3375 | 0 | 0 | 0 | 0 |
| Ghazni Khel | Tor Lawang Khel | 6938 | 7 | 3 | 11959 | 5021 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Abdul Khel | 7900 | 3 | 2 | 13618 | 5718 | 0 | 1 | 0 | 0 |
| Ghazni Khel | Chuhar Khel | 9354 | 4 | 1 | 16124 | 6770 | 1 | 1 | 0 | 1 |
| Bettani | Wateen Sar | 9255 | 2 | 3 | 37387 | 28132 | 3 | 5 | 2 | 1 |
| Bettani | Gabbar Bagh | 9505 | 11 | 14 | 38397 | 28892 | 3 | 5 | 2 | 1 |

| | | | | | | | | | | | |
|---------|---------|------------------|---------|-----|-----|---------|---------|-----|-----|----|----|
| | Bettani | Quetta Khawa | 8981 | 3 | | 36279 | 27298 | 3 | 5 | 1 | 2 |
| | Bettani | Shemali kali | 8852 | 1 | 1 | 35756 | 26904 | 3 | 5 | 2 | 1 |
| | Bettani | Sawan/Chic handi | 9481 | 10 | 13 | 38298 | 28817 | 3 | 5 | 3 | 0 |
| Overall | Urban | | 190455 | 67 | 54 | 365342 | 174887 | 20 | 32 | 7 | 13 |
| | Rural | | 975777 | 548 | 305 | 1901549 | 925772 | 93 | 162 | 18 | 75 |
| | Total | | 1166232 | 615 | 359 | 2266891 | 1100659 | 113 | 194 | 25 | 88 |

The below map illustrates the accessibility of boys’ and girls’ primary schools in District Lakki Marwat, with a service radius of 1.5 kilometers. Green dots represent boys’ primary schools, while red dots indicate girls’ primary schools. The pink-shaded areas show the population within accessible distance to these schools. School accessibility is relatively higher in the central and southern parts of the district, particularly along Tajori road, Esa Khel Mianwali road, and Lakki Marwat road, where schools are closely aligned with the major road network. In contrast, the western and northern peripheries exhibit notable accessibility gaps, especially for girls’ schools, leaving several settlements underserved. Expanding educational infrastructure along secondary road networks and remote settlements will enhance equitable access in primary education across the Lakki Marwat district.



Map 3-3 Primary Schools Accessibility for Boys and Girls

3.1.6.2.1 High Schools (Current Backlog and Future projection)

3.1.6.2.2 Planning Standards for Backward & Hilly Areas for Establishment & Upgradation of Secondary Schools

1. Establishment of Secondary Schools (Grade VI-XIII), (Backward Hilly Areas)

New Secondary School (Grade VI-XII) will be established at a proposed place when the following conditions are fulfilled: -

- a. The Feeder Primary Schools should have an enrolment not less than 50 for boys in class V. In case of Girls, the enrolment in Class V should be at least 40.
- b. The Feeder Middle Schools should have an enrolment not less than 25 for boys in class IIIIV. In case of Girls, the enrollment in Class IIIIV should be at least 20.
- c. The Feeder High Schools should have an environment of not less than 100 for boys in class X. In case of Girls, the enrollment in class X should be at least 80.
- d. (a), (b) and (c) implies that a minimum of 175 boys' students may be available for enrollment in the proposed secondary schools. However, in case of a Girls School, the minimum number of students should be at least 140.
- e. A Secondary School should not exist within a radius of 5 KM of the proposed school. In case the nearest Secondary School is overcrowded and has no accommodation for additional enrolment in classes VI, VII, VIII, IXBX, XI, XII then the condition of distance will be waived off and a Secondary School will be established irrespective of distance from the nearest high School. Only those High/Middle/Primary Schools will be considered as feeder Schools which are at a distance 2.5 KM from the proposed Secondary School and are not feeder schools of other Secondary Schools.
- f. Land requirement

Urban: Minimum 04 Kanal land

Rural: Minimum 08 Kanal land

Vertical construction with maximum of 50% covered area

Note:

- Where a secondary school is being established the existing middle school in the locality will be merged with the newly constructed secondary school and the building of the middle school will be used for primary school. If land is not available for construction of new secondary school, then existing land of middle school will be utilized for new secondary school provided that the land of existing middle school is not less than 04 kanal in urban and 08 kanal in rural areas.
- The land should be centrally located. However, in big cities and urban areas, where land is scarce and costly, land can be purchased for establishment of a high school

2. Upgradation of Middle Schools to High Status Backward & Hilly Areas

A Middle School will qualify for upgradation to High level if it fulfills the following conditions:

- a. The enrolment in class 8th of the proposed school should not be less than 10. In case of Girls, the enrolment in 8th class should be at least 8.

- b. The enrolment in class 8th of feeder school/schools should not be less than 15. In case of Girls this enrolment should be at least 12.
- c. (a) and (b) implies that a minimum of 25 students may be available for enrollment in class IX of the schools proposed for upgradation to High level. However, in the case of a Girls School, the minimum number of students in class VIII should be at least 20. If a middle school has 25 or 20 students in class-V for boys or girls respectively, then if feeder schools do not exist, the school can be upgraded.
- d. A High School should not exist within a radius of 3 K.M of the School proposed for upgradation. In case the nearest High School is overcrowded and has no accommodation for additional enrolment in classes IX-X, the condition of distance will be waived off and the nearest Middle School can be upgraded. Only those Middle Schools will be considered as feeder Schools which are at 2 KMs from the proposed High School and are not feeder schools of other High Schools.
- e. 9000Sft: land within the premises of the proposed School/adjacent to it should be available for construction of building for High Section. The Construction will comprise of 3 classrooms (24'x20' each), Library Room (24'x20'), 2 multipurpose labs (1 IT & 1 science) (30'x20') with Prep-room/ Store (9'x20'), 1 multipurpose examination hall (70X 40) and stage for extra-curriculum, Staff room (16' * 12') with attached bath (6' * 4') Clerk's Office (8' * 10') Headmaster's/Headmistress Office with attached (6' * 4') will be (12' * 10') constructed only if the same does not exist in the Middle School proposed for upgradation to high status. Clerk's Office in Girls Schools will be constructed near the main gate in such a way that purdah of the school is not disturbed.

3.1.6.2.3 Integration of NRM Standards with KP Guidelines for High Schools

KP standards for secondary and high schools do not prescribe a catchment population threshold; instead, they use enrolment benchmarks from feeder primary, middle, and high schools to determine the need for new schools or upgradation. In our analysis, future requirements were projected using NRM standards, which apply an explicit population threshold of one secondary school per 27,000 people. This approach provides a demographic-based framework for long-term projections, while remaining consistent with KP's emphasis on ensuring adequate student availability before establishing or upgrading secondary schools.

The table outlines the projected need for high schools in District Lakki Marwat by 2045, based on a population threshold for boys 23000 and for girls 31000, $(23000+31000)/2 = 27000$ people per school (approx.). It compares the existing number of boys' and girls' schools with the required number, and calculates the resulting backlog. In District Lakki Marwat, the existing schools in urban areas for boys and girls are 6 and 12 respectively. While in rural areas the existing high schools for boys are 54 and for girls are 19. The district required new 5 high schools in urban areas and 19 in rural areas. The existing High schools' and future projections are detailed in the table below.

Table 3-10: District Lakki Marwat High School Current Backlog & Future Projection

| NC/VC | Tehsil | Name_NC_VC | Population 2025 | Existing High Schools | | Population 2045 | Population Difference | Requirement t 27000 | Required High Schools 2045 | |
|-------|----------------------|---------------|-----------------|-----------------------|-------|-----------------|-----------------------|---------------------|----------------------------|-------|
| | | | | Boys | Girls | | | | Boys | Girls |
| Urban | Lakki Marwat | Lakki Marwat | 79553 | 2 | 4 | 159882 | 80329 | 3 | 2 | 1 |
| | Lakki Marwat | Landiwa | 14953 | 0 | 1 | 25776 | 10823 | 0 | 0 | 0 |
| | Tehsil Serai Naurang | Serai Naurang | 62042 | 1 | 4 | 121237 | 59195 | 2 | 2 | 0 |
| | Tehsil Ghazni Khel | Ghazni Khel | 5437 | 1 | 0 | 9372 | 3935 | 0 | 0 | 0 |
| | Tehsil Ghazni Khel | Pezu | 8989 | 0 | 1 | 15494 | 6505 | 0 | 0 | 0 |
| | Tehsil Ghazni Khel | Tajori | 8125 | 2 | 1 | 14006 | 5881 | 0 | 0 | 0 |
| | Tehsil Ghazni Khel | Taja Zai | 11356 | 0 | 1 | 19575 | 8219 | 0 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | | | | |
|---------------|---------------------------|-----------------------|-------|---|-------|-------|-------|---|---|---|
| Rural | Lakki Marwat | Paharkhel Thal - II | 8359 | 0 | 0 | 14409 | 6050 | 0 | 0 | 0 |
| | Lakki Marwat | Paharkhel Thal - I | 12961 | 1 | 0 | 22341 | 9380 | 0 | 0 | 0 |
| | Lakki Marwat | Mash Masti Khani | 18411 | 1 | 0 | 31737 | 13326 | 0 | 0 | 0 |
| | Lakki Marwat | Zangl Khel | 10345 | 1 | 1 | 17832 | 7487 | 0 | 0 | 0 |
| | Lakki Marwat | Ahmad Khel | 15671 | 2 | 0 | 27014 | 11343 | 0 | 0 | 0 |
| | Lakki Marwat | Dalo Khel - II | 5045 | 0 | 1 | 8696 | 3651 | 0 | 0 | 0 |
| | Lakki Marwat | Dalo Khel - I | 4428 | 1 | 0 | 7632 | 3204 | 0 | 0 | 0 |
| | Lakki Marwat | Dara Tang - II | 10370 | 1 | 0 | 17875 | 7505 | 0 | 0 | 0 |
| | Lakki Marwat | Dabak Mandra Khel | 8838 | 0 | 0 | 15234 | 6396 | 0 | 0 | 0 |
| | Lakki Marwat | Landiwa - II | 1163 | 0 | 0 | 2005 | 842 | 0 | 0 | 0 |
| | Lakki Marwat | Wanda Kalan | 9860 | 0 | 0 | 16996 | 7136 | 0 | 0 | 0 |
| | Lakki Marwat | Mirazam Michin Khel | 8441 | 1 | 0 | 14551 | 6110 | 0 | 0 | 0 |
| | Lakki Marwat | Atashi Machin Khel | 5467 | 0 | 0 | 9424 | 3957 | 0 | 0 | 0 |
| | Lakki Marwat | Issak Khel | 13183 | 0 | 0 | 22725 | 9542 | 0 | 0 | 0 |
| | Lakki Marwat | Langar Khel Hati Khan | 4723 | 1 | 0 | 8142 | 3419 | 0 | 0 | 0 |
| | Lakki Marwat | Nawar Khel | 8818 | 1 | 0 | 15200 | 6382 | 0 | 0 | 0 |
| | Lakki Marwat | Begu Khel | 5969 | 1 | 1 | 10290 | 4321 | 0 | 0 | 0 |
| | Lakki Marwat | Alam Shah Khel | 4387 | 0 | 0 | 7561 | 3174 | 0 | 0 | 0 |
| | Lakki Marwat | Wanda Kutana | 15885 | 1 | 0 | 27382 | 11497 | 0 | 0 | 0 |
| | Lakki Marwat | Dara Tang - I | 8012 | 0 | 0 | 13811 | 5799 | 0 | 0 | 0 |
| | Lakki Marwat | Wanda Aurangzaib | 8404 | 1 | 0 | 14486 | 6082 | 0 | 0 | 0 |
| | Lakki Marwat | Samandi | 17269 | 2 | 0 | 29768 | 12499 | 0 | 0 | 0 |
| | Lakki Marwat | Wand Baroo | 9636 | 1 | 0 | 16610 | 6974 | 0 | 0 | 0 |
| | Lakki Marwat | Abba Khel - II | 8010 | 1 | 1 | 13807 | 5797 | 0 | 0 | 0 |
| | Lakki Marwat | Abba Khel - III | 6698 | 0 | 0 | 11546 | 4848 | 0 | 0 | 0 |
| | Lakki Marwat | Abba Khel - IV | 6942 | 0 | 1 | 11966 | 5024 | 0 | 0 | 0 |
| | Lakki Marwat | Wanda Amir | 8325 | 0 | 0 | 14351 | 6026 | 0 | 0 | 0 |
| | Lakki Marwat | Kachi Kamar | 4599 | 0 | 0 | 7928 | 3329 | 0 | 0 | 0 |
| | Lakki Marwat | Wanda Shahabkhel | 12054 | 1 | 0 | 20779 | 8725 | 0 | 0 | 0 |
| | Lakki Marwat | Landiwa - I | 4760 | 0 | 0 | 8206 | 3446 | 0 | 0 | 0 |
| | Lakki Marwat | Mela Shahab Khel | 5282 | 1 | 0 | 9105 | 3823 | 0 | 0 | 0 |
| | Lakki Marwat | Abba Khel - I | 5831 | 0 | 0 | 10052 | 4221 | 0 | 0 | 0 |
| Sarai Naurang | Manji Wala | 30606 | 1 | 1 | 63296 | 32690 | 1 | 0 | 1 | |
| Sarai Naurang | Gandi Khan Khel - II | 20045 | 1 | 1 | 41455 | 21410 | 1 | 1 | 0 | |
| Sarai Naurang | Gandi Khan Khel - I | 11832 | 0 | 0 | 24471 | 12639 | 0 | 0 | 0 | |
| Sarai Naurang | Nar Sahib Dad Maidad Khel | 16703 | 2 | 1 | 34544 | 17841 | 1 | 0 | 1 | |
| Sarai Naurang | Takhti Khel | 10918 | 1 | 0 | 22579 | 11661 | 0 | 0 | 0 | |

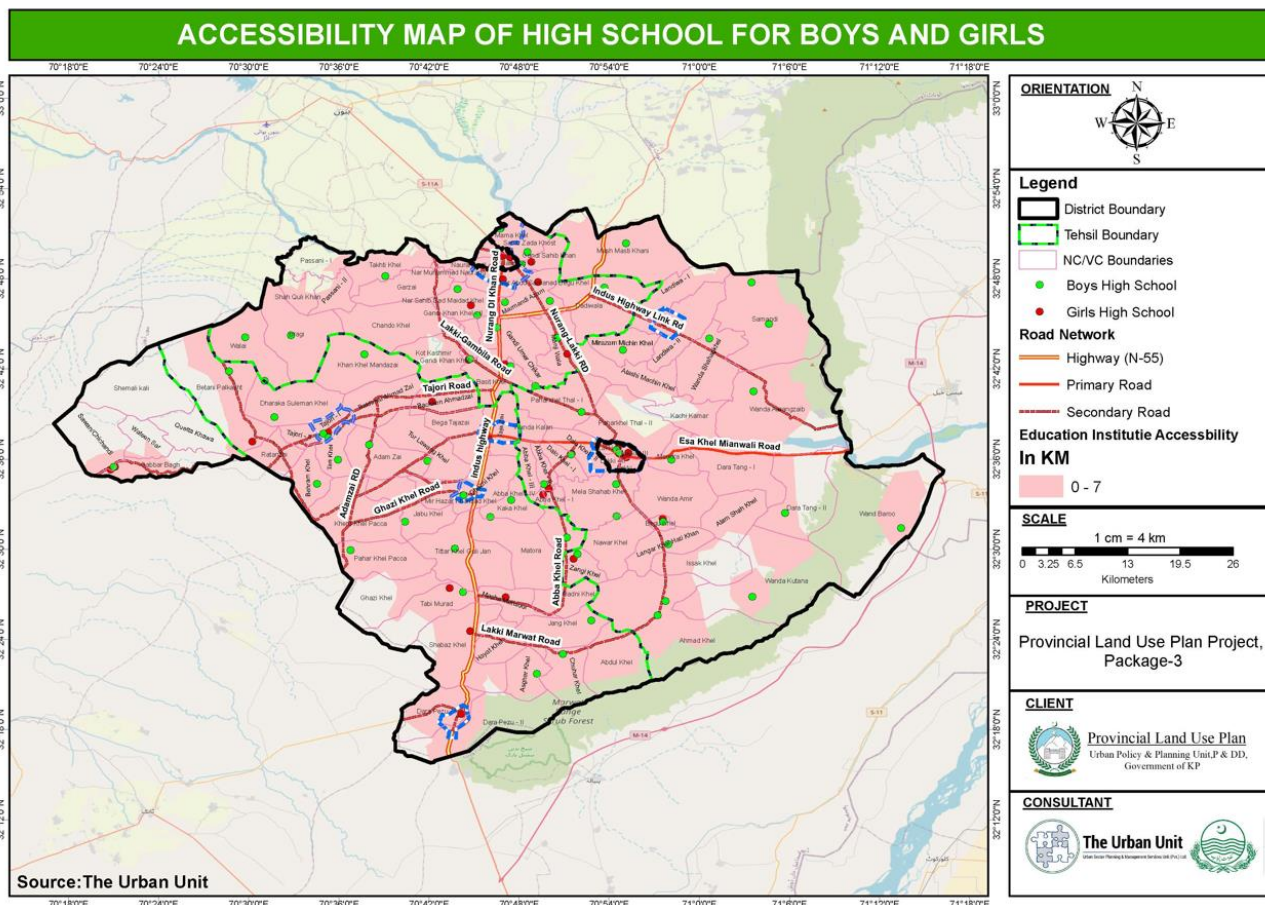
Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | | | |
|---------------|----------------------------|-------|---|---|-------|-------|---|---|---|
| Sarai Naurang | Gandi Umer Chikar | 22594 | 1 | 0 | 46727 | 24133 | 1 | 0 | 1 |
| Sarai Naurang | Nar Abud Samanad Begu Khel | 9480 | 0 | 0 | 19606 | 10126 | 0 | 0 | 0 |
| Sarai Naurang | Sahib Zada Khost | 17913 | 1 | 0 | 37047 | 19134 | 1 | 0 | 1 |
| Sarai Naurang | Dadiwala | 7522 | 1 | 0 | 15557 | 8035 | 0 | 0 | 0 |
| Sarai Naurang | Marmandi Azam | 21081 | 2 | 1 | 43599 | 22518 | 1 | 0 | 1 |
| Sarai Naurang | Chando Khel | 9901 | 0 | 0 | 20477 | 10576 | 0 | 0 | 0 |
| Sarai Naurang | Kot Kashmir | 13243 | 0 | 0 | 27389 | 14146 | 1 | 0 | 1 |
| Sarai Naurang | Garzai | 23963 | 0 | 0 | 49559 | 25596 | 1 | 1 | 0 |
| Sarai Naurang | Basit Khel | 20871 | 2 | 2 | 43164 | 22293 | 1 | 0 | 1 |
| Sarai Naurang | Walai | 8719 | 2 | 0 | 18032 | 9313 | 0 | 0 | 0 |
| Sarai Naurang | Bragj | 14475 | 1 | 0 | 29936 | 15461 | 1 | 0 | 1 |
| Sarai Naurang | Passani - II | 7917 | 0 | 0 | 16373 | 8456 | 0 | 0 | 0 |
| Sarai Naurang | Shah Quli Khan | 10875 | 0 | 0 | 22491 | 11616 | 0 | 0 | 0 |
| Sarai Naurang | Gandi Sahib Khan | 14813 | 1 | 1 | 30636 | 15823 | 1 | 0 | 1 |
| Sarai Naurang | Passani - I | 13130 | 0 | 0 | 27154 | 14024 | 1 | 1 | 0 |
| Sarai Naurang | Nar Muhammad Naurang | 21072 | 0 | 0 | 43579 | 22507 | 1 | 0 | 1 |
| Ghazni Khel | Khan Khel Mandazai | 10504 | 1 | 0 | 18106 | 7602 | 0 | 0 | 0 |
| Ghazni Khel | Adam Zai | 16498 | 2 | 0 | 28439 | 11941 | 0 | 0 | 0 |
| Ghazni Khel | Bachken Ahmadzai | 18094 | 0 | 1 | 31191 | 13097 | 0 | 0 | 0 |
| Ghazni Khel | Ghazni Khel | 5888 | 0 | 0 | 10149 | 4261 | 0 | 0 | 0 |
| Ghazni Khel | Pahar Khel Pacca | 12879 | 1 | 0 | 22200 | 9321 | 0 | 0 | 0 |
| Ghazni Khel | Shabaz Khel | 14981 | 0 | 1 | 25824 | 10843 | 0 | 0 | 0 |
| Ghazni Khel | Masha Mansoor | 11444 | 0 | 1 | 19727 | 8283 | 0 | 0 | 0 |
| Ghazni Khel | Ratanzai | 5677 | 0 | 0 | 9786 | 4109 | 0 | 0 | 0 |
| Ghazni Khel | Betani Palkasht | 13106 | 1 | 1 | 22592 | 9486 | 0 | 0 | 0 |
| Ghazni Khel | Jang Khel | 8403 | 1 | 0 | 14484 | 6081 | 0 | 0 | 0 |
| Ghazni Khel | Dharaka Suleman Khel | 12604 | 1 | 0 | 21726 | 9122 | 0 | 0 | 0 |
| Ghazni Khel | Badni Khel | 4807 | 0 | 0 | 8286 | 3479 | 0 | 0 | 0 |
| Ghazni Khel | Bakhmal Ahmad Zai | 9815 | 0 | 0 | 16919 | 7104 | 0 | 0 | 0 |
| Ghazni Khel | Tari Khel | 9126 | 1 | 0 | 15732 | 6606 | 0 | 0 | 0 |
| Ghazni Khel | Behram Khel | 11945 | 1 | 0 | 20590 | 8645 | 0 | 0 | 0 |
| Ghazni Khel | Bega Tajazai | 5585 | 0 | 0 | 9628 | 4043 | 0 | 0 | 0 |
| Ghazni Khel | Jabu Khel | 7873 | 1 | 0 | 13571 | 5698 | 0 | 0 | 0 |
| Ghazni Khel | Mir Hazar Khanzad Khel | 7300 | 0 | 0 | 12583 | 5283 | 0 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | | | | |
|---------|-------------|----------------------|---------|----|----|---------|---------|----|----|----|
| | Ghazni Khel | Khero Khel Pacca | 11562 | 0 | 0 | 19930 | 8368 | 0 | 0 | 0 |
| | Ghazni Khel | Tittar Khel Guli Jan | 14465 | 1 | 0 | 24935 | 10470 | 0 | 0 | 0 |
| | Ghazni Khel | Ghazi Khel | 5506 | 0 | 0 | 9490 | 3984 | 0 | 0 | 0 |
| | Ghazni Khel | Tabi Murad | 6294 | 1 | 1 | 10849 | 4555 | 0 | 0 | 0 |
| | Ghazni Khel | Dara Pezu - I | 1999 | 0 | 0 | 3446 | 1447 | 0 | 0 | 0 |
| | Ghazni Khel | Dara Pezu - II | 15615 | 0 | 0 | 26917 | 11302 | 0 | 0 | 0 |
| | Ghazni Khel | Asghar Khel | 5590 | 1 | 0 | 9636 | 4046 | 0 | 0 | 0 |
| | Ghazni Khel | Hayat Khel | 4920 | 0 | 0 | 8481 | 3561 | 0 | 0 | 0 |
| | Ghazni Khel | Matora | 6048 | 0 | 0 | 10425 | 4377 | 0 | 0 | 0 |
| | Ghazni Khel | Kaka Khel | 8180 | 2 | 0 | 14101 | 5921 | 0 | 0 | 0 |
| | Ghazni Khel | Tajori - II | 16228 | 0 | 0 | 27974 | 11746 | 0 | 0 | 0 |
| | Ghazni Khel | Mela Mandra Khel | 12092 | 2 | 0 | 20843 | 8751 | 0 | 0 | 0 |
| | Ghazni Khel | Taja Zai | 4664 | 0 | 0 | 8039 | 3375 | 0 | 0 | 0 |
| | Ghazni Khel | Tor Lawang Khel | 6938 | 0 | 0 | 11959 | 5021 | 0 | 0 | 0 |
| | Ghazni Khel | Abdul Khel | 7900 | 0 | 0 | 13618 | 5718 | 0 | 0 | 0 |
| | Ghazni Khel | Chuhar Khel | 9354 | 1 | 0 | 16124 | 6770 | 0 | 0 | 0 |
| | Bettani | Wateen Sar | 9255 | 0 | 0 | 37387 | 28132 | 1 | 1 | 0 |
| | Bettani | Gabbar Bagh | 9505 | 0 | 0 | 38397 | 28892 | 1 | 0 | 1 |
| | Bettani | Quetta Khawa | 8981 | 0 | 0 | 36279 | 27298 | 1 | 1 | 0 |
| | Bettani | Shemali kali | 8852 | 0 | 0 | 35756 | 26904 | 1 | 0 | 1 |
| | Bettani | Sawan/Chichandi | 9481 | 1 | 2 | 38298 | 28817 | 1 | 1 | 0 |
| Overall | Urban | | 190455 | 6 | 12 | 365342 | 174887 | 5 | 4 | 1 |
| | Rural | | 975777 | 54 | 19 | 1901549 | 925772 | 19 | 6 | 13 |
| | Total | | 1166232 | 60 | 31 | 2266891 | 1100659 | 24 | 10 | 14 |

The map below depicts the accessibility of boys' and girls' high schools in district Lakki Marwat, within a 7-kilometer service radius. Green dots represent boys' high schools, while red dots indicate girls' high schools. The pink-shaded areas depict the populations that are served within the defined accessibility range. High school accessibility is mainly concentrated in the central part of the district, particularly along Indus Highway (N-55), and Esa Khel Marwat Road, where settlements are well connected by major and secondary roads. However, significant unserved areas exist in the western and northeastern regions, where travel distances to the nearest high schools are considerably larger. Accessibility challenges are more for girls' high schools. Establishing additional high schools in peripheral areas will improve educational reach and reduce gender disparities in secondary education across the Lakki Marwat district.



Map 3-4: High Schools Accessibility for Boys and Girls

3.1.6.2.4 Higher Secondary (Current Backlog and Future projection)

3.1.6.2.5 Planning Standards for Backward & Hilly Areas for Upgradation of Higher Secondary Schools

1. Upgradation of High Schools to Higher Secondary Status Backward & Hilly Areas

- The enrolment in Class-X of the proposed school including enrolment in Class-X of the Feeder High School (s) should not be less than 100. In case of Girls the desired enrolment in Class-X will be 80 students.
- A Higher Secondary School/Intermediate; or Degree College should not exist within a radius of 10 KM of the school proposed for upgradation. In case of Girls this distance should not be less than 5 KM. However, this condition will be waived off in the case of big cities/Urban areas.
- An area of at least 10,000 S.Ft. should be available for additional construction in the proposed school. A double story building consisting of 4 Classrooms [24' * 20 each), 4 labs for Physics, Biology, Chemistry and IT (33' * 20 each) with prep-rooms/stores (9 * 20) each) will be constructed within the premises or adjacent to the proposed Higher Secondary School.
- Design/structure of construction should be vertical

3.1.6.2.6 Integration of NRM Standards with KP Guidelines for Higher Secondary Schools

KP standards for upgradation of high schools to higher secondary status are defined through enrolment benchmarks, requiring a minimum of 100 boys or 80 girls in Class X of the proposed and feeder schools, along

with conditions related to distance from existing higher secondary institutions and availability of land for additional construction. In contrast, our analysis applies NRM standards, using a population threshold of one higher secondary school per 50,000 people to project future requirements. By adopting this demographic-based approach, the methodology provides long-term projections that complement KP's enrolment-driven upgradation criteria, ensuring that future planning reflects both student availability and population growth trends.

The table outlines the projected need for higher secondary schools in District Lakki Marwat by 2045, based on a population threshold for boys 30,000 and for girls 70,000, $(30,000+70,000)/2 = 50,000$ people per school (approx.). It compares the existing number of boys' and girls' higher secondary schools with the calculated need based on future population. In District Lakki Marwat, urban areas show a backlog of 3 higher secondary schools. Specifically, Lakki Marwat urban lacks 1 boys' and 2 girls' schools. The current backlog and future projections are detailed in the table below.

Table 3-11: District Lakki Marwat Higher Secondary Schools Current Backlog and Future Projection

| NC /VC | Tehsil | Name_NC_VC | Population 2025 | Existing Higher Secondary Schools | | Population 2045 | Population Difference | Requirement 50000 | Required Higher Secondary Schools 2045 | |
|--------|----------------------|---------------------|-----------------|-----------------------------------|-------|-----------------|-----------------------|-------------------|--|-------|
| | | | | Boys | Girls | | | | Boys | Girls |
| Urban | Lakki Marwat | Lakki Marwat | 79553 | 1 | 0 | 159882 | 80329 | 2 | 1 | 1 |
| | Lakki Marwat | Landiwa | 14953 | 1 | 0 | 25776 | 10823 | 0 | 0 | 0 |
| | Tehsil Serai Naurang | Serai Naurang | 62042 | 1 | 0 | 121237 | 59195 | 1 | 0 | 1 |
| | Tehsil Ghazni Khel | Ghazni Khel | 5437 | 0 | 1 | 9372 | 3935 | 0 | 0 | 0 |
| | Tehsil Ghazni Khel | Pezu | 8989 | 1 | 0 | 15494 | 6505 | 0 | 0 | 0 |
| | Tehsil Ghazni Khel | Tajori | 8125 | 0 | 0 | 14006 | 5881 | 0 | 0 | 0 |
| | Tehsil Ghazni Khel | Taja Zai | 11356 | 1 | 0 | 19575 | 8219 | 0 | 0 | 0 |
| Rural | Lakki Marwat | Paharkhel Thal - II | 8359 | 0 | 0 | 14409 | 6050 | 0 | 0 | 0 |
| | Lakki Marwat | Paharkhel Thal - I | 12961 | 0 | 0 | 22341 | 9380 | 0 | 0 | 0 |
| | Lakki Marwat | Mash Masti Khani | 18411 | 0 | 0 | 31737 | 13326 | 0 | 0 | 0 |
| | Lakki Marwat | Zangi Khel | 10345 | 0 | 0 | 17832 | 7487 | 0 | 0 | 0 |
| | Lakki Marwat | Ahmad Khel | 15671 | 0 | 0 | 27014 | 11343 | 0 | 0 | 0 |
| | Lakki Marwat | Dalo Khel - II | 5045 | 0 | 0 | 8696 | 3651 | 0 | 0 | 0 |
| | Lakki Marwat | Dalo Khel - I | 4428 | 0 | 0 | 7632 | 3204 | 0 | 0 | 0 |
| | Lakki Marwat | Dara Tang - II | 10370 | 0 | 0 | 17875 | 7505 | 0 | 0 | 0 |
| | Lakki Marwat | Dabak Mandra Khel | 8838 | 0 | 0 | 15234 | 6396 | 0 | 0 | 0 |
| | Lakki Marwat | Landiwa - II | 1163 | 0 | 0 | 2005 | 842 | 0 | 0 | 0 |
| | Lakki Marwat | Wanda Kalan | 9860 | 0 | 0 | 16996 | 7136 | 0 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | | | |
|---------------|----------------------------|-------|---|---|-------|-------|---|---|---|
| Lakki Marwat | Mirazam Michin Khel | 8441 | 0 | 0 | 14551 | 6110 | 0 | 0 | 0 |
| Lakki Marwat | Atashi Machin Khel | 5467 | 0 | 0 | 9424 | 3957 | 0 | 0 | 0 |
| Lakki Marwat | Issak Khel | 13183 | 0 | 0 | 22725 | 9542 | 0 | 0 | 0 |
| Lakki Marwat | Langar Khel Hati Khan | 4723 | 0 | 0 | 8142 | 3419 | 0 | 0 | 0 |
| Lakki Marwat | Nawar Khel | 8818 | 0 | 0 | 15200 | 6382 | 0 | 0 | 0 |
| Lakki Marwat | Begu Khel | 5969 | 0 | 0 | 10290 | 4321 | 0 | 0 | 0 |
| Lakki Marwat | Alam Shah Khel | 4387 | 0 | 0 | 7561 | 3174 | 0 | 0 | 0 |
| Lakki Marwat | Wanda Kutana | 15885 | 0 | 0 | 27382 | 11497 | 0 | 0 | 0 |
| Lakki Marwat | Dara Tang - I | 8012 | 0 | 0 | 13811 | 5799 | 0 | 0 | 0 |
| Lakki Marwat | Wanda Aurangzaib | 8404 | 0 | 0 | 14486 | 6082 | 0 | 0 | 0 |
| Lakki Marwat | Samandi | 17269 | 0 | 0 | 29768 | 12499 | 0 | 0 | 0 |
| Lakki Marwat | Wand Baroo | 9636 | 0 | 0 | 16610 | 6974 | 0 | 0 | 0 |
| Lakki Marwat | Abba Khel - II | 8010 | 0 | 0 | 13807 | 5797 | 0 | 0 | 0 |
| Lakki Marwat | Abba Khel - III | 6698 | 1 | 0 | 11546 | 4848 | 0 | 0 | 0 |
| Lakki Marwat | Abba Khel - IV | 6942 | 0 | 0 | 11966 | 5024 | 0 | 0 | 0 |
| Lakki Marwat | Wanda Amir | 8325 | 1 | 0 | 14351 | 6026 | 0 | 0 | 0 |
| Lakki Marwat | Kachi Kamar | 4599 | 0 | 0 | 7928 | 3329 | 0 | 0 | 0 |
| Lakki Marwat | Wanda Shahabkhel | 12054 | 0 | 0 | 20779 | 8725 | 0 | 0 | 0 |
| Lakki Marwat | Landiwa - I | 4760 | 0 | 0 | 8206 | 3446 | 0 | 0 | 0 |
| Lakki Marwat | Mela Shahab Khel | 5282 | 0 | 0 | 9105 | 3823 | 0 | 0 | 0 |
| Lakki Marwat | Abba Khel - I | 5831 | 0 | 0 | 10052 | 4221 | 0 | 0 | 0 |
| Sarai Naurang | Manji Wala | 30606 | 0 | 0 | 63296 | 32690 | 1 | 0 | 1 |
| Sarai Naurang | Gandi Khan Khel - II | 20045 | 0 | 0 | 41455 | 21410 | 0 | 0 | 0 |
| Sarai Naurang | Gandi Khan Khel - I | 11832 | 0 | 0 | 24471 | 12639 | 0 | 0 | 0 |
| Sarai Naurang | Nar Sahib Dad Maidad Khel | 16703 | 0 | 0 | 34544 | 17841 | 0 | 0 | 0 |
| Sarai Naurang | Takhti Khel | 10918 | 0 | 0 | 22579 | 11661 | 0 | 0 | 0 |
| Sarai Naurang | Gandi Umer Chikar | 22594 | 0 | 0 | 46727 | 24133 | 0 | 0 | 0 |
| Sarai Naurang | Nar Abud Samanad Begu Khel | 9480 | 0 | 0 | 19606 | 10126 | 0 | 0 | 0 |
| Sarai Naurang | Sahib Zada Khost | 17913 | 0 | 0 | 37047 | 19134 | 0 | 0 | 0 |
| Sarai Naurang | Dadiwala | 7522 | 0 | 0 | 15557 | 8035 | 0 | 0 | 0 |
| Sarai Naurang | Marmandi Azam | 21081 | 0 | 0 | 43599 | 22518 | 0 | 0 | 0 |
| Sarai Naurang | Chando Khel | 9901 | 1 | 0 | 20477 | 10576 | 0 | 0 | 0 |

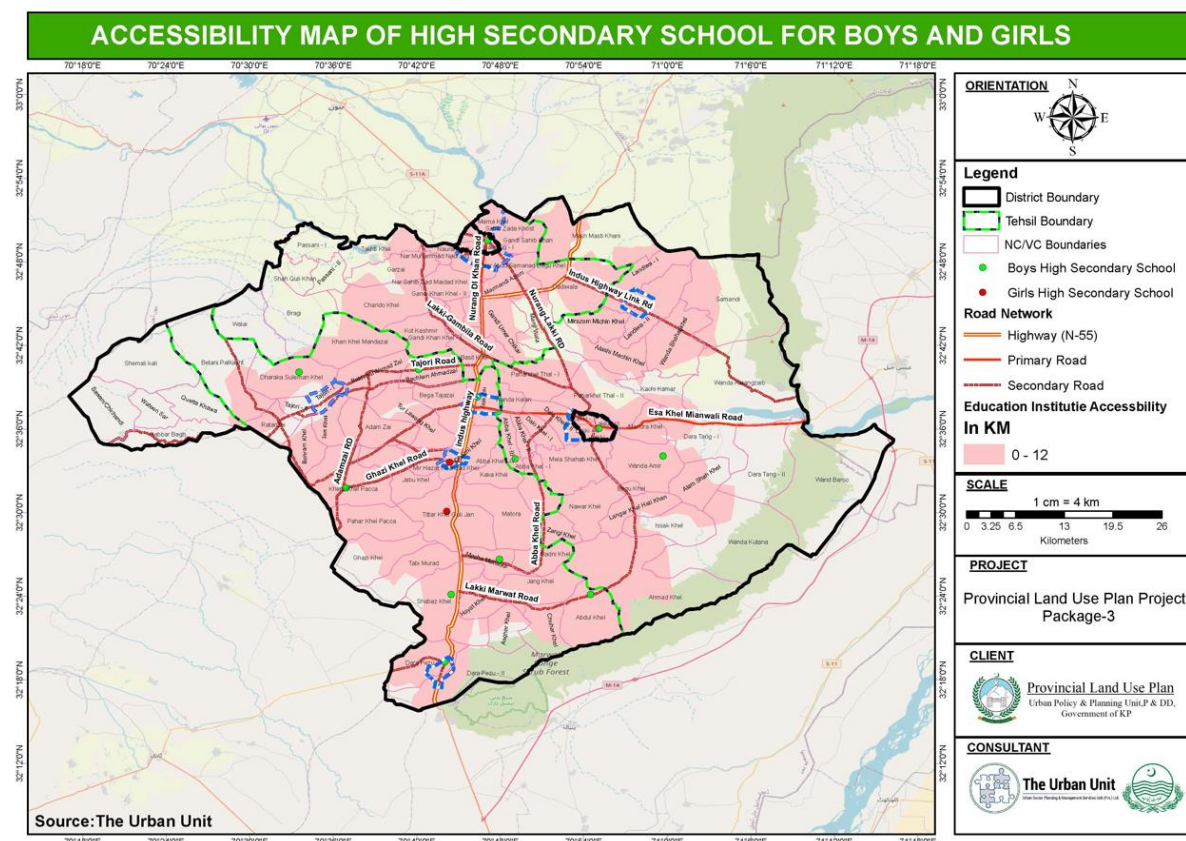
Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | | | |
|---------------|------------------------|-------|---|---|-------|-------|---|---|---|
| Sarai Naurang | Kot Kashmir | 13243 | 0 | 0 | 27389 | 14146 | 0 | 0 | 0 |
| Sarai Naurang | Garzai | 23963 | 0 | 0 | 49559 | 25596 | 1 | 1 | 0 |
| Sarai Naurang | Basit Khel | 20871 | 0 | 0 | 43164 | 22293 | 0 | 0 | 0 |
| Sarai Naurang | Walai | 8719 | 0 | 0 | 18032 | 9313 | 0 | 0 | 0 |
| Sarai Naurang | Bragj | 14475 | 0 | 0 | 29936 | 15461 | 0 | 0 | 0 |
| Sarai Naurang | Passani - II | 7917 | 0 | 0 | 16373 | 8456 | 0 | 0 | 0 |
| Sarai Naurang | Shah Quli Khan | 10875 | 0 | 0 | 22491 | 11616 | 0 | 0 | 0 |
| Sarai Naurang | Gandi Sahib Khan | 14813 | 0 | 0 | 30636 | 15823 | 0 | 0 | 0 |
| Sarai Naurang | Passani - I | 13130 | 0 | 0 | 27154 | 14024 | 0 | 0 | 0 |
| Sarai Naurang | Nar Muhammad Naurang | 21072 | 0 | 0 | 43579 | 22507 | 0 | 0 | 0 |
| Ghazni Khel | Khan Khel Mandazai | 10504 | 0 | 0 | 18106 | 7602 | 0 | 0 | 0 |
| Ghazni Khel | Adam Zai | 16498 | 0 | 0 | 28439 | 11941 | 0 | 0 | 0 |
| Ghazni Khel | Bachken Ahmadzai | 18094 | 1 | 0 | 31191 | 13097 | 0 | 0 | 0 |
| Ghazni Khel | Ghazni Khel | 5888 | 0 | 0 | 10149 | 4261 | 0 | 0 | 0 |
| Ghazni Khel | Pahar Khel Pacca | 12879 | 0 | 0 | 22200 | 9321 | 0 | 0 | 0 |
| Ghazni Khel | Shabaz Khel | 14981 | 1 | 0 | 25824 | 10843 | 0 | 0 | 0 |
| Ghazni Khel | Masha Mansoor | 11444 | 1 | 0 | 19727 | 8283 | 0 | 0 | 0 |
| Ghazni Khel | Ratanzai | 5677 | 0 | 0 | 9786 | 4109 | 0 | 0 | 0 |
| Ghazni Khel | Betani Palkasht | 13106 | 0 | 0 | 22592 | 9486 | 0 | 0 | 0 |
| Ghazni Khel | Jang Khel | 8403 | 0 | 0 | 14484 | 6081 | 0 | 0 | 0 |
| Ghazni Khel | Dharaka Suleman Khel | 12604 | 1 | 0 | 21726 | 9122 | 0 | 0 | 0 |
| Ghazni Khel | Badni Khel | 4807 | 0 | 0 | 8286 | 3479 | 0 | 0 | 0 |
| Ghazni Khel | Bakhmal Ahmad Zai | 9815 | 0 | 0 | 16919 | 7104 | 0 | 0 | 0 |
| Ghazni Khel | Tari Khel | 9126 | 0 | 0 | 15732 | 6606 | 0 | 0 | 0 |
| Ghazni Khel | Behram Khel | 11945 | 0 | 0 | 20590 | 8645 | 0 | 0 | 0 |
| Ghazni Khel | Bega Tajazai | 5585 | 0 | 0 | 9628 | 4043 | 0 | 0 | 0 |
| Ghazni Khel | Jabu Khel | 7873 | 0 | 0 | 13571 | 5698 | 0 | 0 | 0 |
| Ghazni Khel | Mir Hazar Khanzad Khel | 7300 | 0 | 0 | 12583 | 5283 | 0 | 0 | 0 |
| Ghazni Khel | Khero Khel Pacca | 11562 | 1 | 0 | 19930 | 8368 | 0 | 0 | 0 |
| Ghazni Khel | Tittar Khel Guli Jan | 14465 | 0 | 1 | 24935 | 10470 | 0 | 0 | 0 |
| Ghazni Khel | Ghazi Khel | 5506 | 0 | 0 | 9490 | 3984 | 0 | 0 | 0 |
| Ghazni Khel | Tabi Murad | 6294 | 0 | 0 | 10849 | 4555 | 0 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | | | | |
|---------|-------------|------------------|---------|----|---|---------|---------|----|---|---|
| | Ghazni Khel | Dara Pezu - I | 1999 | 0 | 0 | 3446 | 1447 | 0 | 0 | 0 |
| | Ghazni Khel | Dara Pezu - II | 15615 | 0 | 0 | 26917 | 11302 | 0 | 0 | 0 |
| | Ghazni Khel | Asghar Khel | 5590 | 0 | 0 | 9636 | 4046 | 0 | 0 | 0 |
| | Ghazni Khel | Hayat Khel | 4920 | 0 | 0 | 8481 | 3561 | 0 | 0 | 0 |
| | Ghazni Khel | Matora | 6048 | 0 | 0 | 10425 | 4377 | 0 | 0 | 0 |
| | Ghazni Khel | Kaka Khel | 8180 | 0 | 0 | 14101 | 5921 | 0 | 0 | 0 |
| | Ghazni Khel | Tajori - II | 16228 | 0 | 0 | 27974 | 11746 | 0 | 0 | 0 |
| | Ghazni Khel | Mela Mandra Khel | 12092 | 0 | 0 | 20843 | 8751 | 0 | 0 | 0 |
| | Ghazni Khel | Taja Zai | 4664 | 0 | 0 | 8039 | 3375 | 0 | 0 | 0 |
| | Ghazni Khel | Tor Lawang Khel | 6938 | 0 | 0 | 11959 | 5021 | 0 | 0 | 0 |
| | Ghazni Khel | Abdul Khel | 7900 | 1 | 0 | 13618 | 5718 | 0 | 0 | 0 |
| | Ghazni Khel | Chuhar Khel | 9354 | 0 | 0 | 16124 | 6770 | 0 | 0 | 0 |
| | Bettani | Wateen Sar | 9255 | 0 | 0 | 37387 | 28132 | 1 | 1 | 0 |
| | Bettani | Gabbar Bagh | 9505 | 0 | 0 | 38397 | 28892 | 1 | 0 | 1 |
| | Bettani | Quetta Khawa | 8981 | 0 | 0 | 36279 | 27298 | 1 | 1 | 0 |
| | Bettani | Shemali kali | 8852 | 0 | 0 | 35756 | 26904 | 1 | 0 | 1 |
| | Bettani | Sawan/Chichandi | 9481 | 0 | 0 | 38298 | 28817 | 1 | 0 | 1 |
| Overall | Urban | | 190455 | 5 | 1 | 365342 | 174887 | 3 | 1 | 2 |
| | Rural | | 975777 | 9 | 1 | 1901549 | 925772 | 7 | 3 | 4 |
| | Total | | 1166232 | 14 | 2 | 2266891 | 1100659 | 10 | 4 | 6 |

The map depicts the accessibility of boys' and girls' higher secondary schools in district Lakki Marwat, based on a 12-kilometer service radius. Green dots represent boys' higher secondary schools, while red dots indicate girls' higher secondary schools. Educational accessibility is primarily concentrated along the central road corridors, including Talon Road, Indus Highway (N-55), and Esa Khel Marwat Road, reflecting better connectivity and institutional availability in these areas. In contrast, the northern, western, and far-southern parts of the district exhibit notable accessibility gaps, particularly for girls' higher secondary schools, which are limited in number and unevenly distributed. Expanding higher secondary education infrastructure especially for girls and in remote settlements would significantly enhance equitable access and support educational continuity beyond the secondary level.



Map 3-5: Higher Secondary Schools Accessibility for Boys and Girls

3.1.6.3 Need for New Degree Colleges

The need for new degree colleges in District Lakki Marwat has been evaluated according to the NRM standard, which specifies 1 boys' degree college for every 400,000 population and 1 girls' degree college for every 750,000 population. The backlog of degree colleges in each tehsil was calculated by dividing the total population of each tehsil by these thresholds to determine the required number of degree colleges. The existing number of degree colleges was then compared to these requirements to determine any backlog.

In District Lakki Marwat, there is no backlog of degree colleges for either boys or girls. The existing number of degree colleges meets or exceeds the requirements based on the current population.

The current status of degree colleges in District Lakki Marwat is detailed in the table below:

Table 3-12: District Lakki Marwat Current Backlog of Degree Colleges

| Administrative Area | Population 2025 | Boys | | | Girls | | |
|----------------------|-----------------|---------------------|---------------------|---------|---------------------|---------------------|---------|
| | | Existing Institutes | Required Institutes | Backlog | Existing Institutes | Required Institutes | Backlog |
| Lakki Marwat Tehsil | 372653 | 2 | 1 | 0 | 1 | 1 | 0 |
| Serai Nurrang Tehsil | 389716 | 2 | 1 | 0 | 1 | 1 | 0 |
| Ghazni Khel Tehsil | 357789 | 3 | 1 | 0 | 0 | 0 | 0 |
| Bettani Tehsil | 29904 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 1150062 | 7 | 3 | 0 | 2 | 2 | 0 |

3.1.7 Constraints and Challenges

- The overall literacy ratio in District Lakki Marwat is 43.41, significantly lower than the literacy ratios of Khyber Pakhtunkhwa (54.02) and Pakistan (58.91), with a notable gender disparity where male literacy is 66.27 and female literacy is 20.95, a difference of 45.32, which is higher than the gender

disparity in Khyber Pakhtunkhwa (30.51) and Pakistan (18.10). This disparity is particularly pronounced between male and female literacy rates, indicating a severe gender gap in education.

- The previous discussion highlighted that the number of primary schools for both boys and girls is quite satisfactory, with approximately 973 schools available. However, despite the adequate number of schools, the enrolment rates for both boys and girls are disappointingly low. This discrepancy indicates that while the infrastructure is in place, there are significant challenges in getting children enrolled in these schools.
- District Lakki Marwat has only two higher secondary schools for girls, both located in Tehsil Ghazni Khel. Tehsil Lakki Marwat, Serai Naurang, and Bettani lack higher secondary schools for girls, resulting in very low enrollment rates. Educating girls is crucial as it directly impacts future generations; an educated mother contributes to a more educated future. Tehsil Marwat and Tehsil Naurang each have one degree college for girls. However, Tehsil Ghazni Khel and Tehsil Bettani do not have any degree colleges for girls. Additionally, the district does not have any technical colleges for girls.
- The district suffers from a lack of adequate educational facilities, especially at the higher secondary level. This includes a shortage of government colleges and specialized educational institutions, which limits access to higher education for students, particularly in rural areas.
- There is a high dropout rate at various educational levels, particularly among girls. Socio-economic factors, cultural barriers, and inadequate facilities contribute to this trend.
- The quality of education in government schools is generally lower than that in private institutions. This is reflected in the unfavorable teacher-student ratios, lack of trained teachers, and inadequate teaching resources in government schools.
- A significant number of schools in Lakki Marwat lack basic amenities such as clean drinking water, proper sanitation, and electricity. This not only hampers the learning environment but also affects student enrollment and retention.
- The educational institutions in the district are not easily accessible to students from remote areas, leading to low enrollment rates and higher dropout rates. The absence of special education and technical training centers further exacerbates the situation.

3.1.8 Recommendations

- The district faces a significant gender disparity in literacy, with female literacy at 20.95% compared to male literacy at 66.27%. To address this issue, establish additional higher secondary schools for girls in Tehsil Lakki Marwat, Serai Naurang, and Bettani. Implement community-based education programs and awareness campaigns to emphasize the importance of girls' education and encourage enrollment.
- Despite an adequate number of primary schools (approximately 973), enrollment rates remain low. To boost enrollment, introduce financial incentives, scholarships, and targeted enrollment drives. Focus on Tehsil Lakki Marwat, Serai Naurang, and Bettani to address specific barriers to enrollment.
- With only two higher secondary schools for girls in Tehsil Ghazni Khel and no degree or technical colleges in other tehsils, additional educational infrastructure is needed. Establish higher secondary schools, degree colleges, and technical institutions in Tehsil Lakki Marwat, Serai Naurang, and Bettani to improve access to higher and vocational education.
- To address disparities in education quality, improve teacher training, reduce teacher-student ratios, and provide adequate teaching resources. Upgrade existing facilities with better educational materials to enhance student outcomes.
- High dropout rates, particularly among girls, should be addressed by tackling socio-economic and cultural barriers. Implement programs that offer financial assistance to families, promote community support for education, and provide flexible schooling options for working children. Focus on areas with limited educational opportunities, such as Tehsil Ghazni Khel and Tehsil Bettani.
- Many schools lack essential amenities, affecting student retention and enrollment. Invest in upgrading infrastructure to provide clean drinking water, proper sanitation, and electricity in all schools to improve the learning environment and increase attendance.
- Accessibility issues prevent students from remote areas from attending school regularly. Construct additional schools closer to these areas, provide transportation facilities, and consider mobile

schooling units if necessary. Establish special education and technical training centers to enhance accessibility.

- Establish a robust monitoring and evaluation system to regularly assess the effectiveness of educational interventions. This system should track progress, identify areas for improvement, and make necessary adjustments to enhance the overall education system in Lakki Marwat district.
- By implementing these recommendations, District Lakki Marwat can make significant strides in improving educational access, quality, and equity, leading to better educational outcomes and a reduction in existing disparities.

3.1.9 Future Plans

As part of the long-term land use strategy for District Lakki Marwat, Educational zones have been proposed in urban areas based on the projected population for the year 2045, particularly in locations where the population is expected to exceed 40,000 residents. These educational zones are planned to cater to the district's future education requirements.

3.1.9.1 Educational Neighborhood Locational Criteria

The allocation of **educational zone** across District Lakki Marwat is guided by key criteria such as proximity to existing and proposed residential developments, adjacency to existing educational institutions or open/green spaces, accessibility from road networks, and the availability of suitable land parcels.

In **Lakki City**, the proposed educational zone is located on the **northwestern side** of the urban area along the **Essa Khan–Mianwali Road**, with direct access from the same road. It is adjacent to the existing **Government Post Graduate College Lakki Marwat** and lies in close proximity to both existing and proposed residential zones, making it a suitable location for educational development.

In **Landiwa Urban Area**, the proposed educational zone is situated on the **eastern side** of the urban area, accessible from the **proposed urban road**. To its southwest lies an **existing educational facility**, while existing residential areas are located to the west, and **proposed residential zones** to the north and south. These factors collectively make this location appropriate for educational use.

In **Serai Naurang Urban Area**, two educational zones have been proposed—one on the **southern side** and the other on the **northwestern side** of the urban area.

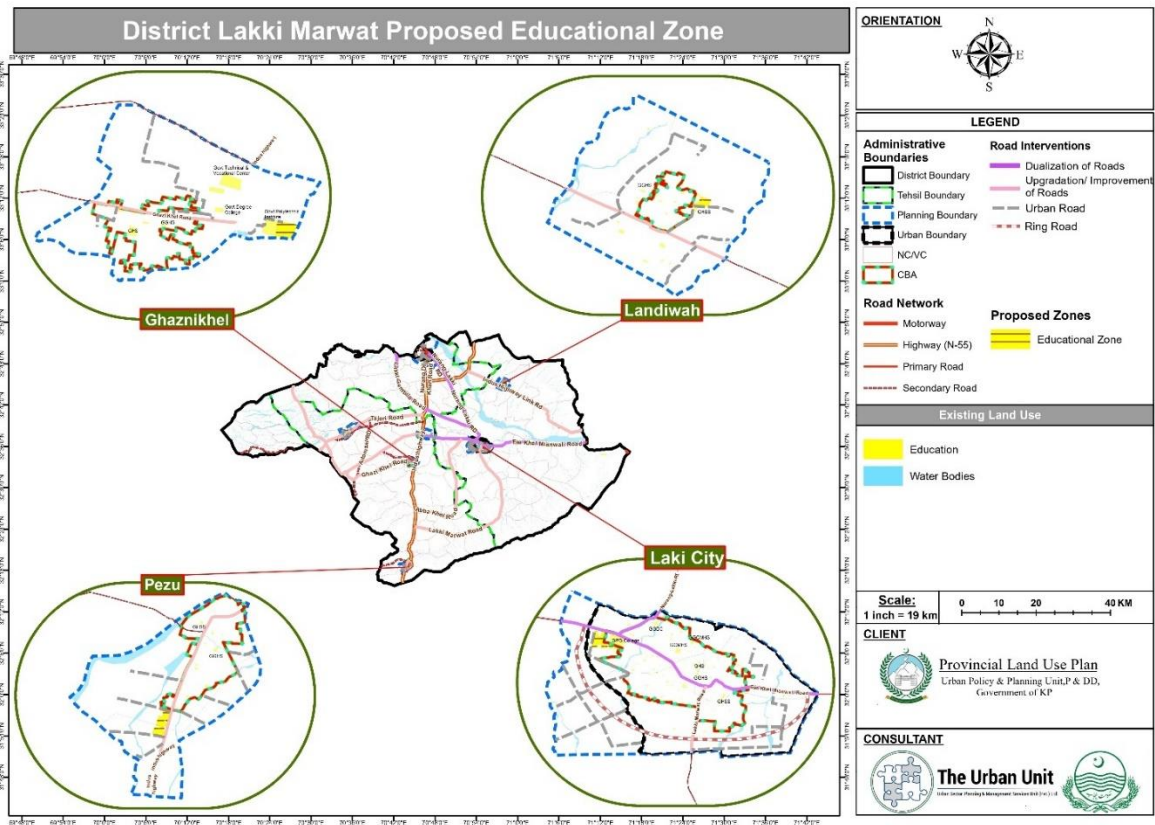
- The **southern educational zone** is located along the **Bannu–D.I. Khan Road**, ensuring strong accessibility. It is adjacent to the **Government Girls High School** and **Government Girls Degree College**, with a **proposed recreational zone** to the east, a **mixed-use zone** to the west, and nearby existing and proposed residential areas.
- The **northwestern educational zone**, also located along the **Bannu–D.I. Khan Road**, has direct access from the same road. A **mixed-use zone** lies to its west, while **proposed residential areas** are located to the north and east, making it a prime location for educational development.

In **Ghazni Khel**, the educational zone is located on the **southeastern side** of the urban area. The site includes the existing **Polytechnic Institute** and is accessible from a **local road** connected to the **Indus Highway**. To its west lies the **public buildings zone**, while a **recreational zone** is situated to the northwest.

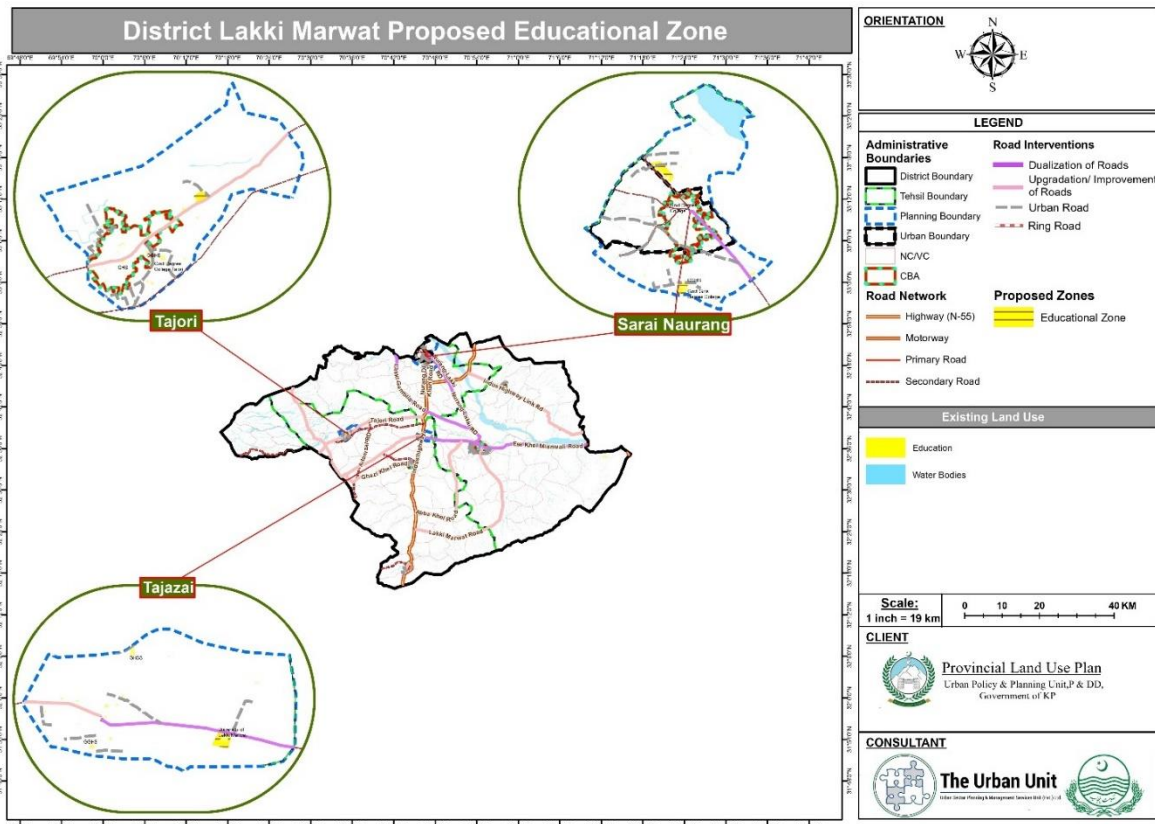
In **Pezu Urban Area**, the proposed educational zone is located on the **southern side** of the urban area along **Pezu Road**, with direct access from this road. **Recreational zone** is located to the northwest side of the zone and **existing and proposed residential areas** to the north and northeast, making it a well-connected and functional location for educational activities.

In **Tajori Urban Area**, the educational zone is centrally located along the **main Tajori Road**, providing direct access. To its east lies the proposed **public buildings zone**, while the **existing and proposed residential areas** are located toward the southwest, ensuring accessibility for students and nearby communities.

In **Tajazai Urban Area**, the area already hosts the **University of Lakki Marwat**. The **proposed educational zone** is planned adjacent to the university along the **Essa Khel–Mianwali Road**, with direct access from the mentioned road, supporting institutional growth and academic expansion.



Map 3-6: Proposed Educational Zones (District Lakki Marwat).



Map 3-7: Proposed Educational Zones (District Lakki Marwat)

3.2 Health

All social sectors are vital in land use planning; however, health holds particular importance in the context of District Lakki Marwat, where it is closely linked to sustainability and community well-being. The connection between health and sustainable development is clear—yet often overlooked—as the design, layout, and functionality of settlements directly influence the health of residents. Land use decisions in Lakki Marwat not only shape the district’s physical development but also significantly impact public health outcomes. There is a strong association between urban growth patterns, accessibility, and healthy living, with issues such as malnutrition, limited mobility, respiratory illnesses, and poor sanitation emerging from unplanned or uneven development. Evidence indicates that land use practices which limit physical activity, reduce access to clean environments and nutritious food, or expose communities to environmental pollutants contribute to the rise of chronic and communicable diseases.

Given these challenges, it is essential for Lakki Marwat to adopt integrated land use and health planning policies that promote active, inclusive, and healthy communities. This includes improving settlement design, ensuring access to healthcare and green spaces, and mitigating environmental hazards. Strengthening coordination between urban planners, public health professionals, and local government will help bridge existing institutional gaps and support sustainable community development for a healthier and more resilient Lakki Marwat.

3.2.1 Existing Health Facilities

Improving public health is directly linked to the happiness, productivity, and overall, wellbeing of the people of District Lakki Marwat. A healthy population forms the foundation for economic growth and social development, as it enhances efficiency, labor participation, and quality of life. The overall health status of Lakki Marwat’s population is shaped by multiple interrelated factors, including adequate nutrition, access to clean drinking water, improved sanitation, a healthy environment, education, sports facilities, public awareness, and the availability of health infrastructure and medical technology. These elements collectively help prevent disease, promote healthy lifestyles, and improve living standards. In Lakki Marwat, a health facility refers to any institution providing curative and preventive healthcare services to the population, catering to both outdoor and indoor patients. The district’s healthcare network is broadly classified into government and private facilities, each playing a crucial role in delivering essential medical services to urban and rural communities.

3.2.2 Government Healthcare

The healthcare infrastructure in District Lakki Marwat, as outlined by the provided data, features a variety of facilities including hospitals, rural health centers, basic health units, dispensaries, and mother-child health centers. The district is equipped with 5 hospitals, 4 rural health centers, 28 basic health units, 13 dispensaries, and 2 mother-child health centers, totaling 556 beds across these facilities.

The distribution of government healthcare infrastructure in District Lakki Marwat reflects a structured network across its urban and rural areas. In the urban area, there are 3 hospitals with a cumulative capacity of 320 beds, alongside 1 dispensary and 2 mother-child health center. The rural area is serviced by 2 hospitals with a combined capacity of 180 beds, 4 rural health centers with a total of 56 beds, 26 basic health units, and 12 dispensaries.

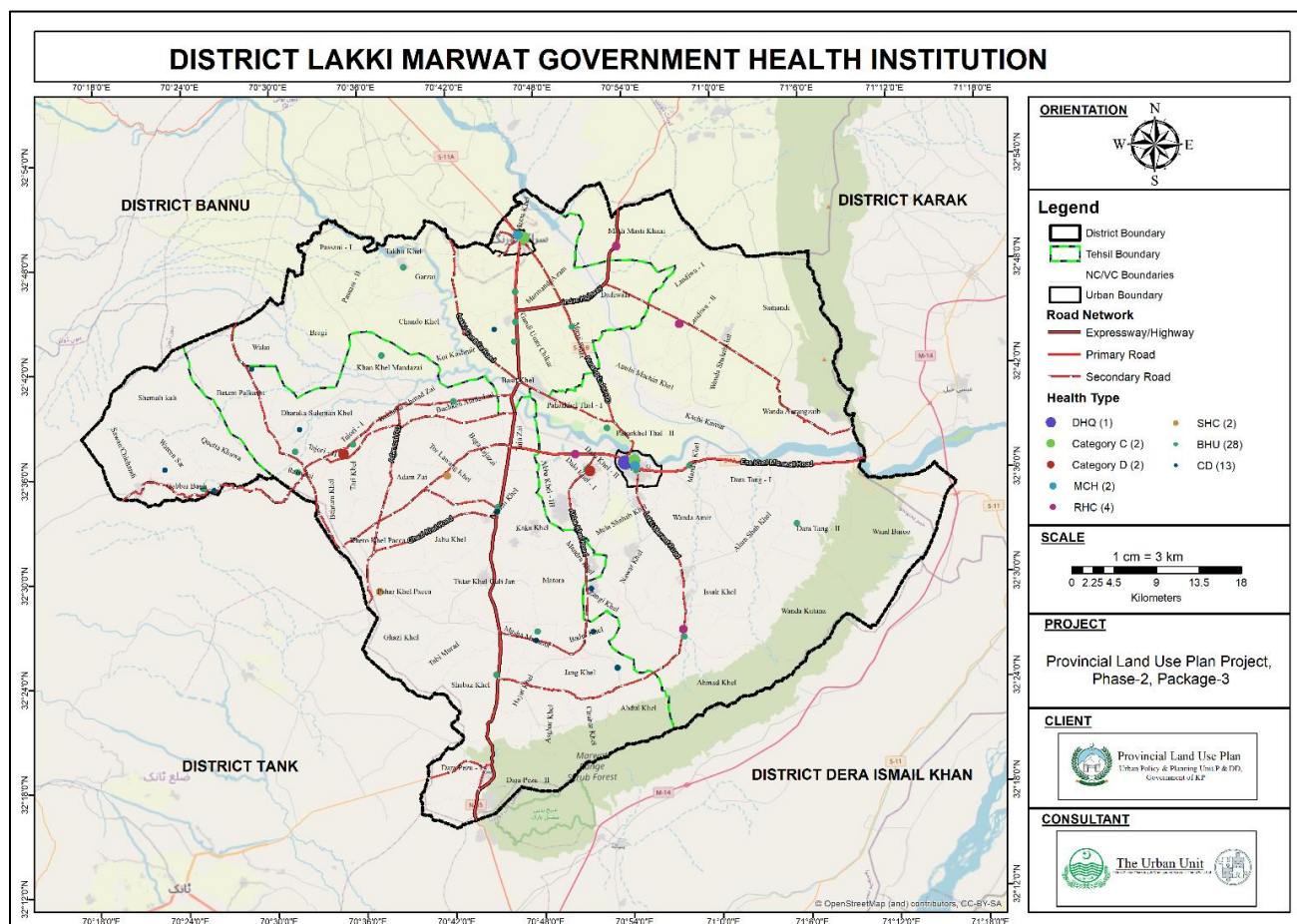
Despite this structured distribution, a closer look reveals that the hospital bed density in District Lakki Marwat falls short when compared to national standards. With a total population, the district has a hospital bed density that equates to a ratio of approximately 4.8 beds per 10,000 people. This is significantly below the required threshold of 18 beds per 10,000 population as per Pakistani standards, it is also below compared to the national average of 8.9 beds per 10,000 population in 2020. This indicates that while the district’s

infrastructure is relatively better than some others, there remains a need for enhancement to meet the ideal standards.

The detailed breakdown of government health facilities and their bed strength in District Lakki Marwat is provided in below table.

Table 3-9: District Lakki Marwat Government Health Facilities

| Administrative Area | Hospitals | | Rural Health Centers | | Basic Health Units | Dispensaries | Mother Health Centers | Child Health Centers |
|---------------------|-----------|------|----------------------|------|--------------------|--------------|-----------------------|----------------------|
| | Number | Beds | Number | Beds | | | | |
| District Urban | 3 | 320 | | | 2 | 1 | 2 | |
| District Rural | 2 | 180 | 4 | 56 | 26 | 12 | | |
| District Overall | 5 | 500 | 4 | 56 | 28 | 13 | 2 | |



Map 3-8: District Lakki Marwat Government Health Institution

The data on private health institutes in District Lakki Marwat reveals a diverse range of healthcare facilities catering to both urban and rural populations. In the urban areas, there are 4 private hospitals, 6 clinics, 5 homeopathic clinics, and 8 laboratories. This indicates a strong presence of outpatient care and diagnostic

services in the urban parts of District Lakki Marwat, providing residents with various healthcare options outside of traditional hospital settings.

In contrast, the rural areas have 1 private hospital, 5 clinics, 1 homeopathic clinic, and 1 laboratory. This shows that rural areas have fewer healthcare facilities compared to urban areas. Overall, District Lakki Marwat has 5 private hospitals, 11 clinics, 3 medical centers, 6 homeopathic clinics, and 9 laboratories, reflecting a comprehensive network of private healthcare services available to its residents. The details of private health facilities in District Lakki Marwat are given in the table below.

Table 3-10: District Lakki Marwat Private Health Facilities

| Administrative Area | Hospitals | Clinics | Medical Center | Homeopathic Clinic | Laboratories |
|---------------------|-----------|---------|----------------|--------------------|--------------|
| District Urban | 4 | 6 | 3 | 5 | 8 |
| District Rural | 1 | 5 | | 1 | 1 |
| District Overall | 5 | 11 | 3 | 6 | 9 |

3.2.3 Doctor to Population Ratio

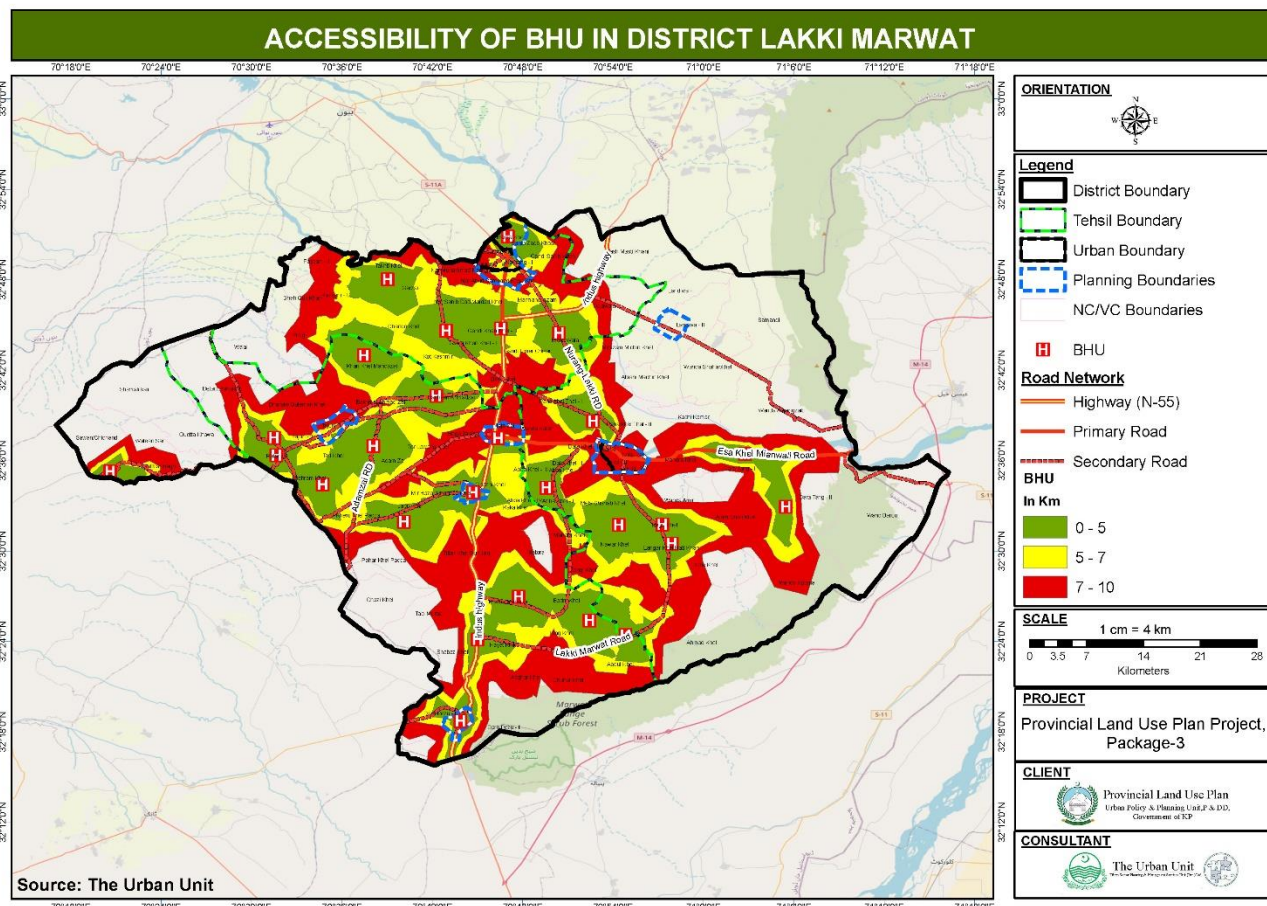
The doctor-to-population ratio, also known as physician density, is a key metric used to assess healthcare accessibility and the distribution of healthcare providers within a population. It is typically expressed as the number of physicians per 1,000 or 10,000 inhabitants. The ideal doctor-to-population ratio varies depending on factors such as the healthcare needs of the population, the distribution of healthcare resources, the prevalence of diseases, and the level of healthcare infrastructure and services available.

Human resources for health are the most critical factor in the provision of quality preventive, promotive, and curative services. The minimum threshold to achieve UHC/SDG-3 is 4.45/1,000 population for essential health workforce (doctors, nurses, LHVs, and dais/midwives) with a breakup of 1.11 doctors per 1,000 population and 3.34 nurses, LHVs, and midwives per 1,000 population.

In District Lakki Marwat, 125 doctors work in various government-owned health facilities and serve a total population of 1,150,062, population, according to the projected population of 2025. The doctor-to-population ratio in District Lakki Marwat is 0.11:1000, meaning that there are only 0.11 doctors per 1,000 persons. Also, there are 45 nurses, 27 LHVs, and 73 dais/midwives for the total population, thus the ratio is 0.13: 1,000 persons, meaning that there are 0.13 medical staff personnel (nurses, LHVs, and dais/midwives) per 1,000 population in District Lakki Marwat. The overall essential health workforce (doctors, nurses, LHVs, and dais/midwives) ratio to the population in District Lakki Marwat is 0.23: 1,000. It could also be described as, there are 0.23 essential health workforce (doctors, nurses, LHVs, and midwives) for 1,000 population, with a breakup of 0.11 doctors per 1,000 population and 0.13 nurses, LHVs, and dais/midwives per 1,000 population. This clearly shows that the overall density of the essential health workforce in District Lakki Marwat is way below the required standard for Universal Health Coverage Network Analysis for Existing Health Facilities.

3.2.4 Network Analysis of Existing Health Facilities

3.2.4.1 Network Analysis of BHU



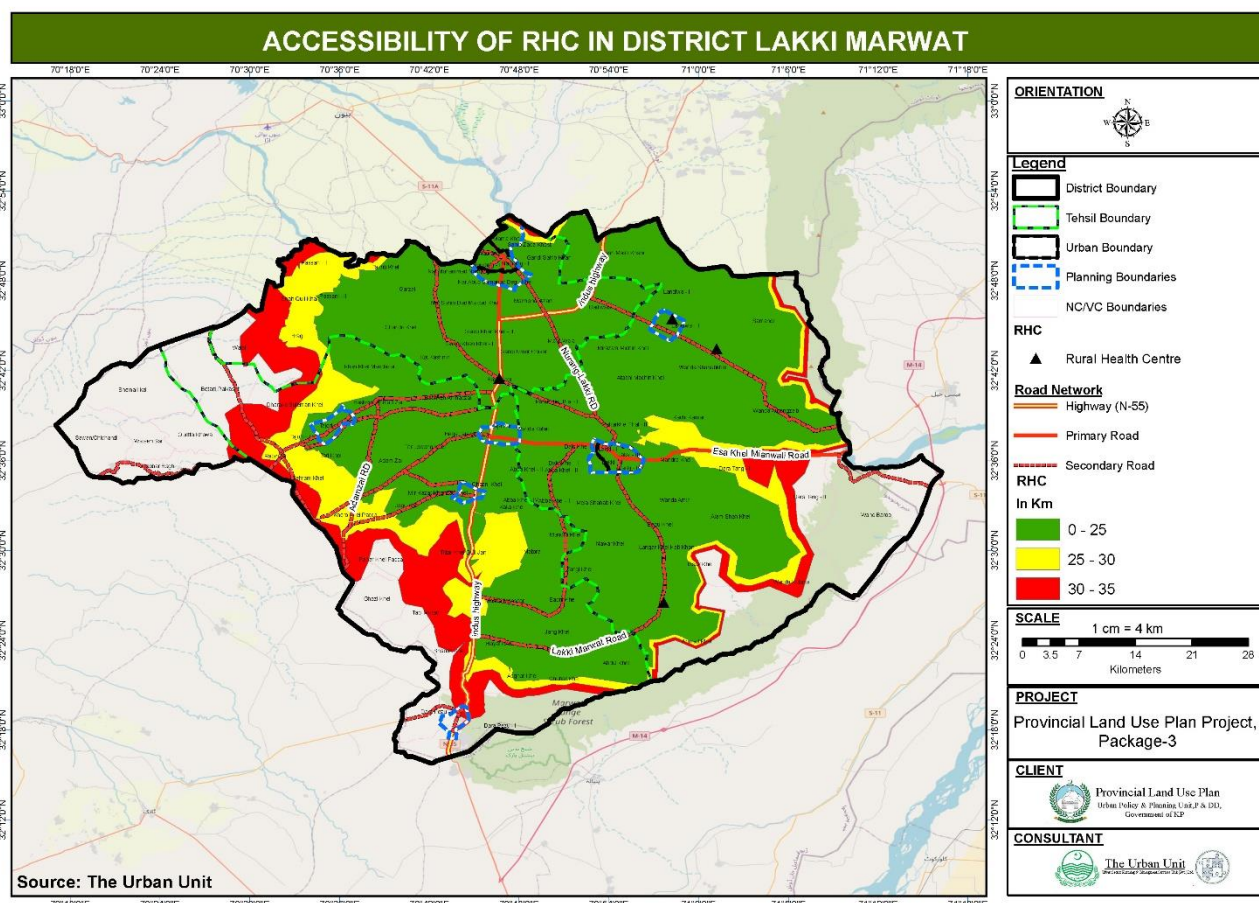
Map 3-9: Network Analysis of BHU in District Lakki Marwat

The road network of District Lakki Marwat is primarily structured around the N-55 highway, which provides good connectivity to central settlements like Lakki Marwat city, Serai Naurang, and Esak Khel. However, the peripheral regions are less connected due to sparse secondary roads, limiting access to nearby health facilities.

In terms of accessibility, areas within 0–5 km of a BHU are mostly along the N-55 and central road corridors, while large tracts fall in the 5–7 km and 7–10 km zones, reflecting moderate to poor accessibility. Peripheral settlements shown in red on the map are particularly underserved, with residents traveling over 7 km to reach a BHU.

Tehsil-wise, unserved areas are mainly concentrated in western Lakki Marwat around Betani, Sharmali, and Sra Darga; in southern parts near Pahar Khel Thal, Ghazni Khel, and Manjiwala; and in eastern Esak Khel Tehsil including Wanda Amir, Wanda Shah, and the forest-edge settlements near Marwat Range. These areas require new BHUs or upgraded outreach services to improve equitable healthcare access across the district.

3.2.4.2 Network Analysis for RHC



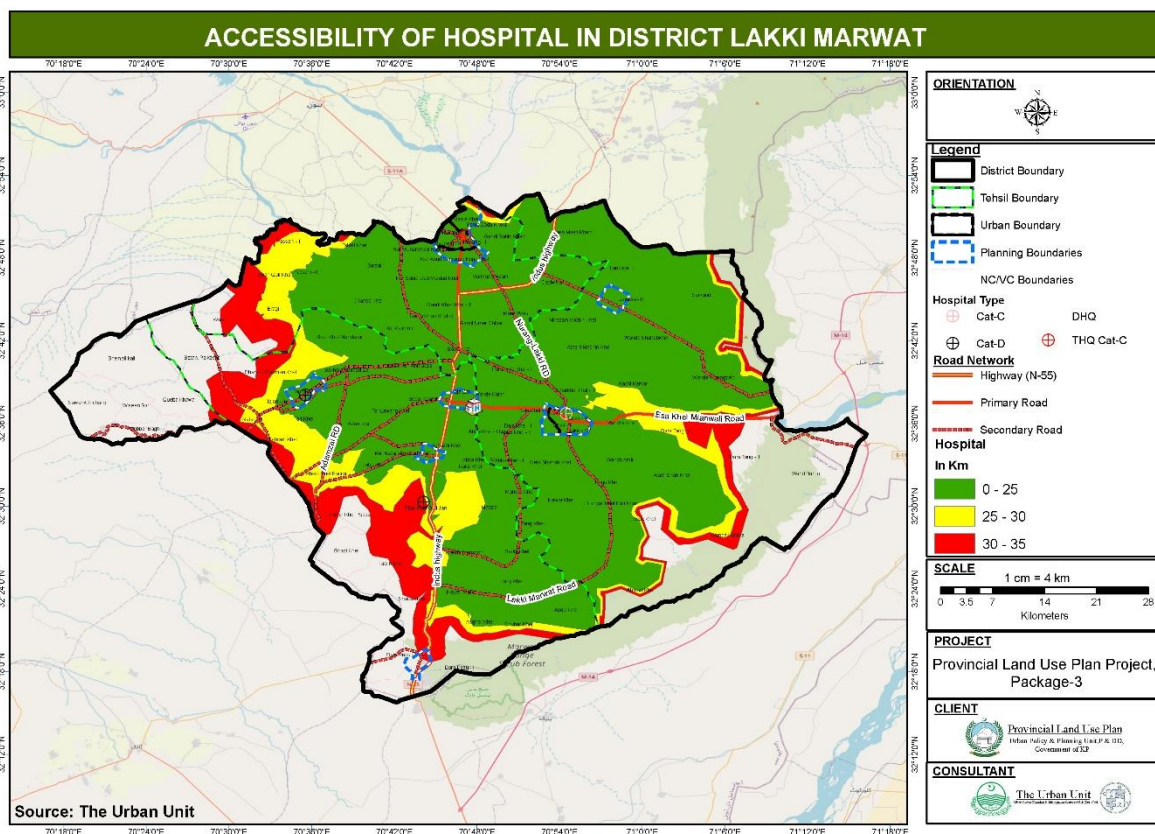
Map 3-10: Network Analysis of RHC in District Lakki Marwat

The road network of District Lakki Marwat is mainly organized around the N-55 highway, which runs through the center of the district and connects major settlements such as Lakki Marwat city, Serai Naurang, and Esak Khel. Several primary and secondary roads extend from this main corridor, ensuring reasonable accessibility to central areas, but peripheral settlements, especially those in the western and southern parts, remain less connected, limiting access to Rural Health Centres (RHCs).

Accessibility analysis shows that areas within 0–25 km of an RHC (green zone) are well-served, covering most of the central and northern regions. However, settlements located 25–30 km away (yellow zone) have moderate access, while those 30–35 km distant (red zone) are significantly underserved.

The underserved areas are mainly located in **western Lakki Marwat**, including Betani, Sharmali, and Sra Darga; **southern regions** around Ghazni Khel, Manjiwala, and Pahar Khel Thal; and **eastern parts** near Wanda Amir, Wanda Shah, and the Esak Khel boundary. These areas fall far from existing RHCs and the main transport routes, highlighting the need for new or upgraded midlevel health facilities and improved road linkages to ensure equitable healthcare access across all tehsils of the district.

3.2.4.3 Network Analysis for Hospitals



Map 3-11: Network Analysis of Hospitals in District Lakki Marwat

The road network of District Lakki Marwat is primarily built around the N-55 highway, which forms the main north-south corridor connecting Lakki Marwat city, Serai Naurang, and Esak Khel. This highway, along with a few primary and secondary roads, facilitates hospital access for central populations. However, peripheral settlements especially in the western, southern, and southeastern parts are poorly connected, leading to reduced accessibility to higher-level healthcare facilities.

The accessibility map shows that most of the central and northern areas of the district fall within the 0-35 km zone (green), indicating satisfactory access to hospitals, including the District Headquarters (DHQ) and Tehsil Headquarters (THQ) hospitals. Areas in the 35-40 km (yellow) and 40-45 km (red) zones represent underserved regions where populations must travel long distances to reach hospital-level care.

Tehsil wise, the western Lakki Marwat region around Betani, Sharmali, and Sra Darga, as well as the southern parts near Ghazni Khel, Pahar Khel Thal, and Manjiwala, show poor access. Similarly, the eastern belt of Esak Khel Tehsil, including Wanda Amir, Wanda Shah, and nearby forest-edge settlements, also remains underserved. These unserved pockets highlight the need for either new secondary-level hospitals or the upgradation of existing RHCs along key secondary roads to improve equitable access to hospital services across the district.

3.2.5 Need for New Health Facilities through Network analysis Approach

Methodology for Estimating Current Gaps and Future Requirements of Health Facilities

1. Data Preparation

Collected baseline land use data on existing health facilities, population (2025 and 2045 projections), and administrative boundaries (VC/NC, tehsil, and urban areas).

2. Road Network Analysis

Conducted travel time analysis for each health facility using the district's road network to assess accessibility and service coverage.

3. Identification of Unserved Areas

Mapped and identified unserved or underserved zones based on travel time thresholds for each type of health facility (BHU, RHC, CHC, hospitals).

4. Clustering for BHUs

Clustered nearby VCs/NCs to meet the minimum population and service delivery standards defined by KPK.

5. Assessment of Existing Gaps (2025)

Applied provincial standards of KPK to current population data to determine existing gaps and backlogs in health facility distribution.

6. Projection of Future Requirements (2045)

Applied the same provincial standards to projected 2045 populations VC/NC-wise for BHUs, tehsil-wise rural for RHCs, and urban-wise for CHCs, to estimate future infrastructure needs.

7. Consolidation and Planning

Compiled findings to outline required expansions, ensuring equitable and efficient health service coverage for both current and future populations.

Table 3-11: Provincial Health Standards of KPK

| Type of Health Facility | Population | No of Beds | Land Requirement (Kanals) |
|-------------------------|-------------|------------|---------------------------|
| BHU | 10000-20000 | N/A | 10.75 |
| RHC | 45000-60000 | 20 | 10.75 |
| CHC | 20000 | 20 | - |
| Cat-D | 105000 | 42 | 20-30 |
| Cat-C | 275000 | 110 | 40-50 |
| Cat-B | 525000 | 210 | 60 |
| Cat-A | 875000 | 350 | 70 |

3.2.5.1 Network Analysis of Proposed BHUs

Based on the network analysis of population distribution in Lakki Marwat District, several areas have been identified as underserved in terms of basic healthcare access. According to the healthcare facility planning standards, one Basic Health Unit (BHU) should be established for every 15,000 to 20,000 unserved population. Following this standard, new BHUs are proposed across different tehsils to ensure equitable coverage and improved access to primary healthcare services. Furthermore, it is proposed that two existing BHUs, one in Dara Tang-II and another in Shahbaz Khel, be upgraded to Rural Health Centers (RHCs) to provide

enhanced secondary level healthcare facilities to surrounding areas. Following table showing the proposed BHUs in Lakki Marwat District, organized by Tehsil and Village Councils (VCs) they will cover, some proposed clusters fall below the 10,000–20,000 BHU standard (for example Shemali Kali = 12,816; Pasani-I = 14,457; Mash Masti Khani = 14,088). Those clusters can still be proposed because geographic isolation or access constraints justify a BHU despite the population being slightly under the threshold.

Table 3-12: Proposed BHUs Clusters through Network analysis Approach

| Tehsil | Proposed BHU (VC) | Village Councils (VC) – Unserved population | Total unserved population |
|----------------------|--------------------|--|---------------------------|
| Bettani | Shemali Kali | Gabbar Bagh; Wateen Sar; Sawan/Chichandi ; Quetta Khawa ; Shemali Kali | 12,714 |
| Sarai Naurang | Pasani-I | Passani-I, Shah Qulli Khan | 14,457 |
| | Walai | Walai, Bragi ; Dharaka Suleman Khel, | 19,005 |
| Lakki Marwat | Wanda Kutana | Wanda Kutana; Issak Khel ; Wand Baroo | 20,757 |
| | Wanda Aurangzeb | Wanda Aurangzeb ; Dara Tang-I; Dara Tang-II | 11,813 |
| | Pahar Khel Thal-II | Pahar Khel Thal-II; Kachi Kamar; Dabak Mandra Khel; Wanda Amir | 16,361 |
| | Wanda Shahbazkhel | Wanda Shahbazkhel; Atashi Machin Khel | 14,485 |
| | Samandi | Samandi | 17,269 |
| | Landiwa-II | Landiwa-II; Mirazam Michin Khel | 18,390 |
| | Mash Masti Khani | Mash Masti Khani, Dadiwala, Landiwa-I | 26,177 |
| | Dadiwala | | |

Source: The Urban Unit

Table 3-13: Detailed Table

| District | Tehsil | NC VC Names | NC VC Type | Population 2025 | Unserved Population | Existing BHU | Required |
|--------------|--------------|-----------------|------------|-----------------|---------------------|--------------|----------|
| Lakki Marwat | Lakki Marwat | Abba Khel - I | VC | 5831 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Abba Khel - II | VC | 8010 | 0 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Abba Khel - III | VC | 6698 | 0 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|--------------------|----|-------|------|---|---|
| Lakki Marwat | Lakki Marwat | Abba Khel - IV | VC | 6942 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Abdul Khel | VC | 7900 | 16 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Adam Zai | VC | 16498 | 0 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Ahmad Khel | VC | 15671 | 3376 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Alam Shah Khel | VC | 4387 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Asghar Khel | VC | 5590 | 1505 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Atashi Machin Khel | VC | 5467 | 2431 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Bachken Ahmadzai | VC | 18094 | 0 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Badni Khel | VC | 4807 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Bakhmal Ahmad Zai | VC | 9815 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Basit Khel | VC | 20871 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Bega Tajazai | VC | 5585 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Begu Khel | VC | 5969 | 0 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Behram Khel | VC | 11945 | 0 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Betani Palkasht | VC | 13106 | 5230 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Bragi | VC | 14475 | 7568 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Chando Khel | VC | 9901 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Chuhar Khel | VC | 9354 | 111 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Dabak Mandra Khel | VC | 8838 | 11 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|----------------------|----|-------|------|---|---|
| Lakki Marwat | Sarai Naurang | Dadiwala | VC | 7522 | 6072 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Dalo Khel - I | VC | 4428 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Dalo Khel - II | VC | 5930 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Dara Pezu - I | VC | 4460 | 0 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Dara Pezu - II | VC | 22143 | 1069 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Dara Tang - I | VC | 8012 | 984 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Dara Tang - II | VC | 10370 | 948 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Dharaka Suleman Khel | VC | 12604 | 2718 | 0 | 0 |
| Lakki Marwat | Bettani | Gabbar Bagh | VC | 9505 | 567 | 1 | 0 |
| Lakki Marwat | Sarai Naurang | Gandi Khan Khel - I | VC | 11832 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Gandi Khan Khel - II | VC | 20045 | 0 | 1 | 0 |
| Lakki Marwat | Sarai Naurang | Gandi Sahib Khan | VC | 14813 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Gandi Umer Chikar | VC | 22594 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Garzai | VC | 23963 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Ghazi Khel | VC | 5506 | 4441 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Ghazni Khel | VC | 11324 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Hayat Khel | VC | 4920 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Issak Khel | VC | 13183 | 1047 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Jabu Khel | VC | 7873 | 0 | 1 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|------------------------|----|-------|-------|---|---|
| Lakki Marwat | Ghazni Khel | Jang Khel | VC | 8403 | 0 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Kachi Kamar | VC | 4599 | 3511 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Kaka Khel | VC | 8180 | 18 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Khan Khel Mandazai | VC | 10504 | 0 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Khero Khel Pacca | VC | 11562 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Kot Kashmir | VC | 13243 | 0 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Lakki Marwat MC | NC | 78668 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Landiwa - I | VC | 6017 | 6017 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Landiwa - II | VC | 14860 | 14860 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Langar Khel Hati Khan | VC | 4723 | 0 | 1 | 0 |
| Lakki Marwat | Sarai Naurang | Mama Khel | VC | 12238 | 0 | 1 | 0 |
| Lakki Marwat | Sarai Naurang | Manji Wala | VC | 30606 | 0 | 1 | 0 |
| Lakki Marwat | Sarai Naurang | Marmandi Azam | VC | 21081 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Mash Masti Khani | VC | 18411 | 14088 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Masha Mansoor | VC | 11444 | 0 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Matora | VC | 6048 | 688 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Mela Mandra Khel | VC | 12092 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Mela Shahab Khel | VC | 5282 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Mir Hazar Khanzad Khel | VC | 7300 | 0 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|----------------------------|----|-------|-------|---|---|
| Lakki Marwat | Lakki Marwat | Mirazam Michin Khel | VC | 8441 | 3530 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Nar Abud Samanad Begu Khel | VC | 20685 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Nar Muhammad Naurang | VC | 21072 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Nar Sahib Dad Maidad Khel | VC | 16703 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Nawar Khel | VC | 8818 | 0 | 1 | 0 |
| Lakki Marwat | Sarai Naurang | Nurang TC | NC | 38600 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Pahar Khel Pacca | VC | 12879 | 5745 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Paharkhel Thal - I | VC | 12961 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Paharkhel Thal - II | VC | 8359 | 6939 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Passani - I | VC | 13130 | 8422 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Passani - II | VC | 7917 | 0 | 0 | 0 |
| Lakki Marwat | Bettani | Quetta Khawa | VC | 8981 | 1572 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Ratanzai | VC | 5677 | 0 | 2 | 0 |
| Lakki Marwat | Sarai Naurang | Sahib Zada Khost | VC | 17913 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Samandi | VC | 17269 | 17269 | 0 | 1 |
| Lakki Marwat | Bettani | Sawan/Chichandi | VC | 9481 | 578 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Shabaz Khel | VC | 14981 | 878 | 1 | 0 |
| Lakki Marwat | Sarai Naurang | Shah Quli Khan | VC | 10875 | 6035 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|----------------------|----|-------|-------|---|---|
| Lakki Marwat | Bettani | Shemali kali | VC | 8852 | 8852 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Tabi Murad | VC | 6294 | 1777 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Taja Zai | VC | 16019 | 0 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Tajori - I | VC | 8125 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Tajori - II | VC | 16228 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Takhti Khel | VC | 10918 | 0 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Tari Khel | VC | 9126 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Tittar Khel Guli Jan | VC | 14465 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Tor Lawang Khel | VC | 6938 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Walai | VC | 8719 | 8719 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Wand Baroo | VC | 9636 | 9636 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Amir | VC | 8325 | 5900 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Aurangzaib | VC | 8404 | 9881 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Wanda Kalan | VC | 9860 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Kutana | VC | 15885 | 10074 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Wanda Shahabkhel | VC | 12054 | 12054 | 0 | 1 |
| Lakki Marwat | Bettani | Wateen Sar | VC | 9255 | 1147 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Zangi Khel | VC | 10345 | 0 | 0 | 0 |

3.2.5.2 Network Analysis of Proposed RHCs

Based on the network analysis of the population distribution in Lakki Marwat District and following the planning standard of one Rural Health Centre (RHC) per 45,000–60,000 population, the district currently shows unserved clusters mainly in the western (Bettani area) and southern regions.

To improve coverage and accessibility, one new RHC is proposed in Bettani Palkasht (Ghazni Khel Tehsil) by combining the surrounding unserved VCs. Additionally, two existing BHUs Shahbaz Khel and Dara Tang-II are recommended for upgradation into RHCs for dispersed populations currently outside RHC facilities.

Table 3-14: Proposed RHCs through Network analysis Approach

| Tehsil | Proposed RHC (VC) | Village Councils (VC) – Unserved Population | Total Unserved Population |
|--------------|--|--|---------------------------|
| Ghazni Khel | Bettani Palkasht | Bettani Palkasht; Dharaka Suleman Khel; Bragi; Walai; Quetta Khawa; Shemali Kali; Wateen Sar; Gabbar Bagh; Sawan/Chichandi. | 65,533 |
| Ghazni Khel | Shahbaz Khel (Upgradation of existing BHU to RHC) | Since the remaining populations do not meet the standard criteria for establishing new RHCs, it is proposed that the unserved populations 27,895 in Ghazni Khel Tehsil and 16,053 in Lakki Marwat Tehsil be accommodated by upgrading two existing BHUs in each tehsil to RHC level. | |
| Lakki Marwat | Dara Tang-II (Upgradation of BHU to RHC) | | |

Source: The Urban Unit

Table 3-15: Detailed Table RHC

| District | Tehsil | NC VC Names | NC VC Type | Population 2025 | Unserved Population | Existing RHC | Required |
|--------------|--------------|-----------------|------------|-----------------|---------------------|--------------|----------|
| Lakki Marwat | Lakki Marwat | Abba Khel - I | VC | 5831 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Abba Khel - II | VC | 8010 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Abba Khel - III | VC | 6698 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Abba Khel - IV | VC | 6942 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Abdul Khel | VC | 7900 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Adam Zai | VC | 16498 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Ahmad Khel | VC | 15671 | 1531 | 1 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|--------------------|----|-------|------|---|---|
| Lakki Marwat | Lakki Marwat | Alam Shah Khel | VC | 4387 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Asghar Khel | VC | 5590 | 14 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Atashi Machin Khel | VC | 5467 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Bachken Ahmadzai | VC | 18094 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Badni Khel | VC | 4807 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Bakhmal Ahmad Zai | VC | 9815 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Basit Khel | VC | 20871 | 0 | 1 | 0 |
| Lakki Marwat | Ghazni Khel | Bega Tajazai | VC | 5585 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Begu Khel | VC | 5969 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Behram Khel | VC | 11945 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Betani Palkasht | VC | 13106 | 7972 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Bragi | VC | 14475 | 137 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Chando Khel | VC | 9901 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Chuhar Khel | VC | 9354 | 111 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Dabak Mandra Khel | VC | 8838 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Dadiwala | VC | 7522 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Dalo Khel - I | VC | 4428 | 0 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|----------------------|----|-------|------|---|---------------------------|
| Lakki Marwat | Lakki Marwat | Dalo Khel - II | VC | 5930 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Dara Pezu - I | VC | 4460 | 3579 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Dara Pezu - II | VC | 22143 | 4026 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Dara Tang - I | VC | 8012 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Dara Tang - II | VC | 10370 | 2267 | 0 | Upgradation of BHU to RHC |
| Lakki Marwat | Ghazni Khel | Dharaka Suleman Khel | VC | 12604 | 3312 | 0 | 0 |
| Lakki Marwat | Bettani | Gabbar Bagh | VC | 9505 | 9505 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Gandi Khan Khel - I | VC | 11832 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Gandi Khan Khel - II | VC | 20045 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Gandi Khan Sahib | VC | 14813 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Gandi Chikar Umer | VC | 22594 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Garzai | VC | 23963 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Ghazi Khel | VC | 5506 | 2318 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Ghazni Khel | VC | 11324 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Hayat Khel | VC | 4920 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Issak Khel | VC | 13183 | 403 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|--------------------------|----|-------|---|---|---|
| Lakki Marwat | Ghazni Khel | Jabu Khel | VC | 7873 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Jang Khel | VC | 8403 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Kachi Kamar | VC | 4599 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Kaka Khel | VC | 8180 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Khan Khel Mandazai | VC | 10504 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Khero Khel Pacca | VC | 11562 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Kot Kashmir | VC | 13243 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Lakki Marwat MC | NC | 78668 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Landiwa - I | VC | 6017 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Landiwa - II | VC | 14860 | 0 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Langar Khel Hati Khan | VC | 4723 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Mama Khel | VC | 12238 | 6 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Manji Wala | VC | 30606 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Marmandi Azam | VC | 21081 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Mash Masti Khani | VC | 18411 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Masha Mansoor | VC | 11444 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Matora | VC | 6048 | 0 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|----------------------------|----|-------|------|---|---|
| Lakki Marwat | Ghazni Khel | Mela Mandra Khel | VC | 12092 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Mela Shahab Khel | VC | 5282 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Mir Hazar Khanzad Khel | VC | 7300 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Mirazam Michin Khel | VC | 8441 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Nar Abud Samanad Begu Khel | VC | 20685 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Nar Muhammad Naurang | VC | 21072 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Nar Sahib Dad Maidad Khel | VC | 16703 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Nawar Khel | VC | 8818 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Nurang TC | NC | 38600 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Pahar Khel Pacca | VC | 12879 | 2805 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Paharkhel Thal - I | VC | 12961 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Paharkhel Thal - II | VC | 8359 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Passani - I | VC | 13130 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Passani - II | VC | 7917 | 0 | 0 | 0 |
| Lakki Marwat | Bettani | Quetta Khawa | VC | 8981 | 8981 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Ratanzai | VC | 5677 | 0 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|----------------------|----|-------|------|---|---------------------------|
| Lakki Marwat | Sarai Naurang | Sahib Zada Khost | VC | 17913 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Samandi | VC | 17269 | 27 | 0 | 0 |
| Lakki Marwat | Bettani | Sawan/Chichandi | VC | 9481 | 9481 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Shabaz Khel | VC | 14981 | 2599 | 0 | Upgradation of BHU to RHC |
| Lakki Marwat | Sarai Naurang | Shah Quli Khan | VC | 10875 | 0 | 0 | 0 |
| Lakki Marwat | Bettani | Shemali kali | VC | 8852 | 8852 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Tabi Murad | VC | 6294 | 1159 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Taja Zai | VC | 16019 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Tajori - I | VC | 8125 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Tajori - II | VC | 16228 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Takhti Khel | VC | 10918 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Tari Khel | VC | 9126 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Tittar Khel Guli Jan | VC | 14465 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Tor Lawang Khel | VC | 6938 | 0 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Walai | VC | 8719 | 8038 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Wand Baroo | VC | 9636 | 9636 | 0 | 0 |

| | | | | | | | |
|--------------|--------------|------------------|----|-------|------|---|---|
| Lakki Marwat | Lakki Marwat | Wanda Amir | VC | 8325 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Aurangzaib | VC | 8404 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Kalan | VC | 9860 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Kutana | VC | 15885 | 2189 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Shahabkhel | VC | 12054 | 0 | 1 | 0 |
| Lakki Marwat | Bettani | Wateen Sar | VC | 9255 | 9255 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Zangi Khel | VC | 10345 | 0 | 0 | 0 |

3.2.5.3 Network Analysis of Proposed Civil Dispensaries:

Based on the population network analysis and the planning standard of one Civil Dispensary (CD) per 10,000–12,000 population, a total of 47 Civil Dispensaries are proposed across Lakki Marwat District to improve first-level healthcare accessibility. The proposed CDs are strategically distributed along main settlement corridors and population clusters identified as unserved in the analysis. In Lakki Marwat Tehsil, 11 CDs are proposed in key VCs including Ahmad Khel, Isak Khel, Wanda Amir, Dara Tang, and Wanda Kutana, covering dense southern and eastern belts. Sarai Naurang Tehsil accounts for the highest need with 21 CDs, mainly around Muhammadi Azam, Garzai, Nara Abud Samand, and Gandhi Khan Khel clusters, where large populations remain outside the 5 km health-service radius. In Ghazni Khel Tehsil, 13 CDs are proposed, primarily in Dara Pezu-II, Shahbaz Khel, Ghazi Khel, and Teri Khel clusters to strengthen service coverage across southern settlements. In Bettani Tehsil, two CDs are proposed at Quetta Khawa and Shemali Kali to cater to remote hilly populations. The proposed network ensures equitable distribution of primary care services across all tehsils, particularly in peripheral and previously unserved areas, and serves as the first referral point to the nearby BHUs and RHCs.

Table 3-16: Proposed CDs through Network analysis Approach

| Tehsil | Proposed BHU (VC) | No. of Proposed | Village Councils (VC) – Unserved population | Total unserved population |
|--------------|-------------------|-----------------|---|---------------------------|
| Lakki Marwat | Ahmad Khel | 1 | Ahmad Khel | 11329 |
| | Isak Khel | 1 | Isak Khel | 13183 |
| | Wanda Amir | 1 | Wanda Amir, Alam Shah | 12458 |
| | Dara Tang | 1 | Dara Tang | 10370 |
| | Wanda Kutana | 1 | Wanda Kutana | 15885 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | |
|---------------|----------------------------|-------|--|-------|
| | Begu Khel | 1 | Begu Khel, Langar Khel Hati Khan, Nawar Khel | 11851 |
| | Dara Tang-I | 1 | Dara Tang-I, Dabak Mandra Khel | 14064 |
| | Samandi | 1 | Samandi | 17269 |
| | Wanda Aurangzeb | 1 | Wanda Aaurangzeb, Kachi Kamar | 13003 |
| | Wanda Shahabkhel | 1 | Wanda Shahabkhel | 12054 |
| | Mash Masti Khani | 1 | Mash Masti Khani | 17269 |
| Sarai Naurang | Dadiwala | 1 | Dadiwala, Landiwa-I | 13539 |
| | Muhammadi Azam | 2 | Muhammadi Azam | 21081 |
| | Gandi Khan Khel-II | 2 | Gandi Khan Khel-II | 20045 |
| | Gandi Khan Khel-I | 1 | Gandi Khan Khel-I | 11832 |
| | Gandi Sahib Khan | 1 | Gandi Sahib Khan | 14813 |
| | Sahib Zada Khost | 1 | Sahib Zada Khost | 17913 |
| | Mama Khel | 1 | Mama Khel | 12238 |
| | Nara Abud Samand Begu Khel | 2 | Nara Abud Samand Begu Khel | 20686 |
| | Basit Khel | 1 | Basit Khel | 13214 |
| | Kot Kashmir | 1 | Kot Kashmir | 13243 |
| | Nar Muhammad Naurang | 2 | Nar Muhammad Naurang | 21072 |
| | Garzai | 2 | Garzai | 23963 |
| | Takhti Khel | 1 | Takhti Khel | 10918 |
| | Passani-I | 1 | Passani-I | 13130 |
| | Shah Quli Khan | 1 | Shah Quli Khan | 10875 |
| Bragi | 1 | Bragi | 12955 | |
| Ghazni Khel | Dara Pezu-II | 2 | Dara Pezu-II | 22143 |
| | Masha Mansoor | 1 | Masha Mansoor | 11444 |
| | Shabaz Khel | 1 | Shabaz Khel | 14981 |
| | Ghazi Khel | 1 | Ghazi Khel, Tabi Murad | 11800 |
| | Pahar Khel Pacca | 1 | Pahar Khel Pacca | 12879 |
| | Khero Khel Pacca | 1 | Khero Khel Pacca | 11562 |

| | | | | |
|---------|----------------------|---|---|-------|
| | Tittar Khel Guli Jan | 1 | Tittar Khel Guli Jan | 14465 |
| | Kaka Khel | 1 | Kaka Khel, Matora | 12989 |
| | Teri Khel | 1 | Teri Khel, Behram Khel | 18575 |
| | Tajori-I | 1 | Tajori-I, Tajori-II, Dharaka Suleman Khel | 10829 |
| | Bakhmal Ahmad Zai | 1 | Bakhmal Ahmad Zai, Tor LAWANG Khel | 11693 |
| | Khan Khel Mandazai | 1 | Khan Khel Mandazai | 10504 |
| Bettani | Quetta Khawa | 1 | Quetta Khawa, Gabbar Bagh | 12271 |
| | Shemali Kali | 1 | Shemali Kali, Sawan Chichandi | 12031 |

Source: The Urban Unit

Table 3-17: Detailed Table

| District | Tehsil | NC VC Names | NC VC Type | Population 2025 | Unserviced Population | Existing CD | Required |
|--------------|--------------|--------------------|------------|-----------------|-----------------------|-------------|----------|
| Lakki Marwat | Lakki Marwat | Abba Khel - I | VC | 5831 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Abba Khel - II | VC | 8010 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Abba Khel - III | VC | 6698 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Abba Khel - IV | VC | 6942 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Abdul Khel | VC | 7900 | 14 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Adam Zai | VC | 16498 | 7672 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Ahmad Khel | VC | 15671 | 11329 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Alam Shah Khel | VC | 4387 | 4387 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Asghar Khel | VC | 5590 | 4990 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Atashi Machin Khel | VC | 5467 | 2081 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|-------------------|----|-------|-------|---|---|
| Lakki Marwat | Ghazni Khel | Bachken Ahmadzai | VC | 18094 | 18094 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Badni Khel | VC | 4807 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Bakhmal Ahmad Zai | VC | 9815 | 9815 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Basit Khel | VC | 20871 | 13214 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Bega Tajazai | VC | 5585 | 2300 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Begu Khel | VC | 5969 | 5969 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Behram Khel | VC | 11945 | 9449 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Betani Palkasht | VC | 13106 | 188 | 2 | 0 |
| Lakki Marwat | Sarai Naurang | Bragi | VC | 14475 | 12955 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Chando Khel | VC | 9901 | 9901 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Chuhar Khel | VC | 9354 | 3110 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Dabak Mandra Khel | VC | 8838 | 6052 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Dadiwala | VC | 7522 | 7522 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Dalo Khel - I | VC | 4428 | 0 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Dalo Khel - II | VC | 5930 | 0 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Dara Pezu - I | VC | 4460 | 4460 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Dara Pezu - II | VC | 22143 | 22143 | 0 | 2 |
| Lakki Marwat | Lakki Marwat | Dara Tang - I | VC | 8012 | 8012 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Dara Tang - II | VC | 10370 | 10370 | 0 | 1 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|----------------------|----|-------|-------|---|---|
| Lakki Marwat | Ghazni Khel | Dharaka Suleman Khel | VC | 12604 | 920 | 1 | 0 |
| Lakki Marwat | Bettani | Gabbar Bagh | VC | 9505 | 3290 | 1 | 1 |
| Lakki Marwat | Sarai Naurang | Gandi Khan Khel - I | VC | 11832 | 11832 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Gandi Khan Khel - II | VC | 20045 | 20045 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Gandi Sahib Khan | VC | 14813 | 14813 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Gandi Umer Chikar | VC | 22594 | 7874 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Garzai | VC | 23963 | 23963 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Ghazi Khel | VC | 5506 | 5506 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Ghazni Khel | VC | 11324 | 0 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Hayat Khel | VC | 4920 | 185 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Issak Khel | VC | 13183 | 13183 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Jabu Khel | VC | 7873 | 5965 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Jang Khel | VC | 8403 | 2278 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Kachi Kamar | VC | 4599 | 4599 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Kaka Khel | VC | 8180 | 6941 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Khan Khel Mandazai | VC | 10504 | 10504 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Khero Khel Pacca | VC | 11562 | 11562 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Kot Kashmir | VC | 13243 | 13243 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Lakki Marwat MC | NC | 78668 | 0 | 0 | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|----------------------------|----|-------|-------|---|---|
| Lakki Marwat | Lakki Marwat | Landiwa - I | VC | 6017 | 6017 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Landiwa - II | VC | 14860 | 14860 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Langar Khel Hati Khan | VC | 4723 | 4723 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Mama Khel | VC | 12238 | 12238 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Manji Wala | VC | 30606 | 5278 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Marmandi Azam | VC | 21081 | 21081 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Mash Masti Khani | VC | 18411 | 18411 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Masha Mansoor | VC | 11444 | 11444 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Matora | VC | 6048 | 6048 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Mela Mandra Khel | VC | 12092 | 0 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Mela Shahab Khel | VC | 5282 | 0 | 0 | |
| Lakki Marwat | Ghazni Khel | Mir Hazar Khanzad Khel | VC | 7300 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Mirazam Michin Khel | VC | 8441 | 3106 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Nar Abud Samanad Begu Khel | VC | 20685 | 20685 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Nar Muhammad Naurang | VC | 21072 | 21072 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Nar Sahib Dad Maidad Khel | VC | 16703 | 16703 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Nawar Khel | VC | 8818 | 1159 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Nurang TC | NC | 38600 | 38600 | 0 | 1 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | |
|--------------|---------------|---------------------|----|-------|-------|---|---|
| Lakki Marwat | Ghazni Khel | Pahar Khel Pacca | VC | 12879 | 12879 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Paharkhel Thal - I | VC | 12961 | 0 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Paharkhel Thal - II | VC | 8359 | 3922 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Passani - I | VC | 13130 | 13130 | 0 | 1 |
| Lakki Marwat | Sarai Naurang | Passani - II | VC | 7917 | 7917 | 0 | 0 |
| Lakki Marwat | Bettani | Quetta Khawa | VC | 8981 | 8981 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Ratanzai | VC | 5677 | 3 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Sahib Zada Khost | VC | 17913 | 17913 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Samandi | VC | 17269 | 17269 | 0 | 1 |
| Lakki Marwat | Bettani | Sawan/Chichandi | VC | 9481 | 3161 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Shabaz Khel | VC | 14981 | 14981 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Shah Quli Khan | VC | 10875 | 10875 | 0 | 1 |
| Lakki Marwat | Bettani | Shemali kali | VC | 8852 | 8852 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Tabi Murad | VC | 6294 | 6294 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Taja Zai | VC | 16019 | 3689 | 0 | 0 |
| Lakki Marwat | Ghazni Khel | Tajori - I | VC | 8125 | 8125 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Tajori - II | VC | 16228 | 1784 | 0 | 0 |
| Lakki Marwat | Sarai Naurang | Takhti Khel | VC | 10918 | 10918 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Tari Khel | VC | 9126 | 9126 | 0 | 1 |

| | | | | | | | |
|--------------|---------------|----------------------|----|-------|-------|---|---|
| Lakki Marwat | Ghazni Khel | Tittar Khel Guli Jan | VC | 14465 | 14465 | 0 | 1 |
| Lakki Marwat | Ghazni Khel | Tor Lawang Khel | VC | 6938 | 1878 | 1 | 0 |
| Lakki Marwat | Sarai Naurang | Walai | VC | 8719 | 2809 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Wand Baroo | VC | 9636 | 3276 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Amir | VC | 8325 | 8071 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Wanda Aurangzaib | VC | 8404 | 8404 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Wanda Kalan | VC | 9860 | 0 | 0 | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Kutana | VC | 15885 | 15885 | 0 | 1 |
| Lakki Marwat | Lakki Marwat | Wanda Shahabkhel | VC | 12054 | 12054 | 0 | 1 |
| Lakki Marwat | Bettani | Wateen Sar | VC | 9255 | 0 | 1 | 0 |
| Lakki Marwat | Lakki Marwat | Zangi Khel | VC | 10345 | 0 | 1 | 0 |

3.2.5.4 Network Analysis of Proposed Hospitals

Based on the population distribution, accessibility patterns, and existing healthcare network in District Lakki Marwat, two higher level health facilities are proposed to strengthen secondary and tertiary service coverage in underserved regions. In Lakki Marwat Tehsil, a District Headquarters Hospital (DHQ) is proposed at Dalo Khel-II, strategically located along the main road network to ensure accessibility from all tehsils. This site lies centrally within the district, enabling efficient referral connectivity with existing RHCs and BHU clusters from Lakki City, Sarai Naurang, and Ghazni Khel. The proposed DHQ will provide comprehensive tertiary care, including diagnostic, surgical, and emergency services, significantly reducing travel time for patients currently dependent on hospitals outside the district. In Ghazni Khel Tehsil, a Tehsil Headquarters Hospital (THQ) is proposed at Bachken Ahmadzai to serve the southern and southwestern population clusters, which are presently outside the 30–35 km service radius of any major hospital. This location connects directly to surrounding settlements through secondary roads and will function as a secondary level referral center for nearby RHCs and BHUs, providing inpatient, maternity, and diagnostic services. Together, these two proposed hospital facilities at Dalo Khel-II and Bachken Ahmadzai will establish a balanced referral network, enhancing accessibility to advanced healthcare across all tehsils and ensuring equitable service coverage for the district's growing population.

Table 3-18: Proposed Hospitals through Network analysis Approach

| Tehsil | Proposed BHU (VC) | Facility Type | Village Councils (VC) |
|--------------|-------------------|---------------|-----------------------|
| Lakki Marwat | Dalo Khel-II | DHQ | Dalo Khel-II |
| Ghazni Khel | Bachken Ahmadzai | THQ | Bachken Ahmadzai |

Source: The Urban Unit

Table 3-19: Detailed Table

| District | Tehsil | NC VC Names | NC VC Type | Population 2025 | Unserviced Population | Existing Hospitals | Facility TYPE | Required |
|--------------|--------------|--------------------|------------|-----------------|-----------------------|--------------------|---------------|----------|
| Lakki Marwat | Lakki Marwat | Abba Khel - I | VC | 5831 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Abba Khel - II | VC | 8010 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Abba Khel - III | VC | 6698 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Abba Khel - IV | VC | 6942 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Abdul Khel | VC | 7900 | 229 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Adam Zai | VC | 16498 | 0 | 1 | SHC | 0 |
| Lakki Marwat | Lakki Marwat | Ahmad Khel | VC | 15671 | 1545 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Alam Shah Khel | VC | 4387 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Asghar Khel | VC | 5590 | 14 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Atashi Machin Khel | VC | 5467 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Bachken Ahmadzai | VC | 18094 | 0 | 0 | THQ | 1 |
| Lakki Marwat | Ghazni Khel | Badni Khel | VC | 4807 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Bakhmal Ahmad Zai | VC | 9815 | 0 | 0 | | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | | |
|--------------|---------------|----------------------|----|-------|------|---|-----|---|
| Lakki Marwat | Sarai Naurang | Basit Khel | VC | 20871 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Bega Tajazai | VC | 5585 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Begu Khel | VC | 5969 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Behram Khel | VC | 11945 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Betani Palkasht | VC | 13106 | 998 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Bragi | VC | 14475 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Chando Khel | VC | 9901 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Chuhar Khel | VC | 9354 | 116 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Dabak Mandra Khel | VC | 8838 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Dadiwala | VC | 7522 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Dalo Khel - I | VC | 4428 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Dalo Khel - II | VC | 5930 | 0 | 0 | DHQ | 1 |
| Lakki Marwat | Ghazni Khel | Dara Pezu - I | VC | 4460 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Dara Pezu - II | VC | 22143 | 1070 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Dara Tang - I | VC | 8012 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Dara Tang - II | VC | 10370 | 948 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Dharaka Suleman Khel | VC | 12604 | 0 | 0 | | 0 |
| Lakki Marwat | Bettani | Gabbar Bagh | VC | 9505 | 4160 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Gandi Khan Khel - I | VC | 11832 | 0 | 0 | | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | | |
|--------------|---------------|-----------------------|----|-------|-----|---|-----|---|
| Lakki Marwat | Sarai Naurang | Gandi Khan Khel - II | VC | 20045 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Gandi Khan Sahib | VC | 14813 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Gandi Chikar Umer | VC | 22594 | 0 | 0 | MCH | 1 |
| Lakki Marwat | Sarai Naurang | Garzai | VC | 23963 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Ghazi Khel | VC | 5506 | 49 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Ghazni Khel | VC | 11324 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Hayat Khel | VC | 4920 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Issak Khel | VC | 13183 | 403 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Jabu Khel | VC | 7873 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Jang Khel | VC | 8403 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Kachi Kamar | VC | 4599 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Kaka Khel | VC | 8180 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Khan Mandazai Khel | VC | 10504 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Khero Pacca Khel | VC | 11562 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Kot Kashmir | VC | 13243 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Lakki Marwat MC | NC | 78668 | 0 | 1 | MCH | 0 |
| Lakki Marwat | Lakki Marwat | Landiwa - I | VC | 6017 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Landiwa - II | VC | 14860 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Langar Khel Hati Khan | VC | 4723 | 0 | 0 | | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | | |
|--------------|---------------|----------------------------|----|-------|---|---|-----|---|
| Lakki Marwat | Sarai Naurang | Mama Khel | VC | 12238 | 0 | 1 | MCH | 0 |
| Lakki Marwat | Sarai Naurang | Manji Wala | VC | 30606 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Marmandi Azam | VC | 21081 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Mash Masti Khani | VC | 18411 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Masha Mansoor | VC | 11444 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Matora | VC | 6048 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Mela Mandra Khel | VC | 12092 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Mela Shahab Khel | VC | 5282 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Mir Hazar Khanzad Khel | VC | 7300 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Mirazam Michin Khel | VC | 8441 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Nar Abud Samanad Begu Khel | VC | 20685 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Nar Muhammad Naurang | VC | 21072 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Nar Sahib Dad Maidad Khel | VC | 16703 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Nawar Khel | VC | 8818 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Nurang TC | NC | 38600 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Pahar Pacca Khel | VC | 12879 | 0 | 1 | SHC | 0 |
| Lakki Marwat | Lakki Marwat | Paharkhel Thal - I | VC | 12961 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Paharkhel Thal - II | VC | 8359 | 0 | 0 | | 0 |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | | | |
|--------------|---------------|----------------------|----|-------|------|---|--|---|
| Lakki Marwat | Sarai Naurang | Passani - I | VC | 13130 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Passani - II | VC | 7917 | 0 | 0 | | 0 |
| Lakki Marwat | Bettani | Quetta Khawa | VC | 8981 | 1431 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Ratanzai | VC | 5677 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Sahib Zada Khost | VC | 17913 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Samandi | VC | 17269 | 27 | 0 | | 0 |
| Lakki Marwat | Bettani | Sawan/Chichandi | VC | 9481 | 4685 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Shabaz Khel | VC | 14981 | 72 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Shah Quli Khan | VC | 10875 | 0 | 0 | | 0 |
| Lakki Marwat | Bettani | Shemali kali | VC | 8852 | 1099 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Tabi Murad | VC | 6294 | 40 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Taja Zai | VC | 16019 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Tajori - I | VC | 8125 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Tajori - II | VC | 16228 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Takhti Khel | VC | 10918 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Tari Khel | VC | 9126 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Tittar Khel Guli Jan | VC | 14465 | 0 | 0 | | 0 |
| Lakki Marwat | Ghazni Khel | Tor Lawang Khel | VC | 6938 | 0 | 0 | | 0 |
| Lakki Marwat | Sarai Naurang | Walai | VC | 8719 | 0 | 0 | | 0 |

| | | | | | | | | |
|--------------|--------------|------------------|----|-------|------|---|--|---|
| Lakki Marwat | Lakki Marwat | Wand Baroo | VC | 9636 | 4483 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Amir | VC | 8325 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Aurangzaib | VC | 8404 | 704 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Kalan | VC | 9860 | 0 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Kutana | VC | 15885 | 2195 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Wanda Shahabkhel | VC | 12054 | 0 | 0 | | 0 |
| Lakki Marwat | Bettani | Wateen Sar | VC | 9255 | 1701 | 0 | | 0 |
| Lakki Marwat | Lakki Marwat | Zangi Khel | VC | 10345 | 0 | 0 | | 0 |

3.2.5.5 Recommendations:

For BHUs:

- A total of 10 new Basic Health Units (BHUs) are proposed across Lakki Marwat District to improve access to primary healthcare in underserved areas.
- The distribution includes 7 BHUs in Lakki Marwat Tehsil, 2 in Sarai Naurang, and 1 in Bettani Tehsil.

For RHCs:

- Establish a new RHC at Bettani Palkasht (Ghazni Khel Tehsil) to serve a clustered unserved population of 65,533 from Bettani Palkasht, Dharaka Suleman Khel, Bragi, Walai, Quetta Khawa, Shemali Kali, Wateen Sar, Gabbar Bagh, and Sawan Chichandi. The cluster size exceeds the 45,000–60,000 threshold, strongly justifying the establishment of a new RHC.
- Since the remaining populations do not meet the standard criteria for establishing new RHCs, it is proposed that the unserved populations 27,895 in Ghazni Khel Tehsil and 16,053 in Lakki Marwat Tehsil be accommodated by upgrading two existing BHUs in each tehsil to RHC level.

For Civil Dispensaries:

- Establish 47 Civil Dispensaries across the district based on network analysis and population standards of 10,000–12,000 people per facility.
- In Lakki Marwat Tehsil, propose 11 CDs in Ahmad Khel, Isak Khel, Wanda Amir, Dara Tang, Wanda Kutana, Begu Khel, Dara Tang-I, Samandi, Wanda Aurangzeb, Wanda Shahabkhel, and Mash Masti Khani to serve dense rural belts and peripheral areas.
- In Sarai Naurang Tehsil, propose 21 CDs across major clusters including Muhammadi Azam, Garzai, Nara Abud Samand Begu Khel, Gandhi Khan Khel, and Takhti Khel to reduce travel distances for primary care.

- In Ghazni Khel Tehsil, propose 13 CDs at Dara Pezu-II, Shahbaz Khel, Ghazi Khel, Teri Khel, and other unserved settlements to strengthen outreach and ensure first-contact care.
- In Bettani Tehsil, propose 2 CDs at Quetta Khawa and Shemali Kali to provide basic outpatient and preventive health services in remote hilly areas.
- These Civil Dispensaries will serve as first level service outlets and feeders to BHUs and RHCs, bridging the accessibility gap for rural and dispersed populations.

For Hospitals:

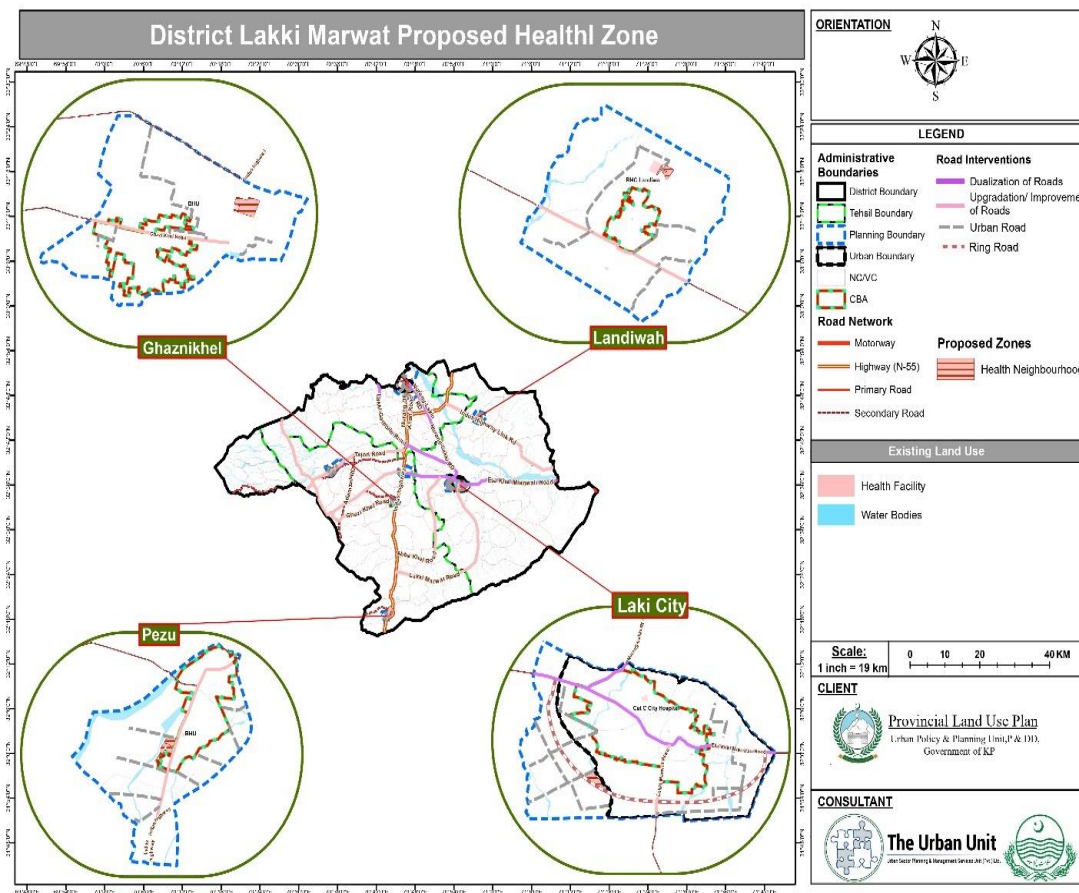
- Establish a new District Headquarters Hospital (DHQ) at Dalo Khel-II (Lakki Marwat Tehsil) to serve as the central tertiary healthcare facility for the entire district. The hospital will provide surgical, diagnostic, and emergency services, acting as the main referral hub for all RHCs and BHUs across Lakki Marwat.
- Establish a new Tehsil Headquarters Hospital (THQ) at Bachken Ahmadzai (Ghazni Khel Tehsil) to serve the southern and southwestern population clusters currently outside the hospital coverage zone. This THQ will offer secondary-level care, including inpatient, maternity, and diagnostic services, reducing travel distances and strengthening the district's referral network.

3.2.6 Future Plans

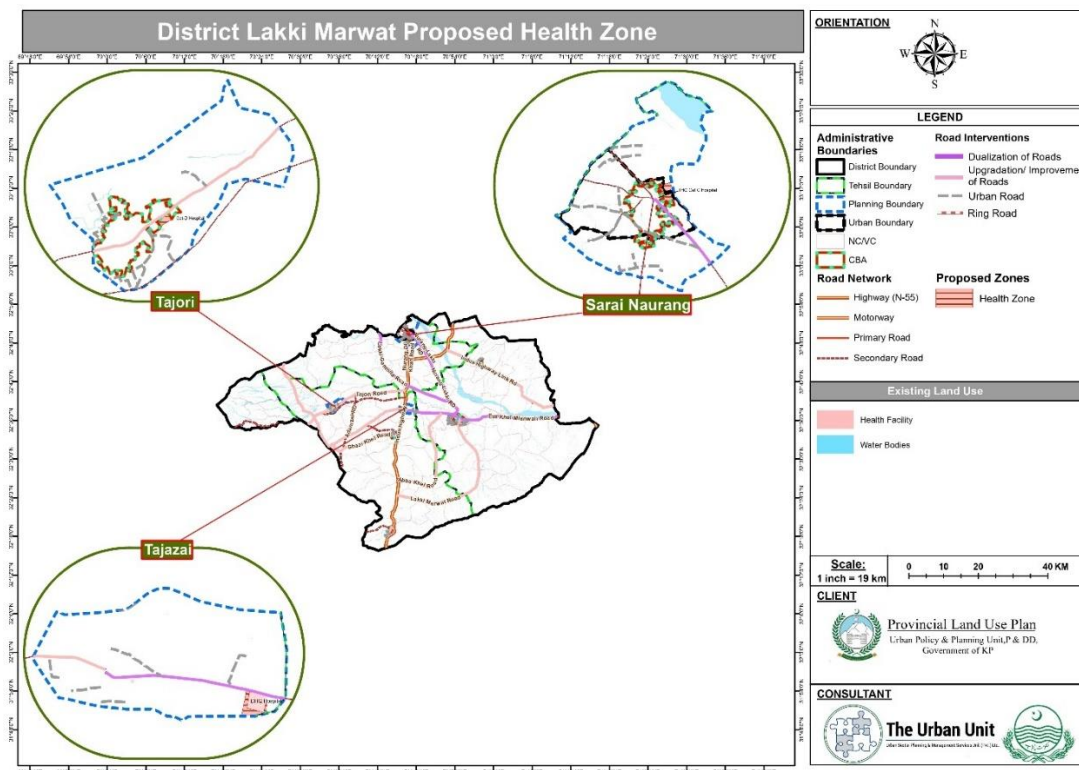
As part of the long-term development strategy for District Lakki Marwat, the future health plan envisions the establishment of integrated Health Neighborhoods in key urban and semi-urban centers, including Lakki City, Sarai Naurang, Tajori, Tajazai, Landiwah, Pezu, and Ghazni Khel, based on the projected population for 2045. These zones will accommodate a comprehensive range of healthcare facilities public and private hospitals, Basic Health Units (BHU), Rural Health Centers (RHC), specialized maternal and child health units to meet the district's expanding healthcare demands in the future.

3.2.6.1 Proposed Health Neighborhood Analysis District Lakki Marwat

The Proposed Health Neighborhood Plan for District Lakki Marwat identifies four key locations Lakki City, Landiwah, Pezu, and Ghazni Khel to establish a well connected and balanced healthcare network across urban and semi urban areas. Lakki City will serve as the district's primary health hub, centered around the Cat-C City Hospital along the N-55 corridor, providing tertiary and specialized medical services with enhanced accessibility through the proposed ring road. Landiwah is planned as a semi urban health zone anchored by the existing RHC Landiwah, catering to eastern settlements with future provisions for diagnostic and maternity care expansion. Pezu will function as a sub-tehsil level health cluster around the BHU Pezu, serving southwestern and hilly regions with space reserved for an upgraded RHC and private healthcare facilities. Similarly, Ghazni Khel will act as a secondary level referral hub built around the existing BHU Ghazni Khel, providing essential medical services and linking the Pezu and Lakki City health systems. Together, these proposed health neighborhoods form an integrated and accessible healthcare framework that promotes equitable service delivery and supports the district's long term health infrastructure needs by 2045.



Map 3-12: District Lakki Marwat Proposed Health Neighborhood



Map 3-13: District Lakki Marwat Proposed Health Neighborhood

The Proposed Health Neighborhood Plan for District Lakki Marwat highlights Sarai Naurang, Tajori, and Tajazai as key health zones to ensure comprehensive and accessible healthcare coverage across the district. Sarai Naurang will function as the northern healthcare hub, anchored by the THQ/Category C Hospital located along the N55 Highway, serving as a major referral and diagnostic center for surrounding rural and semi urban areas. Tajori is designated as a southern health zone, built around the existing Category D Hospital, providing essential medical services and emergency care to dispersed rural communities in the southern corridor. Tajazai will serve as the central health cluster of the district, integrating the proposed DHQ Hospital to cater to the growing urban and rural populations in central Lakki Marwat. Collectively, these proposed health neighborhoods establish a balanced and well connected healthcare network, enhancing accessibility, strengthening referral linkages, and meeting the district’s projected healthcare needs by 2045.

3.2.6.2 Health Neighborhood Locational Criteria

The criteria for selecting locations for health zones across District Lakki Marwat include accessibility from the road, proximity to existing health facilities, availability of suitable land parcels, adjacency to open or green spaces, and closeness to residential areas to ensure convenient access for the population.

In Lakki Marwat City, the health zone has been strategically allocated on the southwestern side of the urban area. It is accessible from both the proposed ring road and the proposed urban road, and is adjacent to the proposed recreational and mixed-use zones, while also being in proximity to the proposed residential area, making it an appropriate and accessible location for health-related development.

In Landiwa Urban Area, the health zone is located on the northeastern side of the urban area. It is accessible from both existing and proposed urban roads. An existing health facility lies to its west, while a recreational zone is positioned to the southwest. The area is also close to existing and proposed residential zones, ensuring convenience and connectivity for users.

In Serai Naurang, the health zone is situated on the northeastern side of the urban area and is accessible from a primary road. An existing health facility is located to its southwest, residential areas are established to the west, and a proposed recreational zone lies to the north. These factors collectively make this location a prime site for health infrastructure.

In Ghazni Khel, the health zone is positioned on the northeastern side of the urban area, with direct access from the Indus Highway. It adjoins an existing health facility and is flanked by proposed recreational zones on the east and south, while remaining close to the proposed residential zone. These characteristics make it an ideal site for future health services.

In Pezu Urban Area, the health zone is located at the center of the urban area along Pezu Road, providing excellent accessibility. It lies near both existing and proposed residential areas, with a proposed recreational zone to the southwest and a public buildings zone to the north, making it a convenient and integrated location for healthcare development.

In Tajori Urban Area, the health zone is centrally located along the main Tajori Road, ensuring easy access. It is surrounded by existing and proposed residential areas on the north, west, and northeast sides, and an established health facility lies toward the southwest, reinforcing its suitability and public access.

In Tajazai Urban Area, the District Headquarters Hospital (DHQ) already exists along the Essa Khan–Mianwali Road, serving as the primary health facility for the area. An extension area is proposed adjacent to this hospital to accommodate private health services, including clinics, laboratories, and pharmacies, ensuring comprehensive healthcare coverage for the urban population.

3.3 Recreational Facilities

Recreational facilities are an essential part of human life and find many different forms that are shaped naturally by individual interests but also by the surrounding environment. A list of recreational activities includes sports and playgrounds.

3.3.1 Sports Facilities

Sporting events have played pivotal roles in creating healthy communities around the globe. Today, contests pushing physical limits are more popular than ever before. As interest in health and longevity continues to rise, and government businesses continue to see sporting events as sound investments and long-lasting impacts, sports can play a vital role in shaping a vigorous society for the foreseeable future.

3.3.1.1 Existing Sports Facilities

The Existing sports facilities in District Lakki Marwat are identified from the data collected from the sports and youth affairs department.

3.3.1.2 Government Sports Facilities

In District Lakki Marwat, a total of 5 sports facilities has been identified, comprising 2 sports complexes 1 of which is a mini sports complex located in Lakki City and 3 playgrounds situated within the urban areas respectively. The rural areas, however, lack both Government sports complex and playgrounds. The detailed data show in table below.

Table 3-20: District Lakki Marwat Government Sports Facilities²³

| Administrative Area | Government | |
|----------------------|----------------|-------------|
| | Sports Complex | Playgrounds |
| District Urban | 2 | 3 |
| District Rural | – | – |
| District Overall | 2 | 3 |
| Urban | | |
| Lakki City | 1 | 2 |
| Serai Naurang | – | 1 |
| Ghazni Khel | – | – |
| Tajori | – | – |
| Tajazai | 1 | – |
| Pezu | – | – |
| Landiwah | – | – |
| Rural | | |
| Tehsil Lakki Marwat | – | – |
| Tehsil Serai Naurang | – | – |
| Tehsil Ghazni Khel | – | – |
| Tehsil Bettani | – | – |

3.3.1.3 Private Sports Facilities

In District Lakki Marwat, a total of 87 sports facilities has been identified, providing valuable spaces for residents to engage in physical activity and promote community well-being. These include 30 general-purpose playgrounds, 30 cricket grounds, 13 football grounds, a Kabadi ground, 7 parks and 6 volleyball ground. These facilities serve as important recreational hubs.

In the urban areas of District Lakki Marwat, Lakki City is comparatively better equipped, featuring 2 playgrounds, 4 cricket grounds, and 2 football grounds. Serai Naurang has 3 cricket grounds, 1 football

²³ Secondary data collected from sports and youth affair department

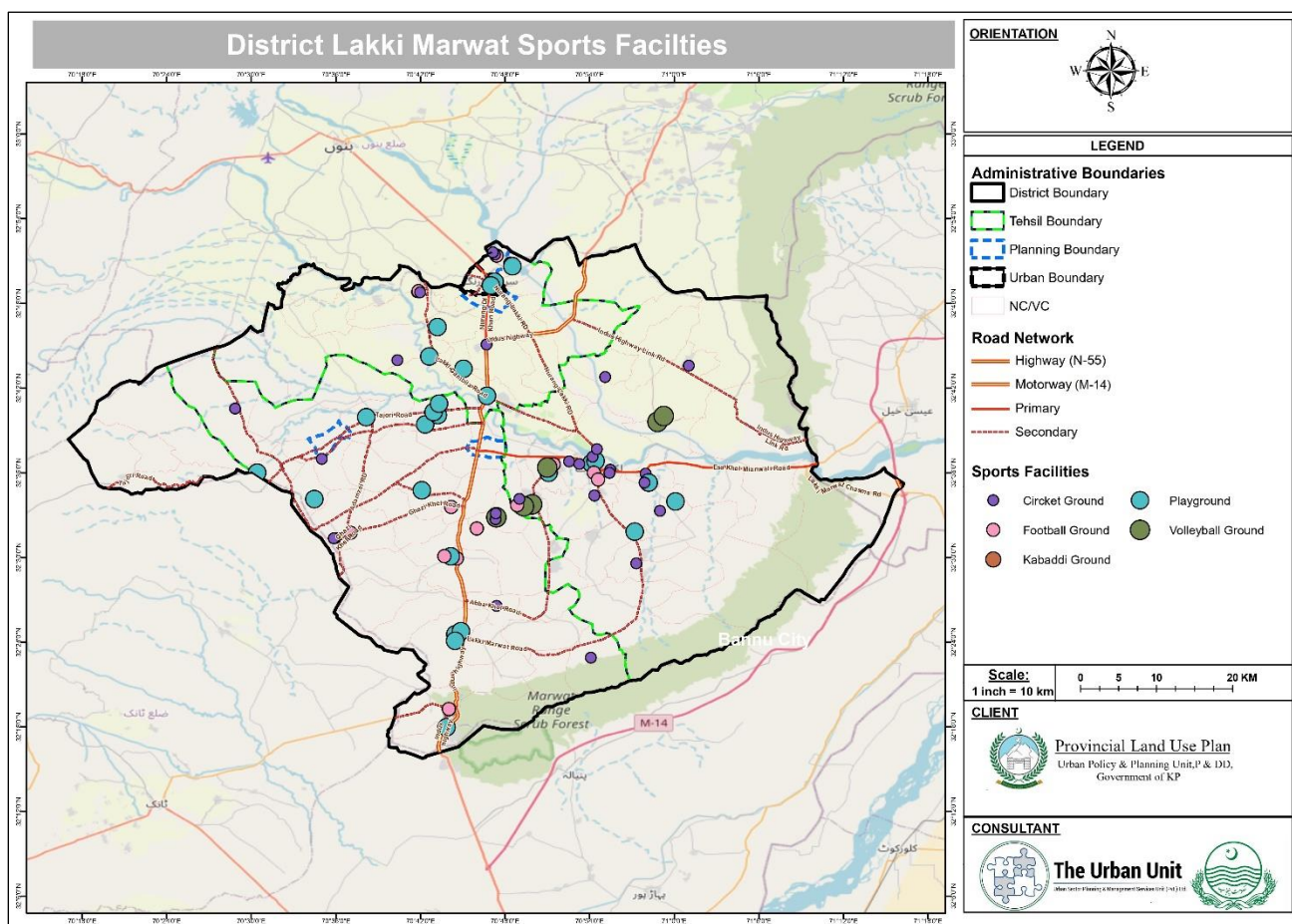
ground, and 2 playgrounds. Ghazni Khel and Pezu each have 1 football ground, while the remaining urban areas lack any private sports facilities.

In the rural areas of District Lakki Marwat, a total of 23 cricket grounds, 8 football grounds, 6 volleyball grounds, 1 kabaddi ground, and 26 playgrounds have been identified. Among the rural tehsils, Tehsil Lakki Marwat has 11 cricket grounds, 2 football grounds, 5 volleyball grounds, and 4 playgrounds. Tehsil Serai Naurang comprises 4 cricket grounds, 2 football grounds, and 5 playgrounds, while Tehsil Ghazni Khel is relatively better equipped, featuring 8 cricket grounds, 4 football grounds, 1 volleyball ground, 1 kabaddi ground, and 17 playgrounds. However, Tehsil Bettani lacks any sports facilities. The detailed data is presented in the table below.

Table 3-21: District Lakki Marwat Private Sports Facilities²⁴

| Administrative Area | Private | | | | |
|----------------------|---------|----------|--------------------|----------------|------------|
| | Cricket | Football | Volley ball Ground | Kabaddi Ground | Playground |
| District Urban | 7 | 5 | | | 4 |
| District Rural | 23 | 8 | 6 | 1 | 26 |
| District Overall | 30 | 13 | 6 | 1 | 30 |
| Urban | | | | | |
| Lakki City | 4 | 2 | | | 2 |
| Serai naurang | 3 | 1 | | | 2 |
| Ghazni Khel | | 1 | | | |
| Tajori | | | | | |
| Tajazai | | | | | |
| Pezu | | 1 | | | |
| Landiwah | | | | | |
| Rural | | | | | |
| Tehsil Lakki Marwat | 11 | 2 | 5 | | 4 |
| Tehsil Serai Naurang | 4 | 2 | | | 5 |
| Tehsil Ghazni Khel | 8 | 4 | 1 | 1 | 17 |
| Tehsil Betani | | | | | |

²⁴ Land use Classification Map



Map 3-14: District Lakki Marwat Sports Facilities

3.3.1.4 Future requirements of Sports Facilities

Active recreation comprises formal and informal, outdoor and indoor games. The more capital-intensive the facility, the larger the catchment required for its viable operations. Sub-standard sizes may be considered for cricket and football, where the games are limited to the pre-teen and early teen age group. The table below delineates the standards set forth by the National Reference Manual for Infrastructure and Planning for the establishment of new active recreational facilities at various levels of settlements and threshold populations:

Table 3-22: Active Recreation Facilities Allocation Criteria

| Type of Facility | Population Criteria | Sports | Size |
|--------------------------------|---------------------|---------------------|---------------|
| Metropolitan City Stadiums | Above 2,000,000 | Cricket | 2.5 hectares |
| | | Hockey | 2.8 hectares |
| | | Football | 1.5 hectares |
| City Stadiums | Above 300,000 | Cricket | 2 hectares |
| | Above 200,000 | Hockey | 1.15 hectares |
| | | Football | 1.4 hectares |
| Community Level Playgrounds | Around 100,000 | Combined Playground | 2.14 hectares |
| Neighborhood Level Playgrounds | Around 25,000 | Combined Playground | 1.63 hectares |

3.3.1.5 Playgrounds (Current Backlog and Future Requirement)

The need for new playgrounds was assessed using NRM standards, which recommend one neighborhood-level playground for every 25,000 people in each NC/VC. To determine the backlog, this standard threshold divided the population of each settlement, and the number of existing playgrounds was subtracted to calculate the backlog.

In District Lakki Marwat, sports facilities are unevenly distributed between urban and rural areas. In urban settlements, Lakki City and Serai Naurang are comparatively better equipped with existing sports facilities, while other urban centers such as Landiwa, Pezu, and Tajori lack sufficient provisions.

In rural areas, a limited number of settlements possess basic sports facilities. Larger villages like Bachken Ahmadzai, Shabaz Khel, and Manji Wala have relatively better access to playgrounds or sports grounds. However, the majority of rural settlements—particularly smaller ones such as Dara Tang, Ahmad Khel, and Takhti Khel—have no existing facilities.

By 2045, the projected population growth indicates an increased demand for sports infrastructure across both urban and rural areas, especially in high-population settlements such as Manji Wala, Marmandi Azam, Garzai, and Quetta Khawa. The data highlights the need for the strategic development of new sports grounds to ensure equitable access and promote recreational activities throughout the district.

The projected future requirements for playgrounds are also presented in the **Table** below.

Table 3-23: Need for new playgrounds (Current backlog and future projection)

| Administrative Area | Settlements | Pop 2025 | Existing | Required (2025) | Backlog 2025 | Pop 2045 | Required (2045) |
|---------------------|-----------------------|----------|----------|-----------------|--------------|----------|-----------------|
| Urban Areas | Lakki City | 79553 | 2 | 3 | 1 | 159882 | 6 |
| | Serai Naurang | 62042 | 2 | 2 | 0 | 121237 | 4 |
| | Ghazni Khel | 5437 | 0 | 0 | 0 | 9372 | 0 |
| | Landiwa | 14953 | 0 | 0 | 0 | 25776 | 1 |
| | Pezu | 8989 | 0 | 0 | 0 | 15494 | 0 |
| | Tajori | 8125 | 0 | 0 | 0 | 14006 | 0 |
| | Tajazai | 11356 | 0 | 0 | 0 | 19575 | 0 |
| Rural Areas | Paharkhel Thal - II | 8359 | 0 | 0 | 0 | 14409 | 0 |
| | Paharkhel Thal - I | 12961 | 0 | 0 | 0 | 22341 | 0 |
| | Mash Masti Khani | 18411 | 0 | 0 | 0 | 31737 | 1 |
| | Zangi Khel | 10345 | 0 | 0 | 0 | 17832 | 0 |
| | Ahmad Khel | 15671 | 0 | 0 | 0 | 27014 | 1 |
| | Dalo Khel - II | 5045 | 0 | 0 | 0 | 8696 | 0 |
| | Dalo Khel - I | 4428 | 1 | 0 | 0 | 7632 | 0 |
| | Dara Tang - II | 10370 | 0 | 0 | 0 | 17875 | 0 |
| | Dabak Mandra Khel | 8838 | 1 | 0 | 0 | 15234 | 0 |
| | Landiwa - II | 1163 | 0 | 0 | 0 | 2005 | 0 |
| | Wanda Kalan | 9860 | 0 | 0 | 0 | 16996 | 0 |
| | Mirazam Michin Khel | 8441 | 0 | 0 | 0 | 14551 | 0 |
| | Atashi Machin Khel | 5467 | 0 | 0 | 0 | 9424 | 0 |
| | Issak Khel | 13183 | 0 | 0 | 0 | 22725 | 0 |
| | Langar Khel Hati Khan | 4723 | 0 | 0 | 0 | 8142 | 0 |
| | Nawar Khel | 8818 | 0 | 0 | 0 | 15200 | 0 |
| | Begu Khel | 5969 | 1 | 0 | 0 | 10290 | 0 |
| | Alam Shah Khel | 4387 | 0 | 0 | 0 | 7561 | 0 |
| | Wanda Kutana | 15885 | 0 | 0 | 0 | 27382 | 1 |
| | Dara Tang - I | 8012 | 0 | 0 | 0 | 13811 | 0 |
| | Wanda Aurangzaib | 8404 | 0 | 0 | 0 | 14486 | 0 |
| | Samandi | 17269 | 0 | 0 | 0 | 29768 | 1 |
| | Wand Baroo | 9636 | 0 | 0 | 0 | 16610 | 0 |
| | Abba Khel - II | 8010 | 0 | 0 | 0 | 13807 | 0 |
| | Abba Khel - III | 6698 | 0 | 0 | 0 | 11546 | 0 |
| | Abba Khel - IV | 6942 | 0 | 0 | 0 | 11966 | 0 |
| | Wanda Amir | 8325 | 1 | 0 | 0 | 14351 | 0 |
| | Kachi Kamar | 4599 | 0 | 0 | 0 | 7928 | 0 |
| | Wanda Shahabkhel | 12054 | 0 | 0 | 0 | 20779 | 0 |
| | Landiwa - I | 4760 | 0 | 0 | 0 | 8206 | 0 |
| Mela Shahab Khel | 5282 | 0 | 0 | 0 | 9105 | 0 | |
| Abba Khel - I | 5831 | 0 | 0 | 0 | 10052 | 0 | |
| Manji Wala | 30606 | 0 | 1 | 1 | 63296 | 2 | |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | | |
|----------------------------|-------|---|---|---|-------|---|
| Gandi Khan Khel - II | 20045 | 0 | 0 | 0 | 41455 | 1 |
| Gandi Khan Khel - I | 11832 | 1 | 0 | 0 | 24471 | 1 |
| Nar Sahib Dad Maidad Khel | 16703 | 1 | 0 | 0 | 34544 | 1 |
| Takhti Khel | 10918 | 0 | 0 | 0 | 22579 | 1 |
| Gandi Umer Chikar | 22594 | 0 | 0 | 0 | 46727 | 1 |
| Nar Abud Samanad Begu Khel | 9480 | 0 | 0 | 0 | 19606 | 0 |
| Sahib Zada Khost | 17913 | 1 | 0 | 0 | 37047 | 1 |
| Dadiwala | 7522 | 0 | 0 | 0 | 15557 | 0 |
| Marmandi Azam | 21081 | 0 | 0 | 0 | 43599 | 1 |
| Chando Khel | 9901 | 0 | 0 | 0 | 20477 | 0 |
| Kot Kashmir | 13243 | 1 | 0 | 0 | 27389 | 1 |
| Garzai | 23963 | 0 | 0 | 0 | 49559 | 1 |
| Basit Khel | 20871 | 1 | 0 | 0 | 43164 | 1 |
| Walai | 8719 | 0 | 0 | 0 | 18032 | 0 |
| Bragi | 14475 | 0 | 0 | 0 | 29936 | 1 |
| Passani - II | 7917 | 0 | 0 | 0 | 16373 | 0 |
| Shah Quli Khan | 10875 | 0 | 0 | 0 | 22491 | 0 |
| Gandi Sahib Khan | 14813 | 0 | 0 | 0 | 30636 | 1 |
| Passani - I | 13130 | 0 | 0 | 0 | 27154 | 1 |
| Nar Muhammad Naurang | 21072 | 0 | 0 | 0 | 43579 | 1 |
| Khan Khel Mandazai | 10504 | 0 | 0 | 0 | 18106 | 0 |
| Adam Zai | 16498 | 0 | 0 | 0 | 28439 | 1 |
| Bachken Ahmadzai | 18094 | 7 | 0 | 0 | 31191 | 1 |
| Ghazni Khel | 5888 | 0 | 0 | 0 | 10149 | 0 |
| Pahar Khel Pacca | 12879 | 0 | 0 | 0 | 22200 | 0 |
| Shabaz Khel | 14981 | 4 | 0 | 0 | 25824 | 1 |
| Masha Mansoor | 11444 | 0 | 0 | 0 | 19727 | 0 |
| Ratanzai | 5677 | 1 | 0 | 0 | 9786 | 0 |
| Betani Palkasht | 13106 | 0 | 0 | 0 | 22592 | 0 |
| Jang Khel | 8403 | 0 | 0 | 0 | 14484 | 0 |
| Dharaka Suleman Khel | 12604 | 0 | 0 | 0 | 21726 | 0 |
| Badni Khel | 4807 | 0 | 0 | 0 | 8286 | 0 |
| Bakhmal Ahmad Zai | 9815 | 1 | 0 | 0 | 16919 | 0 |
| Tari Khel | 9126 | 0 | 0 | 0 | 15732 | 0 |
| Behram Khel | 11945 | 1 | 0 | 0 | 20590 | 0 |
| Bega Tajazai | 5585 | 0 | 0 | 0 | 9628 | 0 |
| Jabu Khel | 7873 | 0 | 0 | 0 | 13571 | 0 |
| Mir Hazar Khanzad Khel | 7300 | 0 | 0 | 0 | 12583 | 0 |
| Khero Khel Pacca | 11562 | 0 | 0 | 0 | 19930 | 0 |
| Tittar Khel Guli Jan | 14465 | 1 | 0 | 0 | 24935 | 0 |
| Ghazi Khel | 5506 | 0 | 0 | 0 | 9490 | 0 |

| | | | | | | |
|------------------|-------|---|---|---|-------|---|
| Tabi Murad | 6294 | 0 | 0 | 0 | 10849 | 0 |
| Dara Pezu - I | 1999 | 0 | 0 | 0 | 3446 | 0 |
| Dara Pezu - II | 15615 | 1 | 0 | 0 | 26917 | 1 |
| Asghar Khel | 5590 | 0 | 0 | 0 | 9636 | 0 |
| Hayat Khel | 4920 | 0 | 0 | 0 | 8481 | 0 |
| Matora | 6048 | 0 | 0 | 0 | 10425 | 0 |
| Kaka Khel | 8180 | 0 | 0 | 0 | 14101 | 0 |
| Tajori - II | 16228 | 0 | 0 | 0 | 27974 | 1 |
| Mela Mandra Khel | 12092 | 0 | 0 | 0 | 20843 | 0 |
| Taja Zai | 4664 | 0 | 0 | 0 | 8039 | 0 |
| Tor Lawang Khel | 6938 | 1 | 0 | 0 | 11959 | 0 |
| Abdul Khel | 7900 | 0 | 0 | 0 | 13618 | 0 |
| Chuhar Khel | 9354 | 0 | 0 | 0 | 16124 | 0 |
| Wateen Sar | 9255 | 0 | 0 | 0 | 37387 | 1 |
| Gabbar Bagh | 9505 | 0 | 0 | 0 | 38397 | 1 |
| Quetta Khawa | 8981 | 0 | 0 | 0 | 36279 | 1 |
| Shemali kali | 8852 | 0 | 0 | 0 | 35756 | 1 |
| Sawan/Chichandi | 9481 | 0 | 0 | 0 | 38298 | 1 |

3.4 Existing Parks

Access to green spaces like parks and open areas has been linked to improved mental and physical health. They offer opportunities for recreation, exercise, relaxation, and stress relief. Playgrounds encourage physical activity and outdoor play, which are essential for children's development and well-being. The table below shows existing parks in district Lakki Marwat.

Table 3-24: District Lakki Marwat Existing Parks

| Sr. No | Park Name | Tehsil | Settlement |
|--------|-----------------------------|---------------|-------------------|
| 1 | GM and Sons Guest House | Lakki Marwat | Lakki City |
| 2 | Meelad Park | Lakki Marwat | Lakki City |
| 3 | Lakki Marwat Public Park | Lakki Marwat | Lakki City |
| 4 | Public Ticket Swimming Pool | Serai Naurang | Serai Naurang |
| 5 | Wild Life Park | Serai Naurang | Dadi Wala |
| 6 | Sheikh Badin Tourism Camp | Ghazni Khel | Dara Pezu II |
| 7 | Sitara Park | Lakki Marwat | Paharkhel Thal II |

3.4.1 Planning Standards for Establishing New Parks and Playgrounds

The Table below delineates the standards set forth by the National Reference Manual for Infrastructure and Planning for the establishment of new active recreational facilities at various levels of settlements and threshold population:

Table 3-25: Passive Recreation Facilities Allocation Criteria

| Type of Facility | Description | Allocation Criteria (Population) | Area (Hectares) | Hectare/1000 pop |
|------------------|-------------|----------------------------------|-----------------|------------------|
|------------------|-------------|----------------------------------|-----------------|------------------|

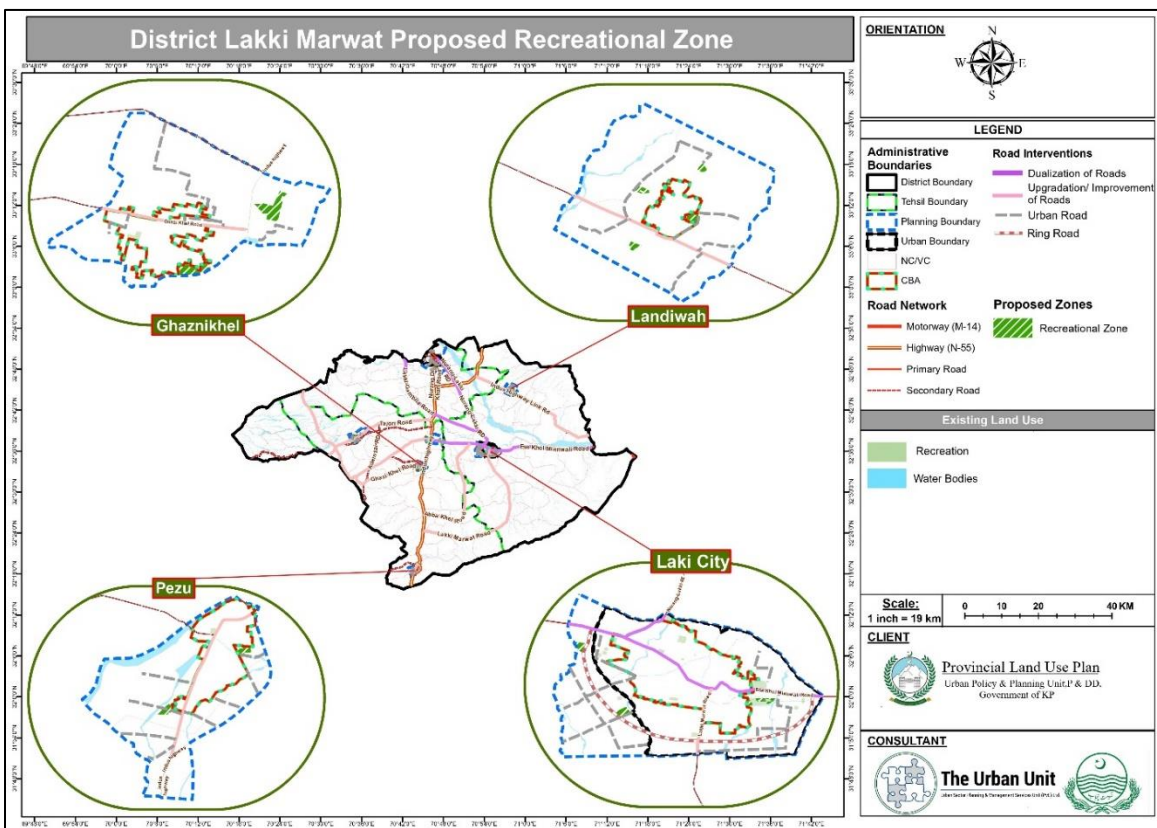
| | | | | |
|--|---|---------|------------|---------------|
| City Park | Wide range of amusement facilities, fountains, lakes, landscaping, etc. | 400,000 | 12 to 15 | 0.03 to 0.037 |
| Community Park | Selected amusement facilities fountains, lakes, landscaping, etc. | 100,000 | 4 to 5 | 0.04 to 0.05 |
| Neighborhood Park | Wide range of child play fixtures, walking & jogging paths. | 25,000 | 3.25 to 4 | 0.13 to 0.16 |
| Mohalla Parks (3-8 per Mohalla, average size 0.45ha each) | Tot lots with slides, swings, and seesaws; other spaces with some turf | 6,250 | 1.6 to 3.6 | 0.26 to 0.58 |

3.5 Future Plan

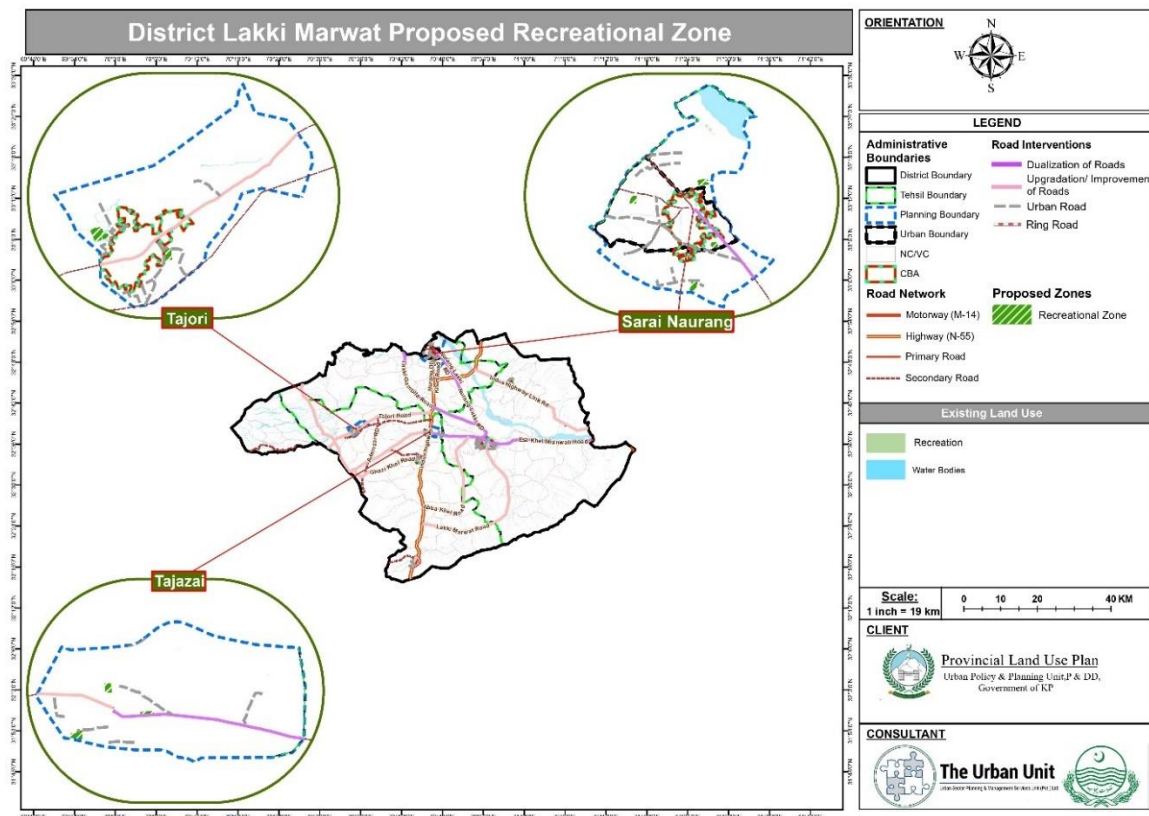
To ensure equitable access to recreational/open spaces and promote healthy urban living, the future provision of recreational facilities has been carefully integrated into the overall land use strategy. At the neighborhood level, parks, playgrounds and open spaces will be accommodated within the 100% additional land reserved alongside to the proposed residential areas. These decentralized green spaces are intended to serve the daily recreational needs of local communities, thereby supporting inclusive and active neighborhoods. At the broader urban scale, community-level recreational facilities have been planned within the designated Recreational Zones. These zones will host larger infrastructure such as sports complexes, public parks, city parks, and multipurpose playgrounds. The proposed allocation of recreational zones has been carefully calibrated to supplement existing facilities and meet future demand. When combined with current recreational areas, the total provision aligns with NRM benchmarks for urban open space. As shown in the **Table** below and mapped in the subsequent **Map**, the proposed recreational zones cover a total of 40.81 hectares in Lakki City, which represents the largest share of recreational land due to its population size and urban footprint. Additional allocations include 38.27 hectares in Naurang Urban, 13.12 hectares in Ghazni Khel Urban, 8.56 hectares in Landiwa Urban, 6.48 hectares in Pezu urban, 10.87 hectares in Tajori urban and 6.44 hectares in Tajazai urban. These allocations reflect a balanced distribution based on projected population, spatial availability, and existing service gaps. Together, these neighborhood- and community-level recreational provisions will play a vital role in enhancing urban quality of life, promoting environmental sustainability, and fostering social cohesion across the five urban centers.

Table 3-26: Proposed Recreational Zones Area (Hectares)

| Administrative Area | Existing Area | Proposed Area (Hectares) | Sum of Existing and Proposed | Proposed Urban Boundary | %age out of total | NRM Standards |
|---------------------|---------------|--------------------------|------------------------------|-------------------------|-------------------|---------------|
| Lakki City | 27.69 | 13.12 | 40.81 | 1751 | 2.3 | 0.5 – 7% |
| Serai Naurang Urban | 5.79 | 32.48 | 38.27 | 3071 | 1.2 | |
| Ghazni Khel Urban | 1.39 | 11.72 | 13.12 | 446.7 | 2.9 | |
| Landiwa Urban | - | 8.56 | 8.56 | 811.8 | 1.1 | |
| Pezu Urban | 0.94 | 5.54 | 6.48 | 649.4 | 1 | |
| Tajori Urban | 1.48 | 9.39 | 10.87 | 932.6 | 1.1 | |
| Tajazai Urban | - | 6.44 | 6.44 | 871.6 | 0.07 | |



Map 3-15: District Lakki Marwat Urban Centers Proposed Recreational Zone



Map 3-16: District Lakki Marwat Urban Centers Proposed Recreational Zone

3.5.1 Recreational Zone Locational Criteria

The allocation of recreational zones across various urban centers in District Lakki Marwat is guided by several key criteria, including **accessibility for nearby residents, connectivity through road networks, availability of suitable land parcels, central or peripheral positioning, and proximity to existing water bodies.**

Lakki City

In **Lakki Marwat City**, three primary recreational zones have been designated—one in the **Northwest, second in Southwest** and the third one is in the **eastern side** of the urban area.

- The Northwest recreational is located along the proposed ring road, adjacent to the residential, CBD, Health zone and mixed-use zones, making it easily accessible to the individuals associated with those sectors and also to the residents living nearby. These characteristics make it an ideal site for recreational use.
- The **southwestern zone**, located near the urban boundary, is accessible from Ishfaq Khan Road (proposed as a ring road) and from the secondary road to the south. It adjoins residential zones on the north and south, public buildings to the east, and a water body to the west, enhancing its visual and environmental value and ensuring easy accessibility to the residents and the workers associated with public building. These factors make it a prime location for recreation.
- The **eastern recreational zone** lies near existing water bodies and includes informal playgrounds and a cricket ground, which can be further developed for community recreation.

Serai Naurang Urban Center

In **Serai Naurang Urban Area**, three recreational zones are proposed—one in the southern, one in the northwestern, and one in the northeastern part of the urban area.

- The **southern zone** is accessible via the proposed urban road to its north and a local road to its south. It is adjacent to residential areas on the north and east, and educational facilities on the west, providing convenient access for both residents and individuals associated with education.
- The **northwestern zone** lies next to residential and industrial zones, offering a balanced location for recreation near major employment and living areas.
- The **northeastern zone**, located near the urban boundary, provides recreational access for nearby residential and health zones.

Landiwa Urban Center

In Landiwa urban area, two recreational zones are proposed—one in the northeast and another in the southeast.

- The **northeastern zone** is accessible from the proposed urban road linked to the Indus Highway link road. It lies adjacent to residential and health zones and near an existing health facility, making it easily accessible to local residents and healthcare staff.
- The **southeastern zone** is accessible via the proposed urban road connecting to the Indus Highway link road. It is adjacent to existing residential and educational areas, making it an ideal site for both community and institutional recreation.

Ghazni Khel Urban Center

In Ghazni Khel urban area, two recreational zones have been identified—one on the east and another on the south side of the urban area.

- The **eastern zone** is accessible via a secondary road connected to the Indus Highway. It is surrounded by major functional areas: a commercial zone to the southwest, existing and proposed health facilities to the north, public buildings to the south, and existing polytechnic institute and proposed educational zone to the southeast, making it accessible to the individuals associated with these zones. These linkages make it a prime location for recreation.
- The **southern zone**, located along the urban boundary, primarily serves the existing residential population. It is surrounded by built-up housing areas to the west and bordered by a water body to the south, enhancing its environmental appeal.

Pezu Urban Center

In Pezu Urban area, two recreational zones are proposed—one in the southwest and one in the northeast.

- **Southwestern recreational zone** is accessible from the proposed urban road connecting to Pezu Road, this site is adjacent to a proposed educational zone to the east, existing residential areas to the northeast, and a proposed health zone nearby. A water body on the west enhances the site's aesthetics and recreational potential. The zone will serve residents, students and healthcare users from the surrounding neighborhoods and institutions.
- **Northeastern recreational zone** is located near the urban boundary and directly accessible from the Indus Highway on its eastern side, this zone is sited beside an established residential area to the west and is intended primarily for the existing urban population making it an ideal location for the recreational zone.

Tajazai Urban Center

In Tajazai Urban area, three recreational zones are proposed — one in the northwest, one in the southwest (towards the edge of the boundary), and one in the center of the urban area.

- **Southwestern recreational zone:** Positioned at the urban boundary and connected directly to the Indus Highway via the proposed urban road, this area is surrounded by existing built-up residential neighborhoods making it easily reachable for local residents.
- **Northwestern recreational zone:** Located along the Indus Highway, this site serves adjacent residential areas and benefits from strong road connectivity. Its highway linkage makes it easily accessible, providing open space and active recreational facilities for nearby communities as well as visitors from outside the town.
- **Central recreational zone:** Sited on the Essa Khan–Mianwali Road, this central recreational zone is designed to serve institutional and civic users as well as the wider public. Key nearby facilities include the District Complex, the University of Lakki Marwat and the DHQ Hospital, making the site particularly suitable for multi-purpose community recreation and events.

Tajori Urban Center

In Tajori Urban Area, two recreational zones are proposed — one in the south and one in the northwest.

- **Southern recreational zone:** Accessible from proposed urban roads approaching from the north and west (which connect to Tajori Road), this site is bordered to the south and west by established residential areas and to the east by an existing educational facility. The location makes the zone convenient for local families, students and staff from adjacent institutions.

- Northwestern recreational zone: Specifically designated to serve the established residential neighborhoods in the northwest, this zone ensures nearby, walkable green space for everyday recreation and community use.

3.5.2 Recommendations

Enhance Government Sports Facilities:

Only 5 government sports facilities exist; additional complexes and playgrounds are required—especially in rural tehsils where none currently exist.

Promote Equitable Rural Access:

Rural areas, particularly **Tehsil Betani**, lack any sports infrastructure. New basic-level playgrounds and multipurpose fields should be prioritized there.

Strengthen Urban Facility Distribution:

Sports infrastructure is concentrated in **Lakki City** and **Serai Naurang**; other urban areas such as **Tajazai**, **Tajori**, **Pezu**, and **Landiwah** need new facilities for balanced provision.

Encourage Public–Private Partnerships (PPP):

Private sector investment in sports and recreation should be incentivized to fill gaps in underserved settlements.

Develop Multi-Purpose Playgrounds:

Introduce shared-use grounds for cricket, football, and volleyball at community level to maximize land efficiency.

Upgrade Existing Facilities:

Renovation and maintenance of existing playgrounds and complexes are needed to meet safety and usability standards.

3.6 Social Security

Security plays a significant role in various aspects of social, economic, and political progress. It creates an environment of safety and stability, which are fundamental prerequisites for development. Effective police security helps prevent crime, corruption, and violence, fostering an environment where individuals and businesses can thrive. The rule of law, upheld by police enforcement, provides certainty and predictability for economic activities, attracting investment and promoting entrepreneurship. Overall, police security is integral to sustainable development, creating an enabling environment where individuals can live in safety, exercise their rights, and participate in social, economic, and political activities.

3.6.1 Entry and Exit Points

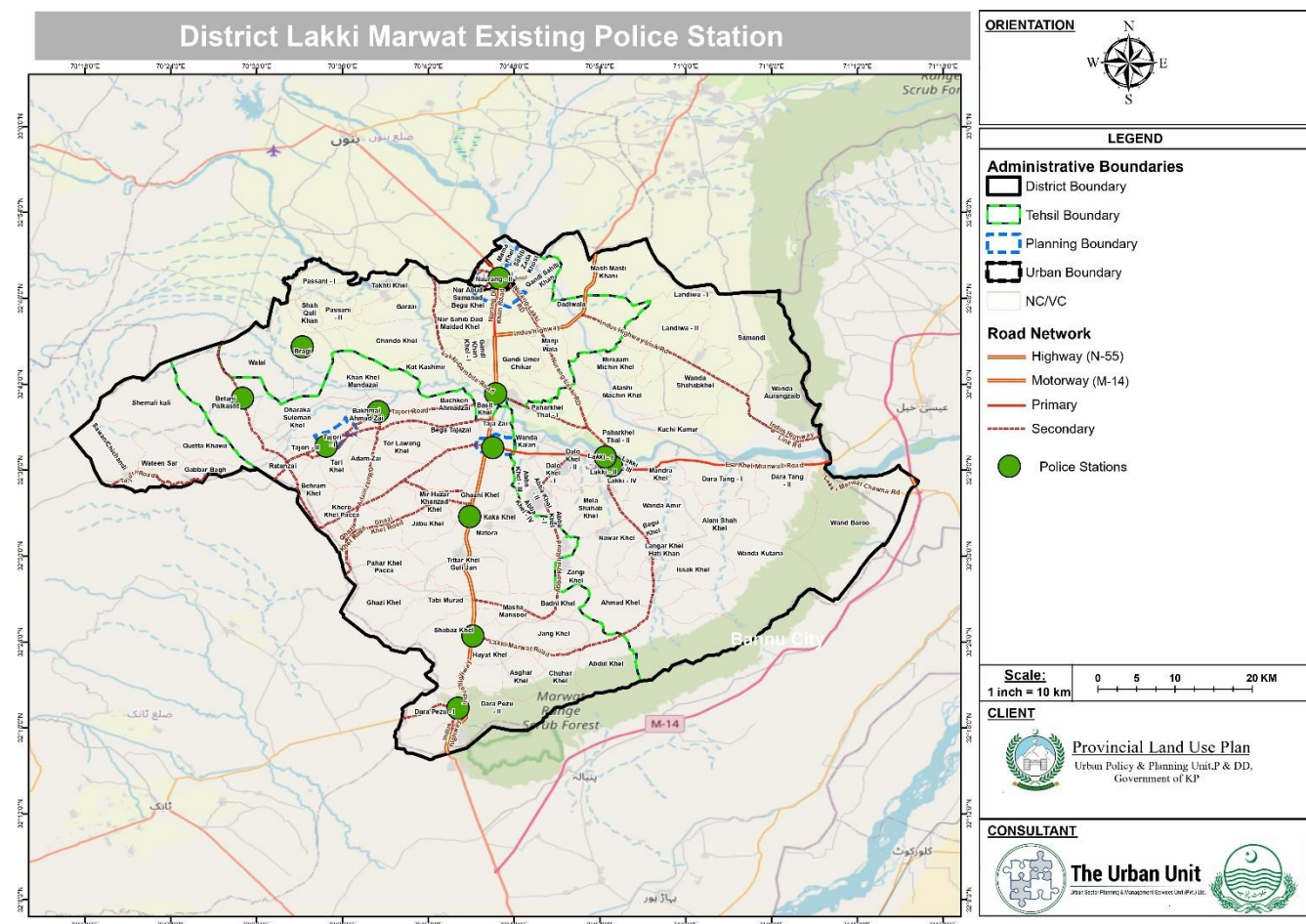
District entry and exit points typically refer to the designated locations where individuals can enter or exit a particular administrative district, such as a city, county, or other geopolitical subdivision. These points serve various purposes, including monitoring traffic, controlling access, and ensuring security.

In regions where districts or jurisdictions are separated by borders, there may be official checkpoints staffed by law enforcement or border control authorities. These checkpoints monitor the movement of people and goods between districts, enforcing regulations and screening for illegal activities. Toll booths on highways often serve as entry or exit points for districts, where motorists pay fees for using the road infrastructure. Highway exits also serve as entry or exit points for specific districts or municipalities, providing access to local roads and communities.

There are 12 entry and exit points in District Lakki Marwat, the details of entry and exit points of District Lakki Marwat is given in the following table:

Table 3-27: Entry and Exit Points of District Lakki Marwat

| Sr. No | Name of Establishment | ASIs | Sis | HC | FC | Total |
|--------|--------------------------------------|------|-----|----|----|-------|
| 1 | PP Shehbaz Khel area of Pezu | -- | -- | 3 | 27 | 30 |
| 2 | PP Rescue 15 Area of PS NAURANG | 1 | -- | 3 | 19 | 23 |
| 3 | PP City Naurang area of PS NAURANG | 1 | -- | 1 | 12 | 14 |
| 4 | PP Abbasa area of PS Dadiwala | -- | -- | 2 | 19 | 21 |
| 5 | PP City Lakki area of PS Lakki City | 1 | -- | 4 | 26 | 31 |
| 6 | PP Daratang area of PS Saddar Lakki | 1 | -- | - | 17 | 18 |
| 7 | PP Mir Alami area of PS Saddar Lakki | - | -- | 1 | 14 | 15 |
| 8 | PP Wanda Banochi area of PS Pezu | 1 | -- | 1 | 16 | 18 |
| 9 | PP Shahtora area of PS Naurang | -- | -- | 1 | 21 | 22 |
| 10 | PP Manjiwala area of PS Naurang | 1 | -- | 1 | 18 | 20 |
| 11 | PP Bakhmal area of PS Tajori | 1 | -- | - | 20 | 21 |
| 12 | PP Manzar Faqir area of PS Gambila | 1 | -- | - | 22 | 23 |



Map 3-17: District Lakki Marwat Existing Police Stations

3.6.2 Need for New Police Stations

To determine the number of new police stations needed to meet current demand, a detailed assessment of existing facilities was conducted. According to the National Reference Manual for Infrastructure and Planning,

one police station is recommended for every 50,000 people. This evaluation is based on demographic data from the 2025 population census of District Lakki Marwat, with projections extending to the year 2045.

In District Lakki Marwat, police infrastructure is insufficient in most tehsils. **Tehsil Lakki Marwat** has only 2 police stations against a need of 7, creating a backlog of 5, and will require 13 by 2045. **Tehsil Serai Naurang** has 3 existing police stations but needs 7, with requirements increasing to 15 by 2045. **Tehsil Ghazni Khel** currently meets its 2025 requirement with 7 stations but will need 12 by 2045. **Tehsil Bettani** presently has no police station but will require 3 by 2045. Overall, there is a strong need to enhance police coverage, especially in Lakki Marwat and Serai Naurang tehsils, and plan new facilities for Bettani to meet future security demands.

Table 3-28: District Lakki Marwat Need for new police stations

| Administrative Area | Population (2025) | Existing Police Stations | Required Police Stations | Police Stations Backlog | Projected Population (2045) | Required Police Stations |
|----------------------|-------------------|--------------------------|--------------------------|-------------------------|-----------------------------|--------------------------|
| Tehsil Lakki Marwat | 372652 | 2 | 7 | 5 | 665119 | 13 |
| Tehsil Serai Naurang | 389715 | 3 | 7 | 4 | 798908 | 15 |
| Tehsil Ghazni Khel | 352354 | 7 | 7 | 0 | 616747 | 12 |
| Tehsil Bettani | 46074 | 0 | 0 | 0 | 186117 | 3 |

3.6.3 Recommendations

- Address the significant shortage of security personnel by increasing manpower, enhancing logistical support, and providing training in modern policing to combat crime and terrorism effectively.
- Enforce standard duty hours with a maximum of eight-hour shifts, especially at key entry and exit points, to support the health, alertness, and effectiveness of police officers.
- Redesign training programs for functional specialization and ongoing professional development to equip officers for challenges like terrorism, organized crime, and public safety.
- Establish 13 new police stations across tehsil Lakki Marwat to ensure a safe environment and meet the needs of the growing population.
- Establish 15 new police stations across tehsil Naurang to ensure a safe environment and meet the needs of the growing population.
- Establish 12 new police stations across tehsil Ghazni Khel to ensure a safe environment and meet the needs of the growing population.
- Establish 3 new police stations across tehsil Bettani to ensure a safe environment and meet the needs of the growing population.
- Police infrastructure requires improvement, as many police stations and post buildings are in poor condition and in need of renovation.

3.7 Graveyards

Graveyards, also known as cemeteries, are specific areas designated for the burial of deceased individuals. These spaces are treated with respect and reverence in many cultures and societies around the world and serve as final resting places. Graveyards hold significant cultural, religious, and historical importance, and they can be places of remembrance and reflection that connect the living with their ancestors and heritage.

Different cultures have varied burial practices, including methods of interment (burial or cremation), burial rituals, and grave markers. Graveyards often feature unique architectural elements, such as mausoleums,

monuments, tombstones, and gardens. The design and layout of graveyards may reflect cultural and religious beliefs, as well as aesthetic considerations.

Graveyards require ongoing maintenance to ensure they remain respectful and dignified spaces. This includes grounds keeping, restoration of aging monuments, and sometimes conservation efforts to protect historical gravesites. While graveyards are primarily places for the deceased, they also serve as places for the living to visit and pay respects to loved ones. Many people find solace and peace in visiting graveyards, especially during times of mourning or remembrance.

There are often legal regulations governing the establishment and maintenance of graveyards, including zoning laws, environmental regulations, and cemetery management guidelines. With changing societal norms and technological advancements, the concept of graveyards is evolving. Alternative burial practices, such as green burials and virtual memorials, are gaining popularity in some communities.

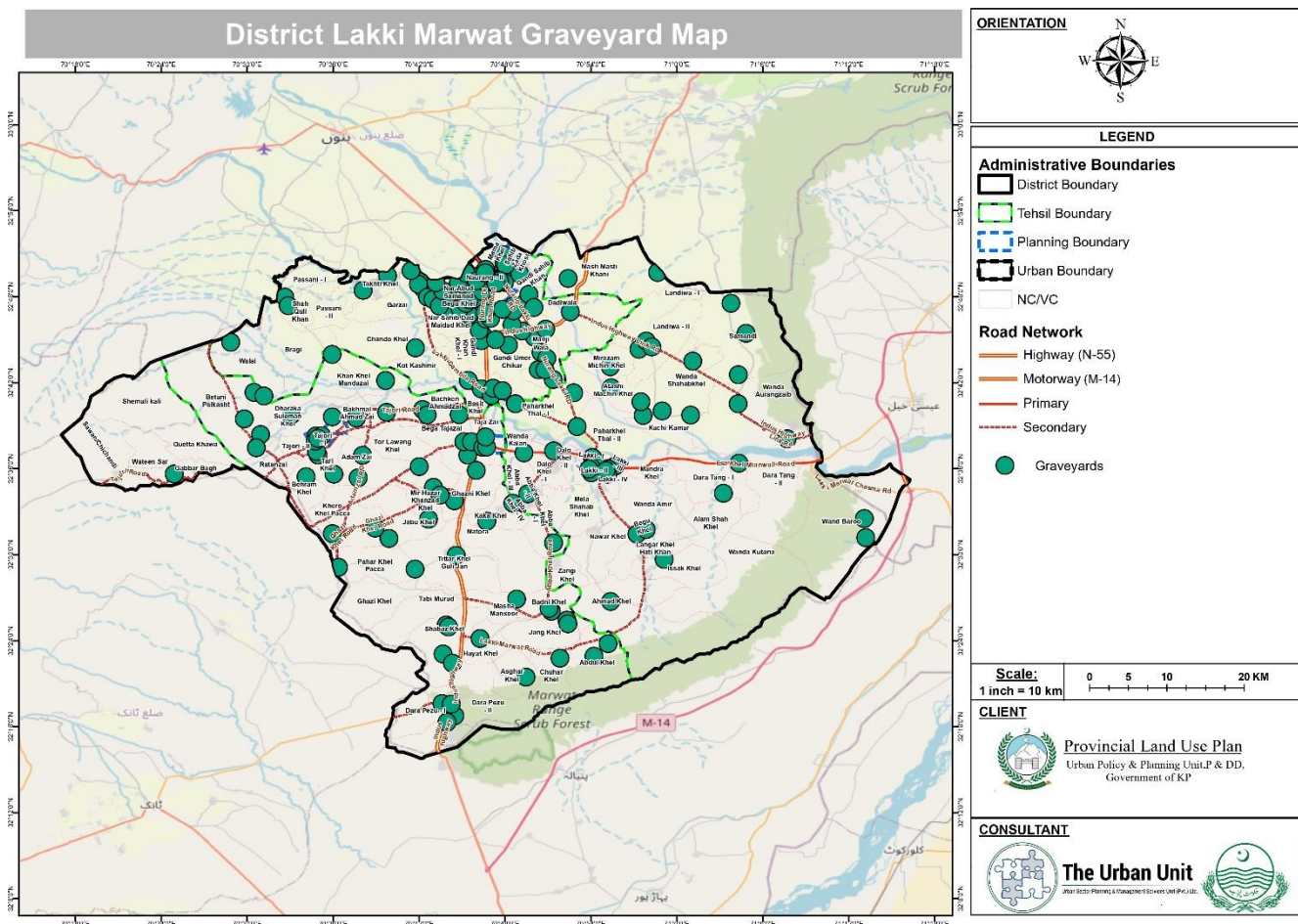
3.7.1 Existing Graveyards

Graveyards have a deep historical connection to the local community. They bring residents closer to an understanding of the past and help to provide insights into how people within the area used to live. The data collected regarding the availability of graveyards within District Lakki Marwat reveals that there is a total of **209** graveyards spread across both urban and rural areas, covering an area of **478.97** hectares. A significant portion of these graveyards, numbering **162** is located in rural areas, occupying **405.16** hectares. Conversely, urban areas host fewer graveyards, with a count of **47** covering **73.81** hectares.

Tehsil Naurang leads in rural graveyard count, with approximately **71** graveyards covering **144.14** hectares followed by Tehsil Ghazni Khel with **56** graveyards covering an area of **141.31** hectares. Conversely, Tehsil Lakki Marwat has **34** graveyards occupying **117.21** hectares and only **01** graveyard in Tehsil Bettani covering **2.5** hectares.

Table 3-29: District Lakki Marwat Existing Graveyards

| Administrative Area | Number of Graveyards | Area of Graveyards (hectares) |
|----------------------|----------------------|-------------------------------|
| District Urban | 47 | 73.81 |
| District Rural | 162 | 405.16 |
| District Overall | 209 | 478.97 |
| Urban Areas | | |
| Lakki City | 11 | 29.33 |
| Naurang | 21 | 15.33 |
| Landiwa | 2 | 1.46 |
| Ghazni Khel | 1 | 0.82 |
| Tajazai | 4 | 9.12 |
| Tajori | 5 | 6.2 |
| Pezu | 3 | 11.55 |
| Rural Areas | | |
| Tehsil Lakki Marwat | 34 | 117.21 |
| Tehsil Sarai Naurang | 71 | 144.14 |
| Tehsil Ghazni Khel | 56 | 141.31 |
| Tehsil Bettani | 1 | 2.5 |



Map 3-18: Existing Graveyards in District Lakki Marwat

4 Agriculture & Livestock

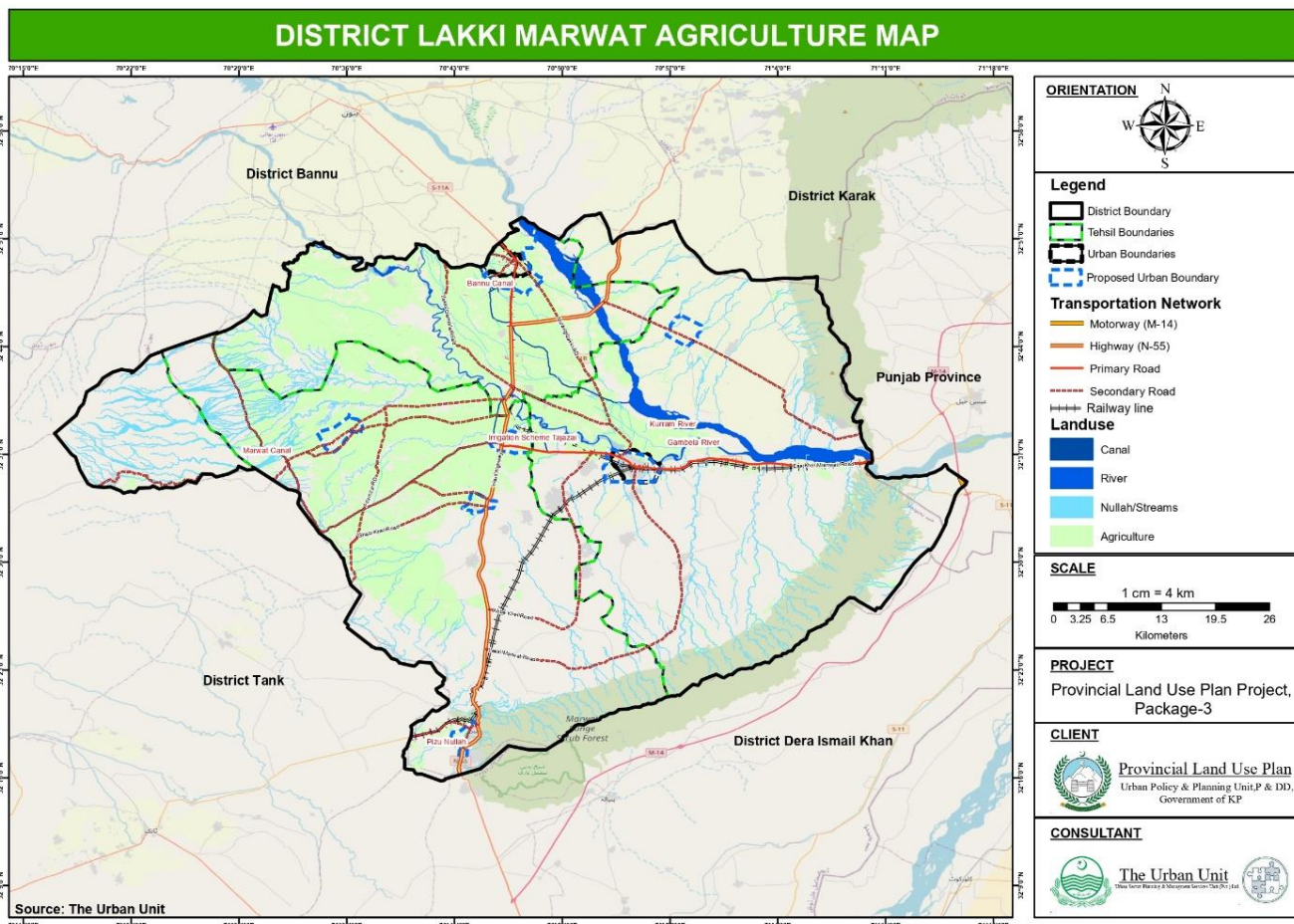
4.1 Agriculture

Agriculture is the principal occupation of the district Lakki Marwat. Besides agriculture, numbers of manufacturing industries have absorbed a large number of skilled and unskilled labors. About 47 percent area of the district Lakki Marwat is irrigated mostly through canals and the rest is dependent upon rains. In the canal irrigated area where the soil is loamy, deep ploughing and regular maturing is carried out and cash crops are widely grown. Sugarcane, wheat, maize are the usual crops. Fruits and vegetables are also grown. Main crops of the district are wheat, maize, barley, sugarcane, jowar and bajra. The major of the above crops is wheat in “Rabi” and maize in “Kharif”.

4.1.1 Agriculture Land Utilization

According to the Crop Statistics Khyber Pakhtunkhwa, the total reported area of district Lakki Marwat is 314,973 hectares, out of which according to the year 2021-22 the total cultivated area is 116,900 hectares containing the sum of “net area sown” and “current fallow” i.e. 37% of the total reported area. Area that is considered not available for cultivation are either barren or mountainous land, area under roads, canals, rivers and all such areas which are not utilized for agriculture purpose.

Given that only a limited portion of the district’s land is suitable for cultivation, while water resources are also scarce, it is vital to protect the existing arable land from conversion to non-agricultural purposes. Any loss of fertile land would reduce the district’s food production capacity, worsen rural poverty, and endanger food security. Therefore, the conservation of agricultural land in District Lakki Marwat is essential for sustaining livelihoods, enhancing productivity, and ensuring long-term food security for its predominantly rural population.



Map 4-1: District Lakki Marwat Agriculture Landuse

AGRICULTURE LAND USE UTILIZATION DISTRICT LAKKI MARWAT 2021-22

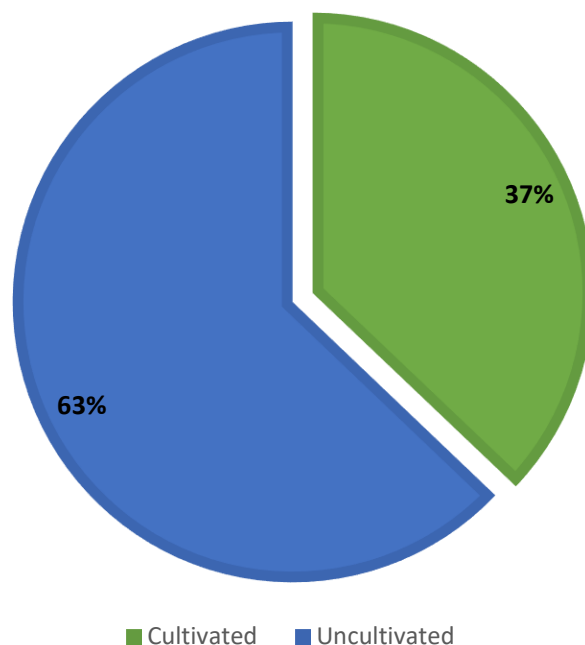


Figure-4-1: Agriculture Land in District Lakki Marwat

The total agriculture-reported area of District Lakki marwat has been found which covers an area of 314,973 hectares. The total cultivated area is 116,900 hectares. There was slight change in net sown area from 36,073 hectares in 2017-18 to 37,215 hectares in 2021-22. The uncultivated area in District Lakki marwat remains remarkably stable from 2017-18 to 2021-22, consistently encompassing approximately 198,073 hectares. The amount of area that has been deducted for Culturable waste encompasses 85,715 hectares, these areas include abandoned farmland, fallow land, and land that is currently underutilized due to various factors such as lack of irrigation, poor soil fertility, and inadequate access to inputs and markets while an area of 112,358 hectares was identified which is not available for cultivation during 2021-22. Details are **Tabulated** below.

Table 4-1: Distribution of Area by Crops in District Lakki Marwat (Hectare)²⁵

| Year | | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 |
|---------------------|--------------------------|---------|---------|---------|---------|---------|
| Total Reported Area | | 314,973 | 314,973 | 314,973 | 314,973 | 314,973 |
| Cultivated Area | Total | 116,900 | 116,900 | 116,900 | 116,900 | 116,900 |
| | Net Sown | 36,073 | 35,390 | 37,753 | 37,865 | 37,215 |
| | Current fallow | 80,827 | 81,510 | 79,147 | 79,035 | 79,685 |
| Cropped Area | Total | 37,508 | 38,316 | 40,595 | 42,013 | 41,420 |
| | Area Sown More than Once | 1,435 | 2,926 | 2,842 | 4,148 | 4,205 |
| Total | | 198,073 | 198,073 | 198,073 | 198,073 | 198,073 |

²⁵ District wise landuse utilization in KP, Development Statistics of KP-2022

| | | | | | | |
|--------------------|-------------------------------|---------|---------|---------|---------|---------|
| Un-Cultivated Area | Culturable waste | 85,910 | 85,903 | 85,891 | 85,877 | 85,715 |
| | Forest | - | - | - | - | - |
| | Non-Available for cultivation | 112,163 | 112,170 | 112,182 | 112,196 | 112,358 |

4.1.2 Production Profile

In the plains of Pakistan, agricultural activities occur in two distinct seasons. Crops cultivated before winter and harvested in early summer are termed "Rabi crops," comprising wheat, gram and barley. Conversely, crops grown in early summer and harvested in early winter are referred to as "Kharif crops," which may include rice, jowar sugarcane, bajra, and maize. The district grows major crops like wheat, gram, barley (Rabi), maize, bajra, and sugarcane (Kharif). Based on the data provided by Crop Reporting Service, the production profile of Rabi and Kharif crops in the Lakki Marwat district can be analyzed as follows:

Table 4-2: Distribution of Area by Crops in District Lakki Marwat (Hectare)²⁶

| Year | Indicators | Wheat | Maize | Rice | Gram | Bajra | Jowar | Barley | Sugarcane | Rapeseed & Mustard |
|---------|-------------------------|--------|-------|-------|--------|-------|-------|--------|-----------|--------------------|
| 2021-22 | Area (ha) | 17,810 | 1,297 | 203 | 7,865 | 27 | 472 | 731 | 6 | 57 |
| | Production (Ton) | 19,670 | 2,561 | 313 | 3,212 | 36 | 312 | 632 | 243 | 43 |
| | Yield per Hectare in Kg | 1,104 | 1,975 | 1,542 | 408 | 1,333 | 661 | 865 | 40,500 | 754 |
| 2020-21 | Area (ha) | 18,070 | 1,295 | 542 | 8,033 | 15 | 441 | 869 | 4 | 26 |
| | Production (Ton) | 19,091 | 2,405 | 845 | 3,337 | 20 | 290 | 741 | 161 | 18 |
| | Yield per Hectare in Kg | 1,057 | 1,857 | 1,559 | 415 | 1,333 | 658 | 853 | 40,250 | 692 |
| 2019-20 | Area (ha) | 18,007 | 1,369 | 603 | 12,577 | 13 | 465 | 582 | 2 | 82 |
| | Production (Ton) | 20,029 | 2,556 | 937 | 8,092 | 17 | 309 | 587 | 70 | 54 |
| | Yield per Hectare in Kg | 1,112 | 1,867 | 1,554 | 643 | 1,308 | 665 | 1,009 | 35,000 | 659 |
| 2018-19 | Area (ha) | 18,755 | 1,385 | 617 | 11,904 | 12 | 480 | 570 | 1 | 72 |

²⁶ Development Statistics-2022

| | | | | | | | | | | |
|---------|-------------------------|--------|-------|-------|--------|-------|-----|-------|--------|-----|
| | Production (Ton) | 27,420 | 2,564 | 956 | 9,018 | 46 | 318 | 624 | 39 | 46 |
| | Yield per Hectare in Kg | 1,462 | 1,851 | 1,549 | 758 | 3,833 | 663 | 1,095 | 39,000 | 639 |
| 2017-18 | Area (ha) | 17,060 | 588 | 55 | 11,780 | 24 | 236 | 340 | 63 | 47 |
| | Production (Ton) | 17,731 | 1,071 | 81 | 5,460 | 68 | 140 | 251 | 2,320 | 29 |
| | Yield per Hectare in Kg | 1,039 | 1,821 | 1,473 | 463 | 2,833 | 593 | 738 | 36,825 | 617 |

Vegetables and fruits: The details of Rabi and Kharif Vegetables and Fruits are given in the below table.

Table 4-3: Distribution of Area by Crops (Vegetables and Fruits) in District Lakki Marwat

| Year | Indicators | Vegetables | | | Fruits | | |
|---------|-------------------------|------------|--------|-------|--------|--------|-------|
| | | RABI | Kharif | Total | RABI | Kharif | Total |
| 2021-22 | Area (ha) | 0 | 11 | 11 | 0 | 10 | 10 |
| | Production (Ton) | 0 | 89 | 89 | 0 | 119 | 119 |
| | Yield per Hectare in Kg | 0 | 8,091 | 8091 | 0 | 0 | 0 |
| 2020-21 | Area (ha) | 0 | 10 | 10 | 0 | 0 | 0 |
| | Production (Ton) | 0 | 80 | 80 | 0 | 0 | 0 |
| | Yield per Hectare in Kg | 0 | 8,000 | 8000 | 0 | 0 | 0 |
| 2019-20 | Area (ha) | 131 | 127 | 258 | 119 | 1,700 | 1819 |
| | Production (Ton) | 1,458 | 777 | 2,235 | 1,048 | 19,118 | 20166 |
| | Yield per Hectare in Kg | 11,130 | 6,118 | 17248 | 8,807 | 11,246 | 20053 |
| 2018-19 | Area (ha) | 138 | 125 | 263 | 119 | 1,704 | 1823 |
| | Production (Ton) | 1,548 | 766 | 2,314 | 1,050 | 19,134 | 20184 |
| | Yield per Hectare in Kg | 11,217 | 6,128 | 17345 | 8,824 | 11,229 | 20053 |
| 2017-18 | Area (ha) | 133 | 120 | 253 | 117 | 1,691 | 1808 |
| | Production (Ton) | 1,363 | 716 | 2079 | 1,028 | 18,838 | 19866 |
| | Yield per Hectare in Kg | 10,248 | 5,967 | 16215 | 8,786 | 11,140 | 19926 |

4.1.3 Water Management, Irrigation System and Type of Irrigation

According to the United Nations' "UN World Water Development Report", the total actual renewable water resources decreased from 2,961 m³ per capita in 2000 to 1,420 m³ per capita in 2005. A more recent study indicates an available supply of water of little more than 1,000 m³ per person, which puts Pakistan in the category of a high stress country. Using data from the Pakistani federal government's Planning and Development Division, the overall water availability has decreased from 1,299 m³ per capita in 1996-97 to 1,101 m³ per capita in 2004-05. In view of growing population, urbanization and increased industrialization, the situation is likely to get worse. Nevertheless, excessive mining of groundwater goes on. Despite a lowering water table, the annual growth rate of electric tube-wells has been indicated to be 6.7% and for diesel tube-wells to be about 7.4%. In addition, increasing pollution and saltwater intrusion threaten the country's water resources. About 36% of the groundwater is classified as highly saline.

Below table shows the total irrigated area and types of irrigation used for agriculture irrigation. The total reported area in 2021-22 is 36,296 hectares in which 10,580 hectares is irrigated by government canals and 6,274 hectares is irrigated by private canals while the rest of area is irrigated by farmers through different methods like tube wells, wells, left pump, etc.

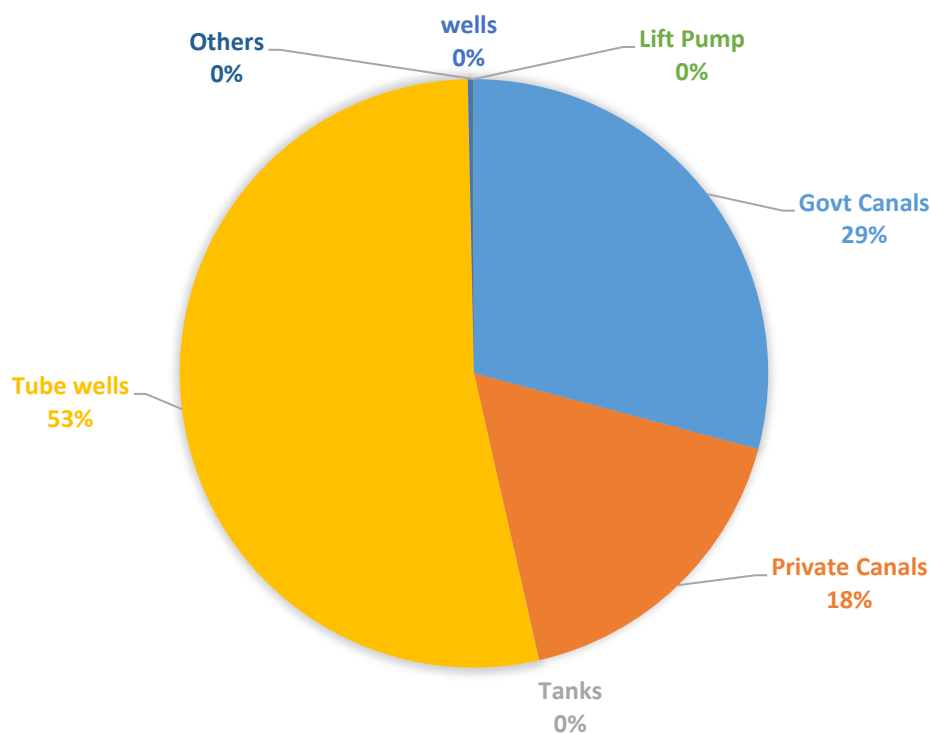


Figure 4-2: Type of Irrigation for Agriculture Use

4.1.4 Irrigated System

District Lakki Marwat, located in southern Khyber Pakhtunkhwa, depends heavily on its irrigation systems for agricultural productivity. The Gambila (Tochi) River, a tributary of the Indus, is the main water source supporting the district's irrigation network. The Marwat Canal System, one of the largest in the region, spans 267 km with a discharge capacity of 800 cusecs, irrigating around 170,500 acres in Lakki Marwat, Jani Khel, and Baka Khel.

The Baran Dam, built in 1962, was originally designed to irrigate 61,700 acres in Bannu and Lakki Marwat. Its ongoing enhancement aims to increase capacity to irrigate up to 100,000 acre-feet of land by diverting

water from the Tochi River. Similarly, the Kurram Tangi Dam in North Waziristan benefits Lakki Marwat by providing irrigation and power generation, with a reservoir capacity of 1.2 million acre-feet and 83.4 MW electricity production, supporting 270,180 acres of farmland.

Smaller schemes like the Tajazai Irrigation Scheme further extend water distribution to remote areas. Overall, the district's irrigation infrastructure is central to sustaining its agriculture-based economy, and ongoing projects are expected to significantly enhance productivity and economic stability. The development of additional irrigated land, however, depends on the availability and efficient management of water resources. This will largely be determined by the successful enhancement of existing structures like Baran and Kurram Tangi Dams, as well as the construction of new reservoirs where feasible. Moreover, the adoption of high-efficiency irrigation technologies—such as drip and sprinkler systems—by the Agriculture Department could substantially improve water-use efficiency and expand the irrigated area.

4.1.5 Agriculture Employment

Most of the people in rural area are farmers in profession. They are engaged either directly or indirectly in agriculture. Agriculture is the major source of employment in rural area. Like other parts of Pakistan, the share of agriculture in employment has decreased over the year. Still, it is larger than any other sector of the economy. The agriculture sector employs a significant proportion of the district's workforce, with 38.8% of the total workforce being employed in agriculture in 2020-21. This indicates the importance of the agriculture sector to the local economy.

In rural areas, the proportion of people employed in agriculture is 41.4% of the rural workforce being employed in agriculture. This highlights the significant role of agriculture in rural livelihoods and the local economy.

In terms of gender, there is a difference in the proportion of males and females employed in the agriculture sector, with 30.5% of males and 80.2% of females being employed in agriculture. This suggests that both genders are involved in agricultural activities to a similar extent.

The data also shows that the urban workforce's involvement in agriculture is 6.1%. This indicates the shift towards non-agricultural employment opportunities in urban areas.

Overall, agriculture remains an important source of employment and livelihoods in the Lakki Marwat District, particularly in rural areas.

Table 4-4: Labor Force Distribution by Sector

| Indicators | | Total | Male | Female |
|--------------------------|-------------|-------|------|--------|
| Employment by Sector (%) | Agriculture | 38.8 | 30.5 | 80.2 |
| | Rural | 41.4 | 32.8 | 82.6 |
| | Urban | 6.1 | 3.8 | 27.3 |

4.1.6 Influence of Urbanization on Agriculture

Over the past two decades, the agricultural landscape of Lakki Marwat District has undergone considerable transformation. A comparison between the 1998 and 2022 censuses reveals a substantial decline in cultivated land, accompanied by a corresponding increase in uncultivated areas. In 1998, the district boasted 180,350 hectares of cultivated land, but by 2022, this had decreased to 116,900 hectares. Conversely, the uncultivated land area expanded from 134,640 hectares to 198,073 hectares over the same period, indicating a significant shift in land use.

The primary reasons for this shift from cultivated to uncultivated land can be attributed to several factors. One major factor is the siltation of the Baran Dam, which disrupted the water supply to certain areas within the Lakki Marwat District. The dam's upliftment further exacerbated the issue, preventing water from reaching these areas, which were previously under cultivation. As a result, agricultural activities, including the production of crops such as sugarcane, ceased. The closure of the local sugar mill, which once processed the sugarcane, is a direct consequence of this decline in agricultural production.

Another contributing factor is the conversion of cultivated land into built-up areas due to urban sprawl. In Lakki City, urban expansion has been somewhat limited by the presence of the Gambila River to the north, which acts as a natural barrier. However, in Naurang City, significant urban sprawl has occurred, leading to the conversion of previously cultivated land into built-up areas. The attached maps of Lakki Marwat and Naurang cities provide a visual representation of these changes, showing how built-up areas have expanded in Naurang City, where the urban sprawl is more pronounced.

In summary, the reduction in cultivated land and the increase in uncultivated land in the Lakki Marwat District can be largely attributed to the issues with water supply from the Baran Dam and the expansion of urban areas, particularly in Naurang City. These changes have had a profound impact on the district's agricultural landscape over the past two decades.

Table 4-5: Cultivated and Uncultivated area in 1998²⁷ and 2022²⁸

| Area | Area in 1998 (Hectares) | Area in 2022 (Hectares) | Change |
|--------------------|-------------------------|-------------------------|---------|
| Cultivated Area | 180,350 | 116,900 | -63,450 |
| Un-Cultivated Area | 134,640 | 198,073 | 63,433 |

Constraints

- In District Lakki Marwat, most farmers are uneducated, limiting adoption of modern practices and lowering productivity.
- In District, water scarcity, inefficient irrigation, and poor canal maintenance reduce crop yields.
- Soil erosion, land degradation, salinity, and waterlogging damage soil fertility.
- Land fragmentation creates uneconomical holdings that are hard to manage.
- Limited pest control knowledge in District Lakki Marwat leads to frequent crop losses.
- Poor transport infrastructure in District hinders access to markets and reduces profitability.
- Dependence on traditional farming keeps yields low.
- Poverty and debt prevent investment in modern inputs and technologies.
- Average yields of crops, fruits, and vegetables remain far below potential.
- Baran Dam and the Marwat Canal in District Lakki Marwat face silting and reduced efficiency.
- High water wastage occurs due to flood irrigation and unlined canals.
- Lack of storage and processing facilities in District Lakki Marwat leads to high post-harvest losses.
- Weak extension services limit farmer access to training and innovations.

²⁷ 1998 census report of District Lakki Marwat

²⁸ Development Statistics-2023

- Shortage of certified seeds and quality fertilizers reduces productivity.
- Rangeland degradation in District Lakki Marwat affects livestock feed availability.

Recommendations

- In District Lakki Marwat, establish agricultural training centers, strengthen extension services, and run adult literacy programs to educate farmers on modern farming, irrigation, and pest control.
- Improve irrigation in District by expanding drip, sprinkler, and smart systems, promoting rainwater harvesting, and constructing small dams and reservoirs for year-round water availability.
- Address soil issues in District Lakki Marwat through reforestation, drainage systems, soil treatment, and conservation practices to combat erosion, salinity, and land degradation.
- Provide subsidies, easy credit, and microfinance for small farmers in District Lakki Marwat to adopt high-yield varieties, modern equipment, quality seeds, and fertilizers based on soil testing.
- Improve transportation and market access in District by investing in roads, affordable transport services, market information systems, and farmer cooperatives.
- Promote crop diversification, climate-resilient varieties, and value addition such as food processing to increase income and resilience.
- Strengthen pest and disease management through Integrated Pest Management (IPM), resistant varieties, and farmer training.
- Encourage solar-powered irrigation and water-efficient technologies in District Lakki Marwat to ensure sustainability and reduce costs.
- In District Lakki Marwat, irrigated agricultural areas and key irrigation structures have been mapped. These areas should be strictly protected from non-agricultural development to sustain water resources and preserve the district's agricultural potential.

4.1.7 Future Plan

Future agricultural development in District Lakki Marwat should focus on safeguarding the 887.74 sq. km designated Agriculture Zone (26.12% of the district area) to ensure food security and livelihood sustainability. Priority should be given to rehabilitating irrigation systems, including the Baran Dam and Marwat Canal, along with the construction of small dams, check dams, and hydraulic structures to guarantee year-round water availability. To enhance land productivity, measures such as soil fertility improvement, salinity control, and reclamation of culturable waste lands should be implemented. The district should promote climate-smart and water-efficient practices, including drip irrigation, laser land leveling, crop diversification, and conservation tillage, to adapt to water scarcity and climate change. High-value crops, fruits, and vegetables should be introduced in line with local soil and climate conditions, coupled with the development of storage, processing, and market linkages to reduce post-harvest losses and improve farmer incomes. Strict land use zoning regulations should prevent the conversion of agricultural land to non-farming uses, particularly in expanding urban areas such as Naurang. Integrated rangeland management should also be prioritized to support livestock, which complements the crop sector.

Link between agriculture sector and land use plan

Agriculture is the dominant land user in Lakki Marwat; however, urban expansion, declining irrigation potential, and culturable waste threaten its sustainability. Integrating agriculture into the district's land use plan ensures:

- Protection of fertile land from urban encroachment.
- Efficient allocation of water and land resources to high-value crops.

- Sustainable reclamation of waste and fallow land.
- Coordination between agricultural policies and urban development policies to balance food security, employment, and industrial growth.

The land use plan for District Lakki Marwat designates an Agriculture Zone of 887.74 sq. km (26.12% of the district's area), identified through field surveys, GIS mapping, and stakeholder consultations, to safeguard prime farmland from non-agricultural encroachment and align land allocation with the district's agricultural and livelihood priorities. By integrating prevailing cropping patterns, irrigation potential, and rangeland management, the plan establishes a strong link between spatial planning and the agriculture sector, ensuring sustainable use of resources and food security. It incorporates environmental safeguards such as buffer zones along watercourses and slope stabilization while defining permitted, permissible, and prohibited uses to minimize land conflicts and guide targeted investments in irrigation, soil management, and agro-based infrastructure. The future agriculture strategy emphasizes modern irrigation systems, small dam construction, soil revitalization, and climate-resilient farming practices, with mapped agricultural zones declared as command areas to guarantee water security, sustainable farming, and the continued role of agriculture as the backbone of the district's economy.

4.2 Livestock

Livestock products such as meat, milk, bones, fat, hides, and skin yield substantial profits for investors, especially with the growing demand in the international halal food market, which presents significant export opportunities for the livestock industry. The livestock sector accounts for 11.53% of the Gross Domestic Product (GDP) at constant basic prices (2005-06) in Pakistan.

The district Lakki Marwat has enormous potential that can be harnessed through appropriate livestock policies. The livelihoods of farmers in the Lakki Marwat district are directly impacted by the livestock sector, which provides food, wool, fuel, and farming resources. This sector offers consistent daily financial support, employment opportunities, and a stable food source. Additionally, it serves as a safeguard against the risks associated with crop failure or other unforeseen events.

4.2.1 Availability of livestock population in District Lakki Marwat

The Table below displays the livestock population in District Lakki Marwat for the years 2006 and 2021. There has been considerable decline in all categories of livestock over this period. The cattle population increased from 163471 in 2006 to around 170893 in 2021 that is 4.54 percent. Buffalo numbers grew from about 3827 to 4715 that is 23.20 percent. The sheep population saw a significant decline from around 88118 to over 53811 that is -38.9 percent. Goats declined from 397290 to about 227374 that is -42.8%. The camel population saw a drastic increase from 7215 to 2747 that is -61.9 percent. Horses and mules also saw notable growth, with horses increasing from 1245 to 1089 that is -12.5 percent mules from 131 to 906 that is 591 percent growth and poultry also decreased from 830448 to 453852 that is -45.3 percent. Overall, there has been substantial decline of -37.02% in the livestock population in District Lakki Marwat over the 15-year period.

According to data, District Lakki Marwat has a lesser population of cattle and goats, with a significant decrease observed between 2006 and 2021. This trend indicates that the district is losing its potential for both milk production and mutton supply. Given the growing livestock numbers and the natural rearing practices in the area, District Lakki Marwat is on lacking its trend of being a hub of organic mutton hub, the decrease in number of goats and sheep show alarming situation. The slight increase in number of buffaloes, cattle's can strengthen its role in meeting regional milk demand.

Table 4-6: Livestock Population in Lakki Marwat

| S.no | Livestock | 2006 | 2021 |
|------|-----------|------|------|
|------|-----------|------|------|

| | | | |
|----|-----------|---------|--------|
| 1 | Cattle | 163471 | 170893 |
| 2 | Buffaloes | 3827 | 4715 |
| 3 | Sheep | 88118 | 53811 |
| 4 | Goats | 397290 | 227374 |
| 5 | Camels | 7215 | 2747 |
| 6 | Donkey | 19174 | 14461 |
| 7 | Horses | 1245 | 1089 |
| 8 | Mules | 131 | 906 |
| 9 | Poultry | 830448 | 453852 |
| 10 | Others | 0 | 22019 |
| 11 | Total | 1510919 | 951867 |

4.2.2 Assessment of Poultry Population

The poultry population in Khyber Pakhtunkhwa (KP) has shown a substantial increase from 27,695,116 in 2006 to 40,996,000 in 2021. This significant growth reflects the expanding poultry industry in the province, driven by increasing demand for poultry products such as meat and eggs. The growth trend indicates advancements in poultry farming practices, enhanced veterinary care, and possibly increased investment in the sector, which collectively contribute to the rising poultry numbers. In contrast to the provincial trend, the poultry population in District Lakki Marwat has decreased sharply from 830448 in 2006 to 453852 in 2021.²⁹ This 45 percent decrease is indicating several underlying issues affecting the poultry sector in Lakki Marwat. This decline suggests several underlying issues affecting the poultry sector in Lakki Marwat. According to the Pakistan Bureau of Statistics, there are 76 poultry farms³⁰ in the district, but the population data from these farms is not available. This lack of comprehensive data likely contributes to the reported decrease in poultry numbers, as the actual population might be higher than documented. The decrease could also be attributed to other factors such as inadequate veterinary services, disease outbreaks, or economic challenges faced by poultry farmers.

4.2.3 Livestock Facilities

During the fiscal years 2018-19 and 2019-20, the district maintained a total of 50 veterinary facilities, which included 3 hospitals, 27 dispensaries, and 20 centers. In 2020-21, there was an expansion in the number of facilities, with the total increasing to 62. This growth was primarily due to the increase in dispensaries to 33 and centers to 26, while the number of hospitals remained constant at 3.

In the current year, the total number of veterinary facilities slightly decreased to 58. This reduction is attributed to a decrease in the number of centers, which dropped to 15, despite an increase in the number of dispensaries to 40. The number of hospitals has consistently remained at 3 throughout these years.

²⁹ Development Statistics-2023

³⁰ Pakistan Bureau of Statistics, table 17, number of commercial poultry farms and number of birds by size of flock

Table 4-7: Veterinary Institutes in Lakki Marwat³¹

| Year | Total | Hospitals | Dispensaries | Centers |
|---------|-------|-----------|--------------|---------|
| 2018-19 | 50 | 3 | 27 | 20 |
| 2019-20 | 50 | 3 | 27 | 20 |
| 2020-21 | 62 | 3 | 33 | 26 |
| Current | 58 | 3 | 40 | 15 |

The performance of veterinary institutes in Khyber Pakhtunkhwa (KP) and the Lakki Marwat district is detailed in the tables below. The effectiveness of these institutes can be assessed by analyzing the quantity of animals and birds receiving treatment and protection. In the fiscal year 2020-21, a total of 114 animals were treated, while 16 animals were protected, along with 215 birds.

Table 4-8: Veterinary Institutes in Lakki Marwat³²

| Year | No. of Animals Treated | No. of Animals Protected | No. of Birds Protected |
|---------|------------------------|--------------------------|------------------------|
| 2018-19 | 110 | 72 | 305 |
| 2019-20 | 121 | 79 | 286 |
| 2020-21 | 114 | 16 | 215 |

4.2.4 Institutional Structure of Livestock sector in Khyber Pakhtunkhwa

The organizational structure of the Directorate General (Research) for Livestock & Dairy Development in Khyber Pakhtunkhwa, Pakistan. It is divided into three main divisions: the Veterinary Research Institute, Planning & Development Cell, and Livestock Research & Development. The Veterinary Research Institute oversees various centers, including the Center of Microbiology & Biotechnology, Center of Biological Production, and Foot & Mouth Disease Vaccine Research Center, as well as Veterinary Research & Disease Investigation Centers. The Livestock Research & Development division encompasses several facilities, such as Livestock Research & Development Stations. It also includes the Center of Animal Nutrition, Poultry Research Institute, Arid Zone Small Ruminants Research Institute, and the Goat Production Research. The Planning & Development Cell is positioned between these two divisions, likely responsible for coordinating and strategizing their activities.

³¹ Development Statistics-2022

³² Development Statistics-2022

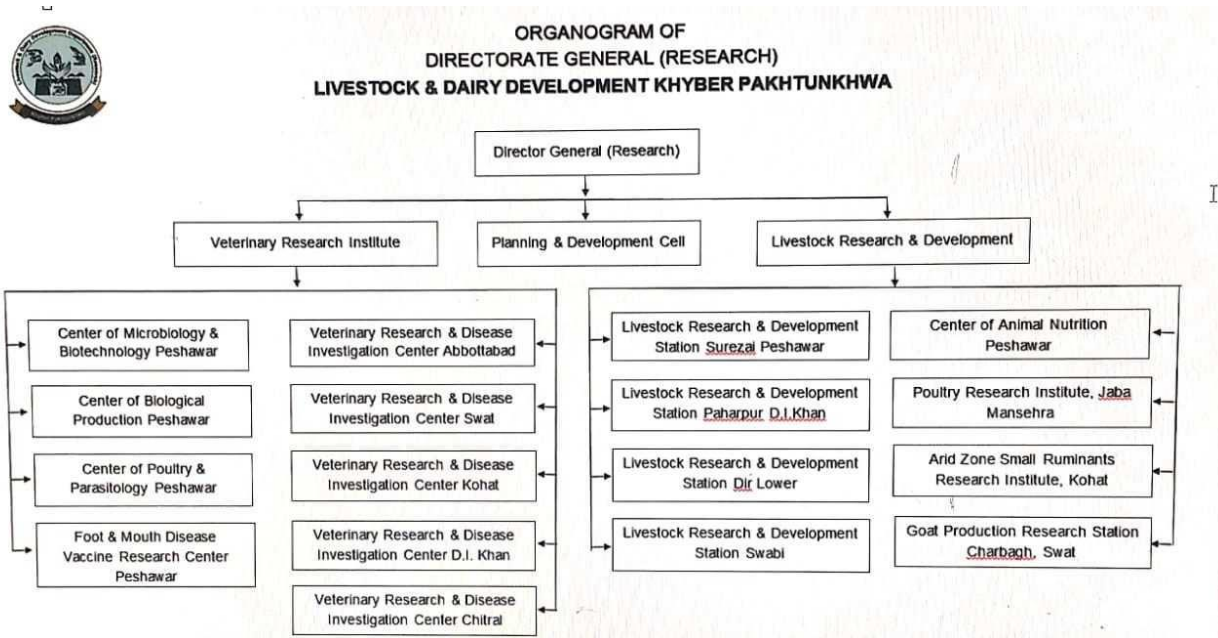


Figure 4-3: Institutional Structure of Livestock sector in KP³³

4.2.5 Constraints

- The livestock population in District Lakki Marwat has shown a significant decline from 2006 to 2021, particularly in sheep, goats, and camels. This reduction is indicative of underlying issues in livestock management and breeding practices.
- The district faces challenges in providing adequate water for livestock, especially during dry seasons. Efficient water utilization strategies are lacking, which impacts the overall productivity of the livestock sector.
- There is a lack of proper identification and management of grazing lands in Lakki Marwat. Additionally, the continuous supply of quality fodder is not guaranteed, which negatively affects livestock productivity.
- The prevalence of diseases among livestock is a significant concern due to insufficient vaccination programs and inadequate veterinary services. Disease surveillance, diagnosis, and control mechanisms are weak, further exacerbating the problem.
- Women play a critical role in livestock raising in Lakki Marwat, yet their contributions are undervalued and unsupported. This lack of recognition limits the potential for improvement in livestock management and productivity.
- The existing regulatory framework for livestock in Lakki Marwat is inadequate in addressing the challenges related to nutrition, breeding, disease control, and marketing. There is a need for more effective policies to support sustainable livestock practices and enhance productivity.
- Despite the potential for significant profits in the livestock sector, especially with the growing demand in the international halal food market, the economic potential of livestock in Lakki Marwat remains underutilized due to poor management, inadequate infrastructure, and lack of investment.

³³ Directorate of Livestock and Dairy Development Khyber Pakhtunkhwa

4.2.6 Recommendation

- Increase the number of veterinary hospitals, dispensaries, and centers to provide better animal health services. Improve the performance of veterinary institutes by ensuring more animals and birds are treated and protected.
- Develop efficient water utilization strategies for livestock, including the development of water sources, watering points, and conservation methods to ensure a consistent water supply throughout the year.
- Conduct comprehensive assessments to identify suitable grazing lands and pastures, ensuring sustainable usage practices and adequate fodder availability. Implement programs for the continuous cultivation of fodder crops and forage preservation techniques.
- Implement comprehensive vaccination programs and enhance veterinary services to improve animal health and reduce disease prevalence. Strengthen disease surveillance, diagnosis, and control mechanisms to prevent outbreaks.
- Recognize and support the crucial role of women in livestock raising through targeted training, resources, and policy support. Promote gender mainstreaming in livestock policies and programs to empower women and enhance productivity.
- Review and enhance existing livestock policies to address challenges related to nutrition, breeding, disease control, and marketing. Foster private sector-led development with public sector support through conducive policy interventions.
- Engage local communities in sustainable livestock practices by providing training and support to improve livelihoods and empower livestock farmers. Encourage the adoption of best practices in livestock management to enhance productivity and economic stability.
- Encourage the cultivation of fodder crops, forage preservation techniques, and feed storage facilities to maintain a continuous supply of quality feed for livestock.
- Promote research on native livestock breeds to address challenges such as diseases, pests, and inadequate feeding. Encourage innovative breeding techniques and the conservation of native livestock to improve resilience and productivity.
- Promote backyard poultry production in rural areas through training on poultry management, access to affordable inputs, and market linkages and Conduct research on poultry nutrition, disease prevention, and management practices to address sector challenges.

By addressing these constraints and implementing the recommended measures, Lakki Marwat's livestock sector can be significantly improved, leading to better productivity, sustainability, and economic stability for the district.

4.2.7 Future Plan

- **Climate adaptation**

Breed selection for livestock that are more tolerant to heat and drought can play a vital role in increasing herd sizes and ensuring better survival under harsh climatic conditions. Addressing these issues is critical to supporting the long-term growth and sustainability of the livestock sector in regions like Lakki Marwat, where environmental stress is a persistent challenge. Agricultural research institutes, universities, and extension services can contribute significantly by conducting research on resilient pasture species and developing fodder varieties capable of withstanding extreme weather conditions. Such coordinated efforts would not only

strengthen the adaptive capacity of livestock systems but also provide farmers with practical solutions to cope with climate variability, ensuring food security and improved rural livelihoods.

- **Training of women and local community**

Training women and local communities in the handling and management of livestock is a critical strategy for enhancing the productivity and sustainability of the livestock sector in Lakki Marwat. Women, who play a central role in feeding, milking, and caring for animals, often have limited access to formal training and veterinary knowledge. By providing targeted education programs on animal husbandry, disease prevention, proper feeding practices, hygiene, and breeding techniques, local communities can be empowered to take better care of their livestock. Such training not only improves animal health and productivity but also strengthens the economic resilience of households, as healthier and more productive animals generate higher income. Moreover, involving women and community members in decision-making and management fosters ownership, encourages the adoption of improved practices, and ensures that livestock interventions are culturally appropriate and sustainable. Integrating these programs with extension services, mobile veterinary units, and community-based support systems can create a holistic approach that maximizes the benefits for both livestock and the people who depend on them in Lakki Marwat.

- **Better policy making with data**

The effective utilization of agriculture and livestock census data is essential for designing informed and targeted interventions that address the specific needs of farmers and herders. By relying on accurate data, policymakers and planners can better identify gaps, allocate resources, and implement strategies that maximize impact. Land use planning should prioritize the identification and preservation of pastureland and grazing zones to ensure sustainable fodder availability and reduce pressure on existing rangelands. At the same time, providing subsidies for essential practices such as fodder cultivation and livestock vaccination can encourage farmers to adopt improved methods, enhance animal health, and ensure feed security. These measures, if integrated into a coordinated framework, can contribute to a more resilient and productive livestock sector while supporting the livelihoods of rural communities.

- **Improving Veterinary & Preventive Care**

Livestock development in Lakki Marwat is significantly constrained by the limited capacity for vaccination drives, preventive spraying, and effective disease surveillance, coupled with farmers' low awareness of disease prevention practices. These gaps expose animals to recurring outbreaks that reduce productivity and threaten rural livelihoods. Strengthening regular vaccination campaigns and establishing a robust disease surveillance system are therefore essential steps toward sustainable growth in the sector. Equally important is building farmers' knowledge and capacity through training programs that emphasize preventive care, hygiene, and early disease detection. To bridge service gaps in remote and underserved areas, mobile and veterinary outreach units can play a vital role by providing timely and high-quality animal healthcare at farmers' doorsteps, ensuring livestock security, reducing mortality, and enhancing productivity. Together, these measures can create a stronger, more resilient livestock sector capable of supporting both economic development and food security in the region.

- **Establishment of Disease-free zone**

The livestock sector has been previously identified as playing an extremely important role in the rural economy, with improved production having the potential to alleviate poverty and contributing to household food security. The decreasing amount of sheep, goats, camels, donkeys, horses and poultry require a serious notice. Livestock diseases are a major source of production loss in Pakistan, with FMD having been identified as a major contributor through impacts on milk production, fertility, and animals being sold at a reduced value. In the same period, Pakistan most region is also endemic for a common disease known as foot and mouth disease (FMD). Creating disease-free zones is crucial for controlling zoonotic diseases and ensuring livestock health. Over the past 15 years, District Lakki Marwat's livestock population has grown by 48%, accompanied

by notable improvements in veterinary facilities, highlighting the region's potential for livestock development. Disease-free zones play a vital role by reducing disease prevalence, lowering veterinary costs, and minimizing production losses. They also improve market access, enhance food security, and reduce the risk of zoonotic disease transmission. Additionally, these zones promote sustainable farming practices by curbing the overuse of antibiotics and chemicals, ensuring long-term productivity and environmental health. This approach strengthens the livestock sector while supporting farmers and the local economy.

- **Improving Livestock feeding resources**

The grazing areas in District Lakki Marwat are steadily declining due to population growth and insufficient water availability for cash crops. There is a need to start activities including rainwater harvesting and small ponds for livestock. The improved irrigation for fodder / forage crops can also help in improving livestock security. Simultaneously, the rising cost of feed ingredients, such as grains and protein sources, has made it increasingly challenging for small-scale livestock farmers to afford quality feed. To address these issues, it is essential to develop feed processing units, storage facilities, and quality control services within the district. This will ensure the availability of affordable, high-quality feed in the market. Additionally, awareness campaigns and knowledge-sharing programs should be implemented to educate livestock farmers about proper feeding requirements and efficient feed management practices, fostering sustainability and growth in the livestock sector.

- **Market access for livestock farmers**

Animals in Lakki Marwat are purchased and sold in traditional weekly rural markets according to phenotypic characteristics. Usually, animals are bought by middlemen, who only estimate the weight of animals from its appearance. The livestock market is fragmented, with no centralized marketing system dominated by middlemen and brokers, leading to low prices for farmers and high prices for consumers. Secondly, the lack of infrastructure, including roads, storage facilities, and slaughterhouses, hinders the livestock sector development. Thirdly there is no standardized grading and labeling systems. Fourthly, the supply chain for livestock and its products is inefficient. Developing livestock markets will minimize the centralizing system and offer a wide opportunity to local farmers to grip into wholesale market for their products.

- **Rural Infrastructure Development**

The district major rural regions have not strong infrastructure for livestock farmers to run their business in their own way. The sector needs more government support for its different functions. Major challenges in district Lakki Marwat are lack of proper infrastructure and farmers often have to travel long distances to get their animals treated. Another challenge is farmers does not have access to credit facilities and no subsidy on high quality animal feed and veterinary medicines. These issues must be addressed to support the sector's long term growth in the future.

Land use assessment in District Lakki Marwat shows that agriculture is the dominant land use, covering 640.47 square kilometers (30.44% of the total area). It is the backbone of the local economy and the primary livelihood for most of the population. The district's fertile alluvial soils, especially in irrigated areas, make it highly suitable for diverse crops. Farmers cultivate staple and cash crops, with wheat, gram, and barley grown in the Rabi season, while maize, rice, bajra, and sugarcane dominate the Kharif season. Fruits such as bananas, guavas, apples, plums, dates, and mangoes flourish in Kharif, whereas bananas, citrus, loquats, and guavas grow in Rabi. Around 45% of the agricultural land is irrigated, primarily by the Kurram Garhi Canal, with tube wells and lift irrigation supplementing the water supply in non-canal areas. The rest depends on seasonal rainfall, making irrigation a crucial factor in sustaining district Lakki Marwat agricultural productivity.

5 Fuels, Minerals, and Energy

Mineral resources form a critical foundation for industrial development, serving as key inputs for construction, manufacturing, energy, and technological sectors. When managed through responsible and sustainable mining practices, these resources can be effectively utilized to stimulate economic growth, generate employment, and strengthen local development. By leveraging these natural endowments, regions can not only support industrial expansion but also contribute to long-term socio-economic progress.

5.1 Existing Mineral Resources

District Lakki Marwat possesses a diverse range of mineral resources, including limestone, shale clay, silica sand, iron ore, coal, sandstone, and laterite, which are vital for construction, manufacturing, and related industries. Among these, limestone and shale clay hold particular importance as they are essential raw materials for cement production.

Despite the richness of these resources, comprehensive and consistent production data remains limited. The most detailed available records pertain to 2018–19, showing outputs of 27,414 tons of iron ore, 35,679 tons of laterite, 918,970 tons of limestone, 30,965 tons of sandstone, 762,515 tons of shale clay, and 14,755 tons of silica sand. The absence of data for other years indicates fluctuations in mining activity, influenced by market demand, operational constraints, or regulatory challenges.

A key highlight of Lakki Marwat's industrial profile is the Lucky Cement factory in Pezu, one of Pakistan's largest cement producers. The availability of abundant limestone and other minerals has underpinned the success of this industry, which supplies cement nationally while providing significant employment and economic benefits to the district and the wider Khyber Pakhtunkhwa province.

For a district with such valuable natural resources, improved monitoring and systematic data collection are crucial to ensure sustainable utilization. Strengthening the mining sector can further enhance Lakki Marwat's role in the national economy while ensuring long-term socio-economic development.

Below is the graph of mineral production statistics of Lakki Marwat District in tons for 2018-19.

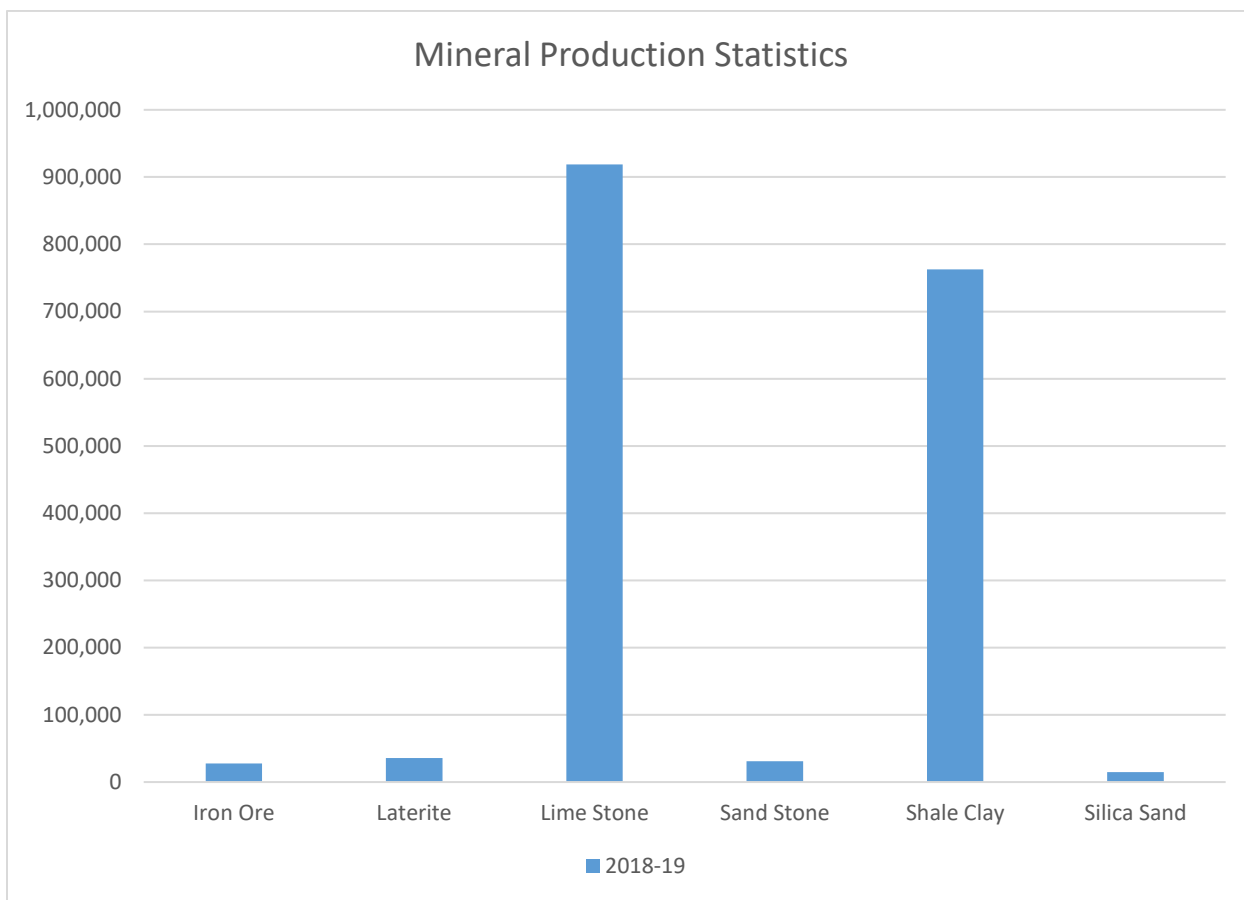
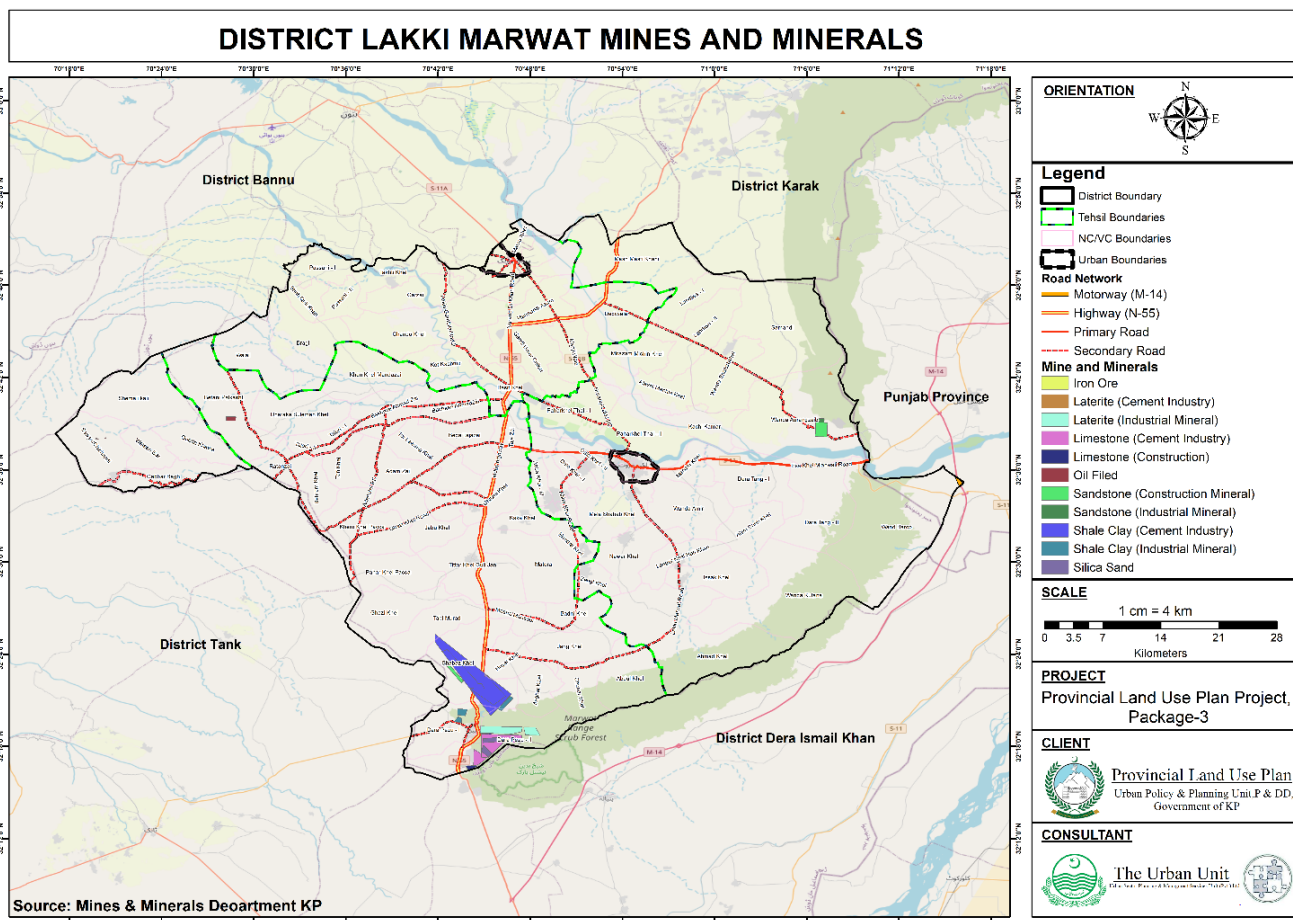


Figure 5-1: Mineral Production Statistics of Lakki Marwat District in tons for the year 2018-19³⁴

The below **Map** titled “District Lakki Marwat Mines and Minerals” provides a detailed overview of the mineral resources and mining activities within the Lakki Marwat district. It highlights the spatial distribution of various minerals such as iron ore, laterite (for both cement and industrial use), limestone, sandstone, shale clay, and silica sand. The map also marks the locations of oil fields and differentiates between types of limestone and sandstone based on their industrial and construction uses. Each mineral type is color-coded, making it easy to interpret the mineral diversity and concentration zones across the district.

³⁴ Development Statistics, 2023



Map 5-1: District Lakki Marwat Existing Mines & Minerals Resources

5.2 Existing Practices of Mineral Extraction

District Lakki Marwat hosts a wide variety of mineral resources, including limestone, shale clay, silica sand, iron ore, coal, sandstone, and laterite, with extraction methods adapted to the specific properties and industrial uses of each mineral. Limestone is the most extensively mined resource, primarily to supply the Lucky Cement plant in Pezu. Quarrying involves cutting and crushing large blocks of rock, which are then processed for cement production, contributing significantly to both local employment and the national supply chain.

Shale clay is extracted through geological surveys, excavation, and advanced techniques such as hydraulic fracturing. Its high plasticity makes it valuable for producing bricks, tiles, cement, ceramics, and industrial additives. Silica sand, though limited in production, is refined for glass, ceramics, and foundry applications, while sandstone is mainly used as a building material. Iron ore mining involves both open-pit and underground methods, followed by beneficiation processes to improve quality for steel production. Laterite, on the other hand, supports road construction, building blocks, and water treatment initiatives.

Despite their economic benefits, these mining practices also pose environmental risks, including soil erosion, habitat destruction, land subsidence, water contamination, and air pollution if not managed responsibly. To safeguard community well-being and natural ecosystems, it is essential to adopt sustainable mining practices, enforce waste management, and involve local communities in decision-making.

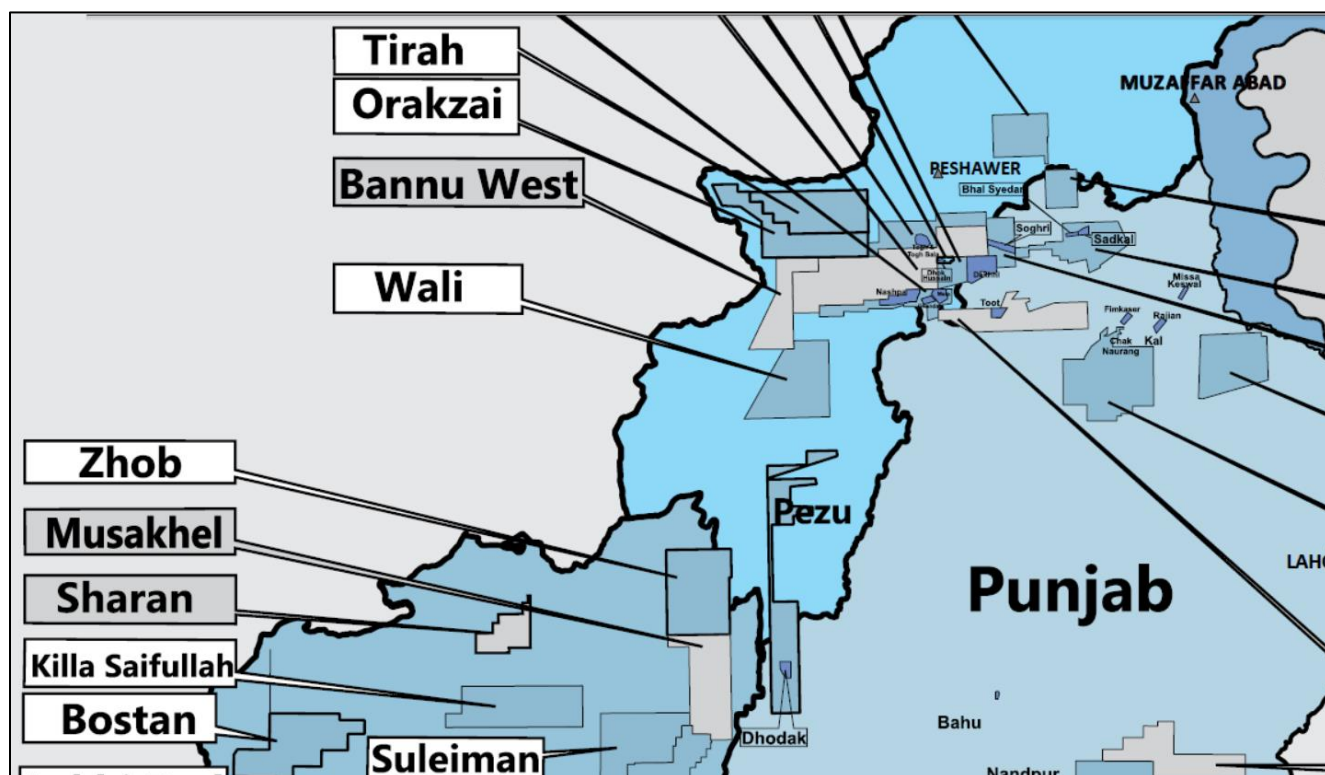
Overall, while Lakki Marwat's mineral wealth highlights strong economic potential, long-term growth depends on balancing industrial gains with environmental and social responsibility.

5.3 Existing Fuel Resources

The southern belt of Khyber Pakhtunkhwa, including District Lakki Marwat, holds substantial reserves of oil and gas, with the Wali Block—particularly in Bettani and Ghazni Khel—emerging as a major contributor to Pakistan’s energy sector. The Lakki Marwat Oil and Gas Field currently produces around 850 barrels of crude oil and 12.5 million cubic feet of gas per day, feeding into the Sui Northern Gas Pipeline system. This production is expected to save the economy over USD 176 million by FY 2023–24, helping to reduce reliance on imported fuels³⁵.

Significant progress has been made under the Bettani Field Development initiative. The Early Production Facility (EPF) at Wali-1, completed in June 2023, enables faster monetization of hydrocarbons. The field’s estimated recoverable 2P reserves stand at approximately 13 million barrels of oil and 219 billion cubic feet of gas, equal to about 55 million barrels of oil equivalent (BOEs). Ongoing projects, including the drilling of Bettani Deep-1 and Bettani-2, are projected to raise output capacity to nearly 50 million cubic feet per day³⁶.

These advancements form part of OGDCL’s broader strategy to strengthen domestic energy production and enhance Pakistan’s long-term energy security. The strategic importance of the Wali Block lies not only in its immediate economic returns but also in its potential to establish Lakki Marwat as a key hub for future oil and gas exploration, positioning Pakistan more strongly in both domestic and global energy markets.



Map 5-2: Wali Block District Lakki Marwat

5.4 Revenue Generated by the Minerals Development Department

District Lakki Marwat is endowed with a wealth of mineral resources, including limestone, shale clay, silica sand, iron ore, coal, sandstone, and laterite. Among these, limestone is the most extensively exploited, primarily due

³⁵ Oil & Gas Development Company Limited Annual Report 2023

³⁶ <https://ogdcl.com/bettani-development-project-district-lakki-marwat-khyber-pakhtunkhwa>

to the operations of the Lucky Cement plant in Pezu is one of Pakistan’s largest cement producers. The availability of high-quality limestone has not only sustained cement production but also positioned Lakki Marwat as a significant contributor to the national cement industry, while simultaneously supporting the local economy through employment and industrial growth.

Although detailed production data for minerals other than limestone is limited, available records indicate substantial economic contributions from the sector in recent years. Revenue generation has shown notable growth, with earnings from major minerals recorded at 104.47 million PKR in FY 2019–20, rising sharply to 216.2 million PKR in FY 2020–21. This increase is largely attributed to higher limestone production linked to cement industry demand.³⁷

The revenue trends highlight the importance of the mineral sector to Lakki Marwat’s economy. However, the lack of information on minor minerals suggests untapped potential. Strengthening data collection and monitoring systems could help identify additional opportunities, ensuring more effective resource utilization and maximizing economic benefits for the district.

The following table summarizes the revenue generated from major and minor minerals in Lakki Marwat over the two fiscal years:

Table 5-1: Revenue generated from Major & Minor Mineral of Lakki Marwat District (2019–2021)³⁸

| Year | Major Mineral (PKR) | Minor Mineral | Total Revenue (PKR) |
|---------|---------------------|---------------|---------------------|
| 2019-20 | 104468743 | 0 | 104468743 |
| 2020-21 | 216220925 | 0 | 216220925 |

5.5 Recommendations

1. Improve Health and Safety Standards (*Short-Term*)

Strengthen occupational health and safety measures by providing regular medical check-ups, safety training, and adequate protective equipment for mining workers.

2. Strengthen Legal and Regulatory Frameworks (*Short-Term*)

Update and enforce mining laws and regulations, conduct inspections, and ensure compliance with environmental standards.

3. Strengthen Environmental Monitoring (*Short-Term*)

Create a system to continuously track environmental impacts of mining and implement timely interventions.

4. Strengthen Waste Management (*Short-Term*)

Design and enforce strategies for handling mine tailings and other by-products to minimize contamination risks.

5. Enhance Community Engagement and Consultation (*Short-Term*)

³⁷ Secondary data was collected from Minerals Development Department in June 2024

³⁸ Directorate General of Industries & Commerce Khyber Pakhtunkhwa

Establish structured dialogue mechanisms between mining companies and local communities to promote transparency and trust.

6. Adopt Sustainable Mining Practices (*Medium-Term*)

Introduce environmentally responsible mining techniques, waste management systems, and site rehabilitation to minimize ecological degradation.

7. Stabilize Revenue Management (*Medium-Term*)

Formulate strategic financial plans, adopt modern financial tools, and diversify the local economy to reduce dependency on mining revenues.

8. Encourage Technological Advancements (*Medium-Term*)

Promote the use of modern machinery, automation, and efficient processing technologies to enhance productivity and safety.

9. Improve Data Collection and Sectoral Promotion (*Medium-Term*)

Develop comprehensive mineral reserve databases and promote the mining sector through investment outreach and public-private partnerships.

10. Facilitate Stakeholder Participation (*Medium-Term*)

Institutionalize stakeholder participation in mining-related decisions through a representative regulatory authority.

11. Address Infrastructural Gaps (*Long-Term*)

Upgrade essential infrastructure—roads, electricity, water, and gas—to support efficient mining operations.

12. Expand Education and Vocational Training (*Long-Term*)

Establish technical and vocational institutes to develop specialized skills and promote sustainable employment.

13. Rehabilitate Depleted Mining Areas (*Long-Term*)

Implement long-term rehabilitation programs such as reforestation, soil stabilization, and post-mining land-use planning.

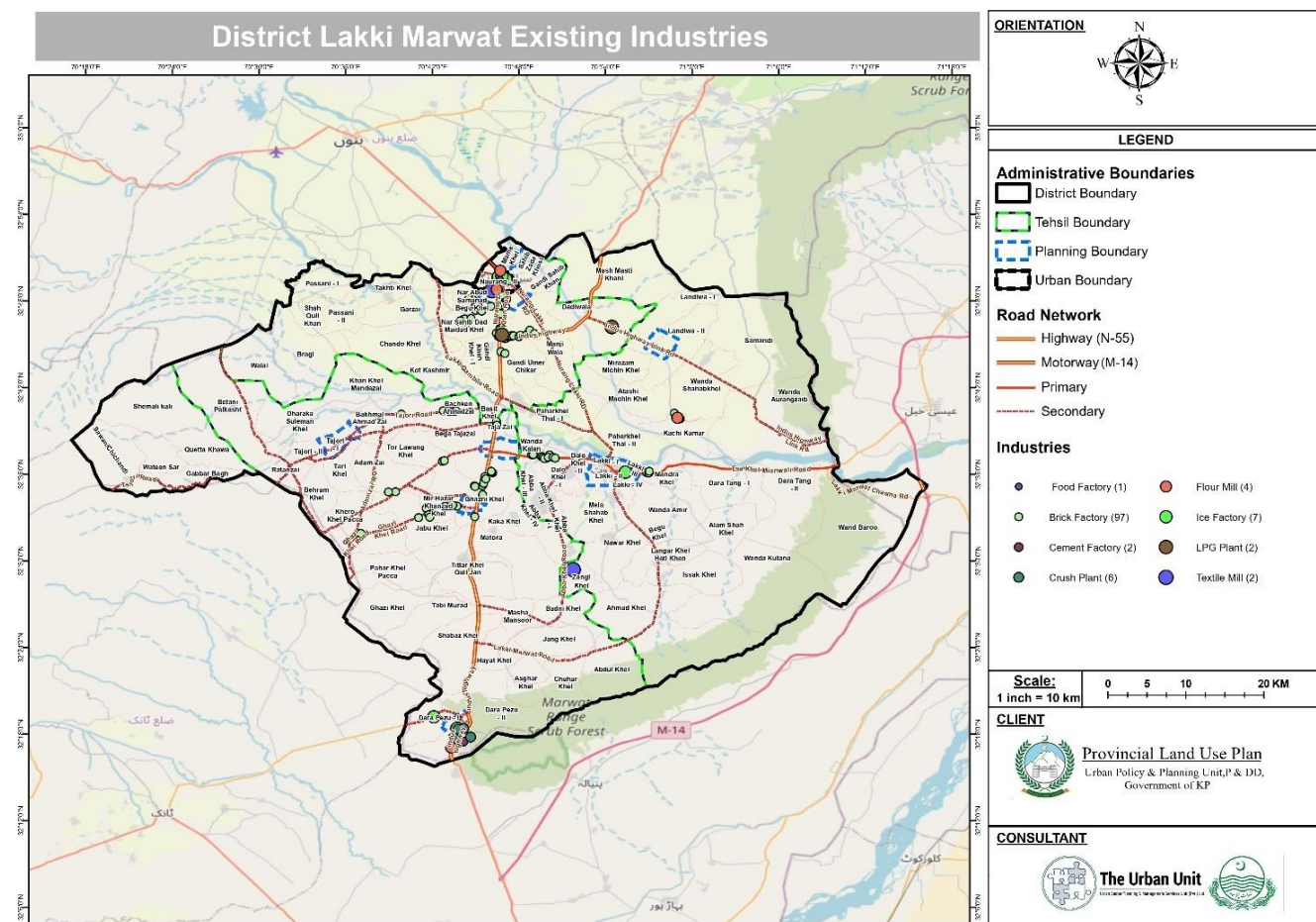
6 Industry

6.1 Existing Industrial Distribution

District Lakki Marwat exhibits a diverse yet widely dispersed industrial structure due to the absence of a designated industrial zone, resulting in industries being scattered across multiple locations. Among the most significant establishments is the Lucky Cement factory in Pezu, which plays a pivotal role in both regional and national cement supply. Supporting the construction sector, several crush plants operate in Pezu and Ghazni

Khel, while two textile mills and a carpet/blanket mill reflect the district’s strong cultural heritage and provide valuable employment opportunities. In addition, 168 brick kilns are concentrated along the Bannu-Naurang Road, Indus Highway near Gandhi Chowk in Tehsil Serai Naurang, and the Essa Khel-Mianwali Road near the University of Lakki Marwat. Other industries include aluminum and steel manufacturing, charcoal production, flour mills, ice factories, LPG plants, and food processing units, highlighting the district’s industrial diversity.

These enterprises collectively range from small-scale units such as ice factories, charcoal units, and brick kilns, to medium industries like textile and flour mills, and extend to large-scale establishments such as the Lucky Cement Factory, which directly employs around 3,000 workers. While their contribution to the local economy is substantial, the scattered nature of these industries creates challenges in terms of infrastructure, coordination, and efficient resource utilization. Establishing a dedicated industrial zone could address these issues by centralizing activities, improving infrastructure, and attracting further investment, thereby strengthening the district’s industrial base and supporting long-term economic development.



Map 6-1: Existing Industrial Distribution of District Lakki Marwat

6.1.1 Scattered Industries

District Lakki Marwat hosts a wide range of industries that are scattered across the area due to the absence of a dedicated industrial zone. These include small units such as aluminum and steel product workshops, charcoal factories, ice factories, food units, and LPG plants, alongside medium industries like textile and flour

mills, and larger operations such as the Lucky Cement Factory. In addition, 168 brick kilns and several crush plants play a vital role in supporting the construction sector. While these industries contribute significantly to the local economy, their dispersed nature poses challenges for coordination, infrastructure development, and efficient resource use.

Table 6-1: Scattered Industries in District Lakki Marwat³⁹

| S. No | Industrial Type | Industrial Units |
|--------------------|--------------------------------------|------------------|
| 1 | Aluminum / Steel Products / Utensils | 6 |
| 2 | Charcoal | 21 |
| 3 | Textile Mill | 2 |
| 4 | Flour Mill | 4 |
| 5 | Carpet Blanket | 1 |
| 6 | Ice Factory | 7 |
| 7 | Cement Factory | 1 |
| 8 | Stone Crushers / Crush Plants | 8 |
| 9 | Dall Mill | 1 |
| 10 | LPG Plant | 3 |
| 11 | Food factory | 1 |
| Grand Total | | 55 |
| Brik Kilns | | 168 |

6.1.2 Categories of Industrial Establishment by size

Industries play a crucial role in economic development, serving as key drivers of employment, innovation, and wealth creation. To effectively understand the industrial landscape and to formulate targeted economic policies, it is essential to categorize industrial establishments by size. In District Lakki Marwat, this categorization is based on data from the Directorate General of Industries and is reflected in the digitized land use base map of the district. The industries are classified into three main categories: small, medium, and large, according to criteria such as capital investment, number of employees, production capacity, and technological infrastructure.

6.1.2.1 Small Industries

Small industries form the foundation of District Lakki Marwat's economy, characterized by limited capital investment, smaller workforces, and modest production capacities, primarily catering to local and regional markets. They play a vital role in encouraging grassroots-level entrepreneurship and innovation. In the district, this category includes 7 ice factories, 168 brick kilns, 8 crush plants, 6 aluminum and steel product units, 1 carpet/blanket factory, 1 food factory, and 21 charcoal factories. Employing an average of 25 workers per unit, these industries provide significant employment opportunities and contribute meaningfully to the district's economic development.

6.1.2.2 Medium Industries

Medium industries in District Lakki Marwat involve greater investment, larger workforces, and more formal organizational structures compared to small-scale enterprises. Serving regional and national markets, they are crucial in bridging the gap between small-scale and large-scale industrialization. The district has 2 textile mills, 4 flour mills, and 1 Dall mill, each employing between 50 and 250 workers. Their scale and operational

³⁹ Directorate General of Industries & Commerce Khyber Pakhtunkhwa

complexity demonstrate the district’s potential to strengthen its industrial capacity and promote regional economic stability.

6.1.2.3 Large Industries

Large industries in the district are defined by extensive operations, high capital investment, advanced technology, and sizable workforces, often operating at national or international levels. The Lakki Cement Factory in Pezu is the most significant, directly employing around 3,000 workers across various specialized departments. Beyond its direct employment, the factory supports numerous indirect jobs through its supply chain and related services, making it a cornerstone of the local economy. Its scale underscores Lakki Marwat’s capacity for further industrial growth and highlights its role as an emerging hub in the regional economy.

Table 6-2: Categorization of Industries by size

| Type | Small | Medium | Large |
|--------------------------------------|-------|--------|-------|
| Ice Factory | 7 | | |
| Brick Kiln | 168 | | |
| Crush Plants | 8 | | |
| Aluminum / Steel Products / Utensils | 6 | | |
| Charcoal | 21 | | |
| Carpet Blanket | 1 | | |
| LPG Plant | 3 | | |
| Food factory | 1 | | |
| Textile Mill | | 2 | |
| Dall Mill | | 1 | |
| Flour Mill | | 4 | |
| Cement Factory | | | 1 |
| Total | 215 | 7 | 1 |

6.2 Industrial Growth Pattern

Lakki Marwat, situated in the southern part of Khyber Pakhtunkhwa, Pakistan, has long been characterized by an agriculture-based economy. Formerly a tehsil of Bannu District until 1992, the area is rich in natural resources, particularly limestone found in the Sheikh Badin Hills near Pezu. This resource supports the Lakki Cement Factory, the district’s largest industrial establishment, which plays a vital role in both the local and national economy.

Compared to other districts, industrial development in Lakki Marwat is relatively recent, with the Lakki Cement Factory serving as a major milestone in this transformation. The factory has been operational for several years, employing nearly 3,000 people and significantly contributing to economic growth. However, aside from this large facility, the district’s industrial base remains modest, consisting mainly of small- and medium-scale units.

Data from the Directorate General of Industries highlights a steady rise in industrial establishments over recent years. In 2017–18, 17 units were recorded, of which 15 were operational; this number gradually increased to 18 units in 2018–19, 24 in 2019–20, and 28 in 2020–21, all fully functional. The peak came in 2021–22 with 39 units, 37 of which were active, while the current figure stands at 38 units, with only one closed. This gradual expansion demonstrates resilience and steady progress in Lakki Marwat’s industrial sector, underscoring its potential for continued growth, strengthened by the presence of major industries such as the Lakki Cement Factory.

Table 6-3: Historical Overview of Industrial Sector in District Lakki Marwat⁴⁰

| Year | Total Units | Running Units | Closed Units |
|---------|-------------|---------------|--------------|
| 2017-18 | 17 | 15 | 2 |
| 2018-19 | 18 | 16 | 2 |
| 2019-20 | 24 | 24 | 0 |
| 2020-21 | 28 | 28 | 0 |
| 2021-22 | 39 | 37 | 2 |
| Current | 38 | 37 | 1 |

6.3 Industrial Employment

District Lakki Marwat's economic activities are strongly supported by its diverse soil types and abundant natural resources. While agriculture benefits from fertile land, the district also shows considerable potential in its growing industrial and services sectors. Together, these sectors sustain local livelihoods and contribute to a dynamic economy with promising prospects for future development.

The district's total labor force is 219,400, distributed across agriculture, industry, and services. Agriculture employs 38.8% of workers, reflecting its continued though moderate role in job creation. Industry accounts for 26.4% of employment, driven by manufacturing, construction, and energy-related activities. The services sector is the largest employer, engaging 34.8% of the workforce through activities such as retail, education, healthcare, hospitality, and finance, underscoring its central role in the district's economy.

Table 6-4: Sectoral Employment of District Lakki Marwat(%)⁴¹

| Sector | Employment |
|-------------------|------------|
| Total labor force | 219400 |
| Agriculture | 38.8% |
| Industry | 26.4% |
| Services | 34.8% |

⁴⁰ Development Statistics-2023

⁴¹ Labor Force Survey 2020-21

SECTORAL EMPLOYMENT LAKKI MARWAT DISTRICT (%)

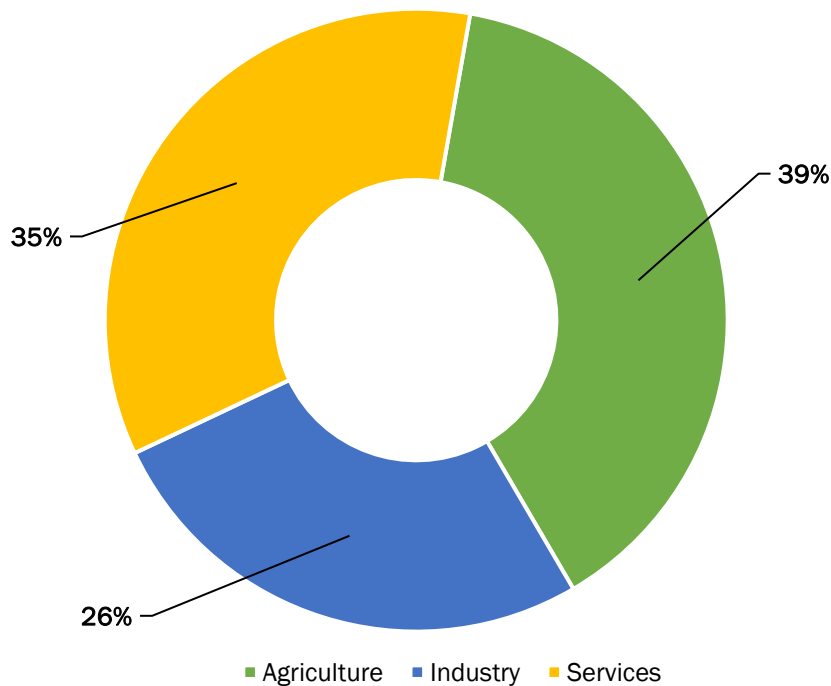


Figure 6-1: Sectoral Employment District Lakki Marwat (%)⁴²

6.4 Recommendations

1. Skill Development and Employment Generation (*Short-Term*)

- **Vocational Training:** Strengthen technical and vocational education programs to enhance workforce skills and adaptability to modern industrial requirements.
- **Inclusive Employment:** Launch initiatives to create balanced job opportunities across both rural and urban areas, ensuring equitable economic participation.

2. Policy and Institutional Support (*Short-Term*)

- **Investment Incentives:** Introduce tax benefits, subsidies, and easy financing options to attract investors and encourage industrial diversification.
- **Regulatory Simplification:** Streamline approval processes and provide transparent policy frameworks to facilitate industrial compliance and sustainable growth.

3. Environmental Sustainability (*Medium-Term*)

⁴² Labor Force Survey 2020-21

- **Emission Reduction:** Enforce environmental regulations and adopt clean technologies to control emissions and reduce pollution.
- **Efficient Resource Use:** Promote sustainable utilization of natural resources and introduce better waste management practices to ensure eco-friendly industrial growth.

4. Industrial Clustering (*Medium-Term*)

- **Zoning and Specialization:** Establish designated industrial zones, particularly for sectors like brick kilns and crush plants, to centralize operations and optimize shared infrastructure.

5. Infrastructure Development (*Long-Term*)

- **Roads and Connectivity:** Upgrade and expand road networks to facilitate the smooth movement of goods and raw materials, enhancing industrial efficiency.
- **Power Supply:** Provide a stable and uninterrupted electricity supply to ensure consistent industrial operations.
- **Water Management:** Implement effective water conservation and management systems to address water scarcity and support industrial sustainability.

6. Industrial Diversification (*Long-Term*)

- **Sectoral Expansion:** Broaden the industrial base beyond cement manufacturing to include technology-oriented and high-value sectors.
- **Agro-Industrial Development:** Promote value-added processing in agriculture-based industries to strengthen local economies and support rural livelihoods.

By pursuing these strategies, Lakki Marwat can overcome its industrial challenges, ensure sustainable development, and establish itself as a key contributor to the regional and provincial economy.

6.5 Rural-Urban Linkages

Rural–urban linkages in District Lakki Marwat are primarily driven by industrial and agricultural interactions. The presence of industries such as Lucky Cement in Pezu and related small-scale enterprises creates employment opportunities for residents from nearby rural areas, fostering labor mobility and income diversification. Rural producers supply raw materials such as limestone, sand, and agricultural goods to urban-based processing units, while towns provide essential services, markets, and access to goods for surrounding villages.

However, weak infrastructure—particularly poor road connectivity and limited transport services restricts efficient movement of goods and workers between rural and urban centers. Strengthening these linkages through improved transportation networks, rural market access, and logistics support can enhance economic integration. Promoting agro-based industries, establishing rural service centers, and facilitating small enterprise development in peri-urban areas would further balance regional growth and reduce rural poverty.

6.6 Future Plan

In **District Lakki Marwat**, **seven new industrial zones** are proposed across key urban and semi-urban centers to stimulate economic growth, attract investment, and create local employment opportunities. The estimation for these zones is based on a **labor force ratio of 6%** of the additional population representing individuals likely to be employed in industrial sectors. Land requirements were calculated using a standard of **50 workers per acre**, ensuring realistic land use projections for future development. These proposed zones will promote **balanced regional industrialization**, reduce economic dependence on neighbouring districts, and strengthen Lakki Marwat's role in the southern industrial corridor of Khyber Pakhtunkhwa.

6.6.1 Lakki Marwat City Industrial Zone

As the **district's administrative and commercial center**, Lakki Marwat City is proposed as the **primary industrial hub**. With an additional projected population of **80,329**, approximately **4,820 people** are expected to join the industrial workforce, requiring **96 acres (39.03 hectares)** of land. The zone will focus on **Agro-based processing, small-scale manufacturing, packaging, and logistics**, leveraging its strong connectivity via the **Indus Highway (N-55)** and proximity to the Central Business District.

6.6.2 Landiwah Industrial Zone

Located along the **Lakki–Pezu Road**, **Landiwah** offers excellent connectivity and expansion potential for light industry. The area's additional population of **11,665** will generate employment for **700 industrial workers**, requiring **14 acres (5.67 hectares)** of land. This zone is planned for **light engineering, construction materials, and agro-support industries**, providing local jobs and reducing dependence on external markets.

6.6.3 Serai Naurang Industrial Zone

Serai Naurang, the district's **second-largest urban hub**, is ideally situated along the **Indus Highway (N-55)** and regional trade routes. With a projected population increase of **59,195**, approximately **3,552 workers** will engage in industrial activities, requiring **71 acres (28.76 hectares)**. The proposed zone will cater to **food processing, warehousing, textile workshops, and livestock-related industries**, enhancing trade integration with **Bannu and D.I. Khan**.

6.6.4 Ghaznikhel Industrial Zone

Strategically positioned along the **Indus Highway**, **Ghaznikhel** offers opportunities for **small and medium-scale enterprises**. The additional population of **3,935** translates into **236 industrial jobs**, requiring **5 acres (1.91 hectares)**. The proposed zone will support **automobile maintenance, fabrication workshops, and agro-based services**, strengthening local value chains and promoting rural industrialization.

6.6.5 Pezu Industrial Zone

Pezu, home to the **Lucky Cement Factory**, is already an industrially active area and thus a logical location for expansion. With an additional population of **6,505**, approximately **390 workers** will require industrial employment, necessitating **8 acres (3.16 hectares)**. The new zone will accommodate **cement-linked industries, logistics, and building material production**, reinforcing Pezu's role as a **regional industrial anchor**.

6.6.6 Tajori Industrial Zone

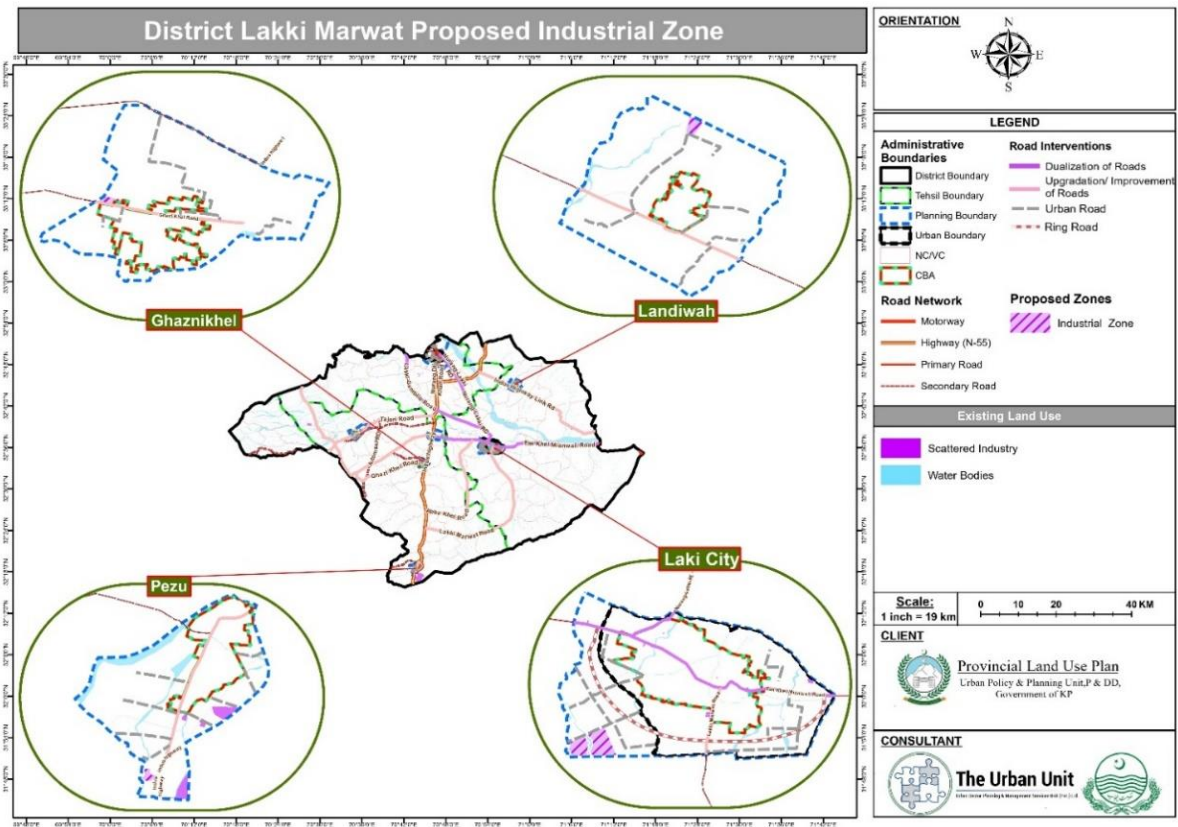
Tajori, positioned along the **Esa Khel–Mianwali Road**, has an additional population of **5,881**, generating **353 industrial jobs** and requiring **7 acres (2.86 hectares)** of land. The zone’s agricultural linkages make it suitable for **agro-processing, packaging, and small mechanical workshops**, supporting rural entrepreneurship and local business development.

6.6.7 Tajazai Industrial Zone

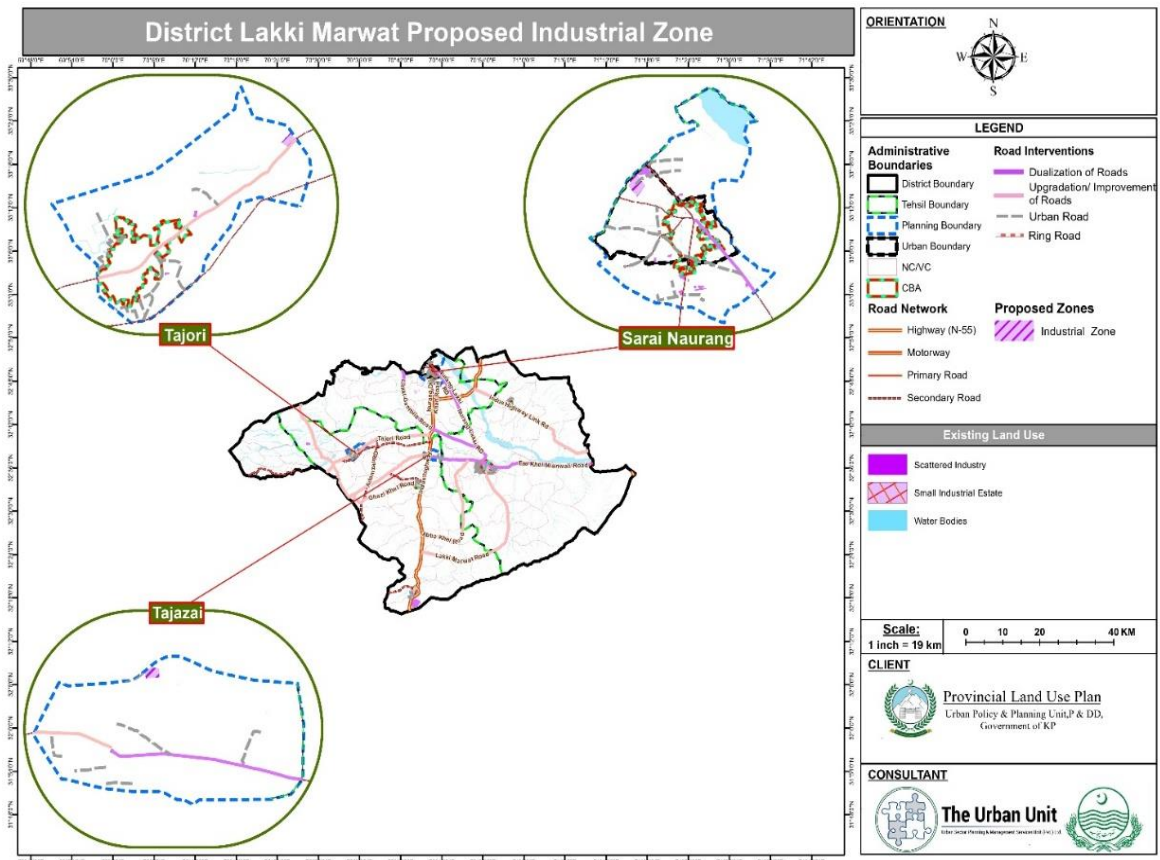
Located between **Lakki City and Ghaznikhel**, **Tajazai** serves as a **support node** for logistics and small industries. With an additional population of **8,219**, around **493 workers** will engage in industrial activities, requiring **10 acres (3.99 hectares)**. The proposed Tajazai zone will promote **warehousing, light manufacturing, and transport-related services**, easing pressure on Lakki City and diversifying the district’s industrial base.

Table 6-5: District Lakki Marwat Proposed industrial zones in Urban Areas

| Industrial | Lakki Marwat City | Landiwa | Serai Naurang Urban | Ghazni Khel Urban | Pezu Urban | Tajori Urban | Tajazai |
|-------------------------------------|-------------------|---------|---------------------|-------------------|------------|--------------|---------|
| Additional Population | 80329 | 11665 | 59195 | 3935 | 6505 | 5881 | 8219 |
| Labour Force @6% of Population | 4820 | 700 | 3552 | 236 | 390 | 353 | 493 |
| Area Required (@50 Labour per Acre) | 96 | 14 | 71 | 5 | 8 | 7 | 10 |
| Area Required in Hactare | 39.03 | 5.67 | 28.76 | 1.91 | 3.16 | 2.86 | 3.99 |



Map 6-2: Proposed Industrial Zone for District Lakki Marwat



Map 6-3: Proposed Industrial Zone for District Lakki Marwat

6.6.8 Industrial Zone Locational Criteria

The allocation of industrial zones across District Lakki Marwat is guided by key criteria, including accessibility from the road network, proximity to existing industrial areas, and availability of suitable land parcels.

In Lakki Marwat Urban Area, the proposed industrial zone is located on the southwestern side, near the urban boundary. It is accessible via the proposed urban road, which connects to the proposed ring road. A water body lies to the west of the zone, while a residential area is located to the east, providing potential housing opportunities for industrial workers. To the northeast, the mixed-use, CBD, and recreational zones are located nearby, enhancing the area's overall economic potential and spatial integration.

In Landiwa Urban Area, the proposed industrial zone is located on the northern side of the urban area and is connected through the proposed urban road leading to the Indus Highway link road, ensuring efficient access and connectivity for transport and logistics.

In Serai Naurang Urban Area, the proposed industrial zone is situated on the northwestern side of the urban area. It is accessible from the urban road linking to the main Bannu–Naurang Road. An existing industry is located to the northeast of the proposed zone, reinforcing its suitability for further industrial development. These factors make it an appropriate and strategic location for the proposed industrial zone.

In Pezu Urban Area, the proposed industrial zone is located on the southern side of the urban area and is accessible via the main Indus Highway. Existing commercial areas are located to the northeast and southeast, enhancing the zone's economic and logistical potential.

In Ghazni Khel Urban Area, the proposed industrial zone is located on the western side of the urban boundary along the Ghazni Khel Road, ensuring direct accessibility and connectivity to the transport network.

In Tajori Urban Area, the proposed industrial zone is located on the northeastern side of the urban boundary along the main Tajori Road, ensuring convenient accessibility for goods movement and industrial operations.

In Tajazai Urban Area, the proposed industrial zone is located on the northern side of the urban area and is connected to the Indus Highway through the proposed urban road, ensuring strong connectivity and logistical efficiency for industrial activity.

7 Trade and Commerce

Trade and commerce form the backbone of Lakki Marwat's economic activity, linking its urban center, Lakki City, Serai Naurang, Tajori, and Pezu with surrounding rural areas through vibrant local markets that sustain both livelihoods and regional exchange. Despite this active marketplace network, the district lacks major trade centers and relies heavily on external markets in Bannu and Mianwali (Punjab) for essential goods, with cement being its only notable export. This dependence limits self-sufficiency and economic diversification. At the provincial level, the services sector remains a dominant contributor to Khyber Pakhtunkhwa's economy, with Wholesale and Retail Trade, along with Hotels and Restaurants, accounting for over 40% of the sector's output and nearly a quarter of KP's total GDP. Although the sector experienced setbacks due to the COVID-19 pandemic, prospects for recovery remain strong, underscoring the continued importance of trade and commerce in driving Lakki Marwat's socio-economic development and integration into the wider regional economy.

7.1 Distribution of Commerce and Trade Center

Lakki Marwat, though not historically as prominent in trade as neighboring districts like Bannu, has long played a supporting role in regional commerce due to its strategic location connecting southern Khyber Pakhtunkhwa with surrounding areas such as Karak and Dera Ismail Khan. Historically, it served as a transit route for the movement of livestock and agricultural produce, contributing modestly to regional trade flows. Today, the district is gradually evolving into an emerging hub for local and regional commerce, anchored by its main trade centers in Lakki City, Serai Naurang, Tajori, and Pezu. These urban bazaars serve as central points of exchange for surrounding rural areas, where smaller markets source their goods from these larger hubs. Lakki City Bazaar functions as the district's commercial core, offering daily-use items, textiles, and household goods, while Serai Naurang Bazaar remains vital for agricultural and livestock trading. Similarly, the smaller markets in Pezu and Tajori cater to local populations, sustaining the district's grassroots economic activity.

Agriculture remains the foundation of Lakki Marwat's trade economy, with wheat, maize, and vegetables forming the bulk of local produce traded through Sabzi Mandis in Lakki City and Serai Naurang. Livestock markets (Mawaishi Mandis) in these towns also play a major role, attracting traders from neighboring regions and contributing significantly to local incomes. However, the district's commercial structure is still underdeveloped, with limited diversification and a strong reliance on external markets for consumer goods. Unlike Bannu, which exports various processed products, Lakki Marwat's export potential remains narrow, dominated by cement production from the Lucky Cement Factory in Pezu. The lack of large-scale industries and dependency on neighbouring districts such as Bannu and Mianwali (Punjab) for essential goods highlight the need for local market expansion and enhanced infrastructure to achieve sustainable commercial growth.

Table 7-1: Sectorial Contribution of Services Sub-Sectors towards Gross Value Added⁴³

| Sub-Sectors of Services Sector | 2018-2019 GVA (in Million) | Percentage of Total | 2019-2020 GVA (in Million) | Percentage of Total |
|--|----------------------------|---------------------|----------------------------|---------------------|
| Gross Value Added of Services Sector | 720266 | | 681074 | |
| Wholesale & Retail trade and Hotel and restaurants | 312853 | 43.44 | 274953 | 40.37 |
| Transport, Storage & Communication (TS&C) | 125872 | 17.48 | 116745 | 17.14 |
| Finance & Insurance (FI) | 33089 | 4.59 | -32747 | -4.81 |
| Housing Services (HS) | 40836 | 5.67 | 41161 | 6.04 |
| General Government Services | 98529 | 13.68 | 102395 | 15.03 |
| Other Private Services | 109087 | 15.15 | 113072 | 16.6 |
| YoY Growth Rate | 0.012 | | -0.054 | |

7.2 Commercial Activities in the District

Lakki Marwat's commercial activities reflect a dynamic mix of traditional marketplaces, agricultural trade, and emerging small enterprises that together sustain the district's economy. The overall commercial land area spans approximately 231.74 hectares, indicating a modest yet growing economic base. The district's trade structure is primarily rooted in its agricultural production, with a strong presence of fruit, vegetable, and grain markets that serve both urban and rural populations. Small-scale industries, local crafts, and service-based

⁴³ Economic Review of KP 2019-20

businesses further contribute to the district's economic diversity, underscoring its gradual progress toward a more vibrant commercial landscape.

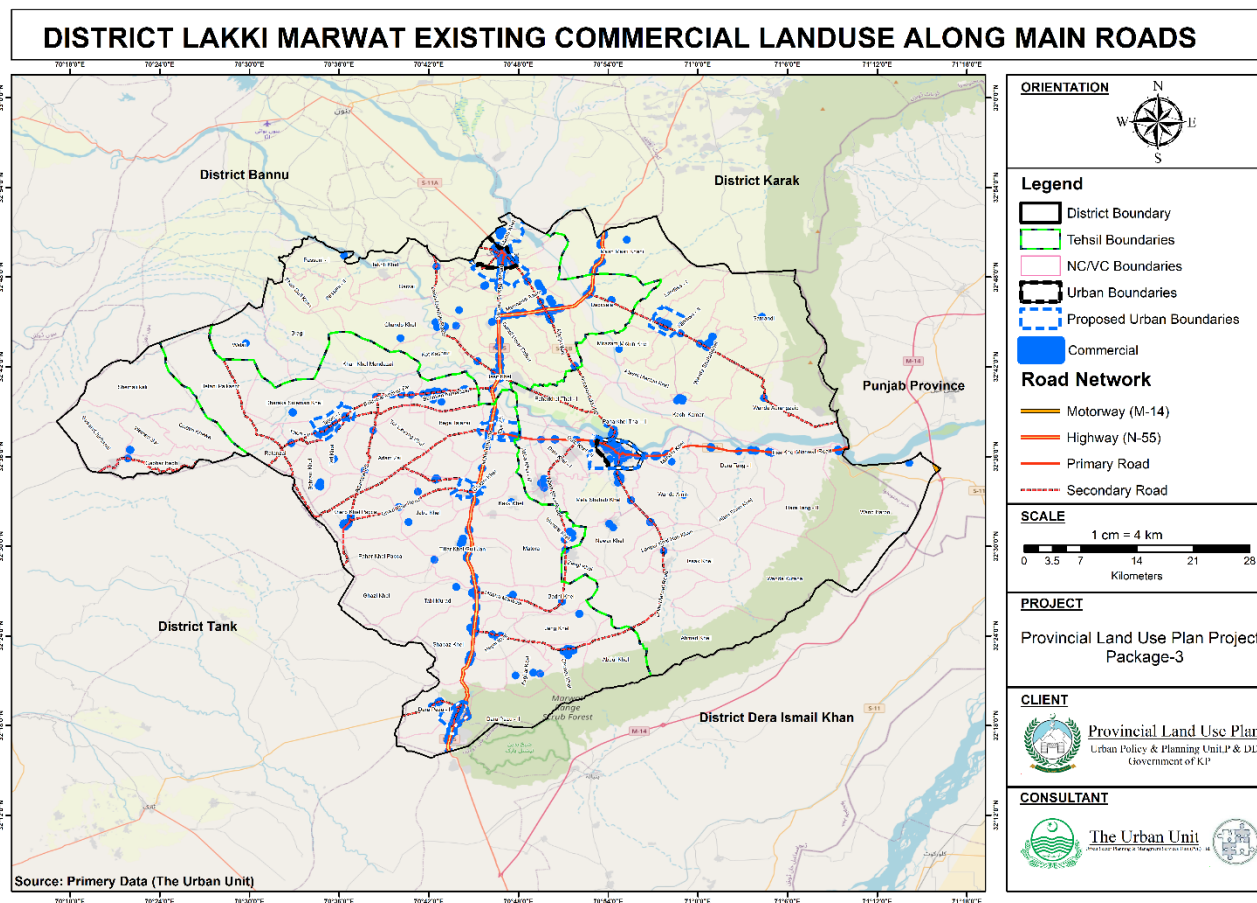
Lakki City serves as the administrative and commercial nucleus of the district, hosting the most active bazaars and wholesale markets. The central Old Bazaar, situated along Bazaar Road and extending to the Essa Khel–Mianwali Road, remains the focal point of trade, offering a variety of consumer goods ranging from textiles to household items. The Sabzi Mandi on Baghban Road and the Serai Naurang–Lakki Road is the key wholesale hub for fruits and vegetables, while the Mawaishi Mandi, located on the outskirts, handles livestock trading that supports both the local meat supply and regional commerce. These markets follow a linear pattern along major roadways, optimizing access for traders and consumers alike. Lakki Marwat Tehsil itself encompasses 55.07 hectares of designated commercial land, demonstrating its role as the district's primary trade center.

Serai Naurang, another major commercial hub, functions as a secondary trade nucleus serving both urban and rural populations. Its main bazaar, located along the Bannu–Naurang–Dera Ismail Khan Road, features a diverse range of goods including electronics, textiles, auto parts, and agricultural produce. The Gaandi Chowk Bazaar on the Indus Highway complements this network, catering to nearby rural settlements and facilitating regional connectivity. According to land use data, Serai Naurang Tehsil possesses about 74.65 hectares of commercial land, mostly arranged in a ribbon-like formation along main transport routes. This spatial pattern allows for the easy movement of goods but also limits centralized market development.

In contrast, Ghazni Khel and Pezu exhibit smaller yet functionally important commercial setups, primarily aligned along the Indus Highway and connecting roads. Ghazni Khel hosts bazaars at Tajazai Chowk and along Ghazni Khel Adda Road, serving as key trade stops for local and through traffic. Pezu's commercial market, positioned strategically along the Indus Highway and Pezu City Road, supports trade linked to the nearby cement industry and rural economy. Meanwhile, Bettani remains the least developed tehsil, with a minimal commercial footprint of just 0.49 hectares and only a few small shops catering to local needs. The sharp contrast in commercial activity across tehsils highlights the uneven economic development within Lakki Marwat, emphasizing the need for targeted infrastructure investment and urban planning to strengthen regional trade connectivity.

Spatial Concentration and Future Planning

The map of District Lakki Marwat – Existing Commercial Land Use Along Main Roads provides a spatial overview of how commercial activities are distributed across the district's primary transportation network. The concentration of blue dots indicates that commercial development is primarily clustered along major highways such as the N-55 and M-14, as well as key urban centers like Lakki City and Serai Naurang. These nodes serve as economic corridors linking the district to neighboring regions, including Bannu, Karak, Tank, and Dera Ismail Khan, thereby enhancing trade flow and accessibility. The map also reveals secondary commercial pockets along primary and secondary roads, reflecting localized markets and service-based clusters that support rural settlements. The alignment of commercial land use with major roads underscores the district's linear growth pattern, dependent on transportation infrastructure rather than dispersed urban expansion. This pattern suggests that future planning should focus on strengthening commercial hubs along these corridors while regulating unplanned ribbon development to ensure balanced regional growth and infrastructure efficiency.



Map 7-1: Existing Commercial Land Use of District Lakki Marwat

7.2.1 Exports & imports of key Goods & Commodities

Pakistan’s trade landscape in Fiscal Year 2022 (FY22) reflected significant growth, with exports reaching USD 23.7 billion—an increase of 26.6% year-on-year—while imports surged by 49.1%, totaling USD 58.9 billion. The services sector, which constitutes around 58% of the national economy, recorded a 17.1% growth in exports during this period. Within this sector, wholesale and retail trade accounted for 32.4%, underscoring the critical role of trade and commerce in Pakistan’s economic framework. At the provincial level, while specific data for Khyber Pakhtunkhwa (KP) are unavailable, key contributors to foreign inflows include mining and quarrying, horticulture, and tourism. According to the Economic Review of Khyber Pakhtunkhwa (2019–20), the province’s economic base primarily relies on sectors such as furniture, fruits, fishery products, and rice, with rice and cotton serving as major sources of national foreign exchange earnings.

In contrast, the country’s import composition for FY22 was dominated by petroleum products, liquefied natural gas (LNG), palm oil, plastics, pharmaceuticals, and iron and steel—amounting to USD 59.8 billion. Given KP’s relatively low industrialization, the province’s import mix is presumed to be skewed toward consumer goods rather than industrial machinery or capital goods. Within this context, Lakki Marwat’s local economy plays a vital role in regional trade, primarily driven by agriculture, livestock, and the cement industry. The district exports cement, agricultural produce, and livestock, while importing machinery, pharmaceuticals, and food products from other regions. Lucky Cement, one of Pakistan’s leading producers based in Pezu, stands out as the district’s flagship export, contributing significantly to both local employment and regional economic growth.

Table 7-2: Trade & Commerce of Lakki District

| Level | Incoming Commodities | Outgoing Commodities |
|--------------------|--|---|
| International | Processed Food, Machinery, electronics | Cement |
| National | Pharmaceuticals, Steel, Electronics, Processed Foods, Textiles, Jewelry | Cement, Livestock, Agriculture Products |
| Regional | Fruits, Vegetables, Livestock, Jewelry, Handicrafts, Food and Non-food, Pulses, Spices, Textiles | Wheat, Maize Livestock, Cement, Dairy products, Bricks |
| Local/Sub-regional | Daily-use Items, Fruits, Vegetables, Wood Products, Dairy Products | Livestock, Fruits, Vegetables, Cement, Dairy Products, Bricks |

7.3 Growth Pattern

Lakki Marwat District, which gained its administrative independence from Bannu in 1992, has experienced gradual commercial development over the years. Historically, it functioned as a small but active trading hub, particularly for the Marwat and Bhattani tribes, with agriculture and livestock forming the backbone of its economy. The establishment of the Pezu Cement Factory has introduced a new phase of industrial progress, diversifying the district's economic base. Although its commercial growth has lagged behind neighboring Bannu largely due to limited infrastructure and the region's arid conditions recent improvements in road connectivity and government-led development projects have begun to stimulate trade and investment within the district.

The district's trade network is supported by key transport corridors such as the Bannu–D.I. Khan Road and the Indus Highway, linking Lakki Marwat to major surrounding districts including Dera Ismail Khan, Bannu, and Karak. Unlike Bannu's radial road pattern, commercial development in Lakki Marwat follows a linear or ribbon-like growth along major roads such as the Essa Khel–Mianwali Road and Naurang–D.I. Khan Road. These routes facilitate both inter-district trade and local market activities, with smaller bazaars catering to nearby rural communities. Despite these advantages, the district's commercial zones face several persistent challenges, including shop encroachments that block pedestrian movement, inadequate parking spaces leading to traffic congestion, poor solid waste collection systems, and underdeveloped infrastructure such as narrow roads, weak drainage, and insufficient street lighting. A lack of urban planning and enforcement of zoning laws has further compounded these urban management issues.

While Lakki Marwat's growth remains modest compared to other districts, ongoing infrastructure improvements and industrial expansion efforts signal promising potential for the future. The Pezu Cement Factory continues to be a cornerstone of the district's economy, while agriculture and livestock trade sustain local livelihoods. With continued investment in urban management, waste collection, and transportation infrastructure, Lakki Marwat can strengthen its role as a regional trade hub. Strategic planning and sustainable development will be key to integrating the district more effectively into regional and national economic networks, ensuring balanced and long-term commercial growth.

7.4 Recommendations

- **Enhance Vocational Training** (*Short-Term*)

Set up vocational training institutes in Lakki City and Serai Naurang to build a skilled workforce. Training should emphasize modern agricultural practices, livestock management, and small-industry operations.

- **Provide Financial Assistance to Traders** (*Short-Term*)

Introduce microfinance schemes and grants for small traders to help them expand operations and reduce dependency on external markets.

- **Strengthen Waste Management and Urban Regulation** (*Short-Term*)

Improve waste collection frequency and introduce recycling programs in commercial areas. Enforce stricter zoning and construction regulations to control unauthorized developments and ensure organized urban growth.

- **Support Local Artisans** (*Short-Term*)

Establish artisan and craft centers where local craftsmen can produce, train, and market handmade goods. These centers can enhance local tourism and contribute to the district's trade activities.

- **Promote Small-Scale Industries** (*Medium-Term*)

Encourage the establishment of small industrial units focused on agricultural processing, dairy production, and traditional crafts. Government assistance through subsidies or low-interest financing can accelerate small-scale industrial growth.

- **Improve Agricultural Market Facilities** (*Medium-Term*)

Upgrade infrastructure in existing vegetable (Sabzi) and livestock (Mawaishi) markets to ensure cleaner, better-organized, and more efficient trading spaces for farmers and merchants.

- **Expand Digital Connectivity** (*Medium-Term*)

Improve internet and mobile network coverage throughout Lakki Marwat to attract investors, assist businesses in digital transformation, and enable e-commerce growth.

- **Upgrade Infrastructure** (*Long-Term*)

Rehabilitate roads, improve drainage systems, and install adequate street lighting in major commercial centers to support business operations and enhance safety.

- **Develop Parking Facilities** (*Long-Term*)

Construct dedicated parking lots in congested commercial zones of Lakki City and Serai Naurang to reduce roadside congestion and facilitate smoother traffic flow.

- **Formalize Commercial Corridors** (*Long-Term*)

Officially designate the Essa Khel–Mianwali Road in Lakki City and the Naurang–D.I. Khan Road in Serai Naurang as commercial routes. Levy commercial taxes on businesses along these roads and reinvest the revenue into improving public and business services to stimulate sustainable economic growth.

7.5 Future Plan

To accommodate the projected urban population growth across District Lakki Marwat by the year 2045, the demand for commercial land is expected to increase substantially. In total, seven urban and semi-urban centers have been identified for future commercial expansion, ensuring a balanced spatial distribution of trade

and service functions across the district. These projections are based on population growth estimates and standard commercial land-use ratios.

- Lakki Marwat City will experience the most significant commercial expansion due to its status as the district’s administrative and trade hub. With an additional projected population of 80,329, the city will require 11.09 hectares of new commercial land. The expansion will primarily occur along the Bannu–Lakki–Marwat Road, reinforcing the city’s Central Business District (CBD) and supporting retail, service, and logistics activities.
- Landiwah, situated along the Lakki–Pezu corridor, will require 4.72 hectares of additional commercial area to accommodate 11,665 new residents. Its position near the Indus Highway makes it an ideal site for wholesale markets, small business centers, and highway-oriented commercial development.
- Serai Naurang Urban, the second-largest commercial hub, is projected to add 5.01 hectares of new commercial land for an additional 59,195 residents. Strategically located on the Naurang–D.I. Khan Road, it will host food markets, warehousing, and transport-related commercial activities serving both local and regional demand.
- Ghazni Khel Urban—as seen on the proposed commercial map—has been designated as a new CBD node due to its advantageous location along the Indus Highway. With a projected increase of 3,935 residents and a commercial requirement of 1.59 hectares, this area will facilitate transit-related trade, small-scale retail, and service enterprises, forming a sub-regional business center for western Lakki Marwat.
- Pezu Urban, located along the N-55 Highway, will expand its commercial footprint by 2.63 hectares to accommodate 6,505 new residents. The proposed zone complements the nearby industrial area, focusing on construction supplies, transport services, and retail centers that support Pezu’s growing industrial base.
- Tajori Urban, positioned along rural trade routes, will add 2.38 hectares of new commercial land for 5,881 additional people. The proposed area will focus on agro-product markets, small workshops, and service-oriented businesses to strengthen local economic linkages.
- Tajazai, located between Lakki Marwat City and Ghazni Khel, will serve as a support node for logistics and regional commerce. For its 8,219 projected population increase, 3.33 hectares of new commercial land have been allocated, emphasizing warehousing, wholesale, and mixed-use retail development.

Table 7-3: Future Commercial Area Requirement 2045 (Hectares)

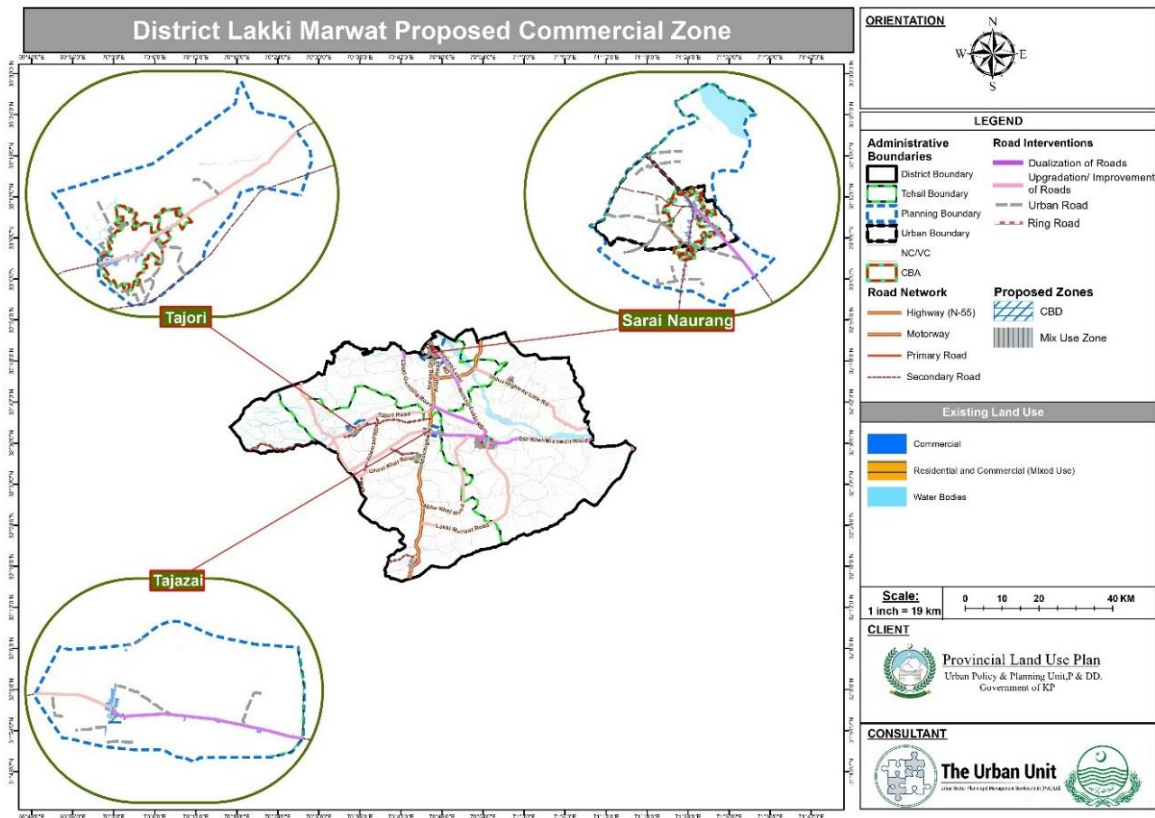
| Urban Area | Additional Population (2025-45) | Additional Required Commercial (Acre) | Additional Required Commercial (Hectare) |
|---------------------|---------------------------------|---------------------------------------|--|
| Lakki Marwat City | 80329 | 80.33 | 11.09 |
| Landiwa | 11665 | 11.67 | 4.72 |
| Serai Naurang Urban | 59195 | 59.20 | 5.01 |
| Ghazni Khel Urban | 3935 | 3.94 | 1.59 |
| Pezu Urban | 6505 | 6.51 | 2.63 |

| | | | |
|--------------|------|------|------|
| Tajori Urban | 5881 | 5.88 | 2.38 |
| Tajzai | 8219 | 8.22 | 3.33 |

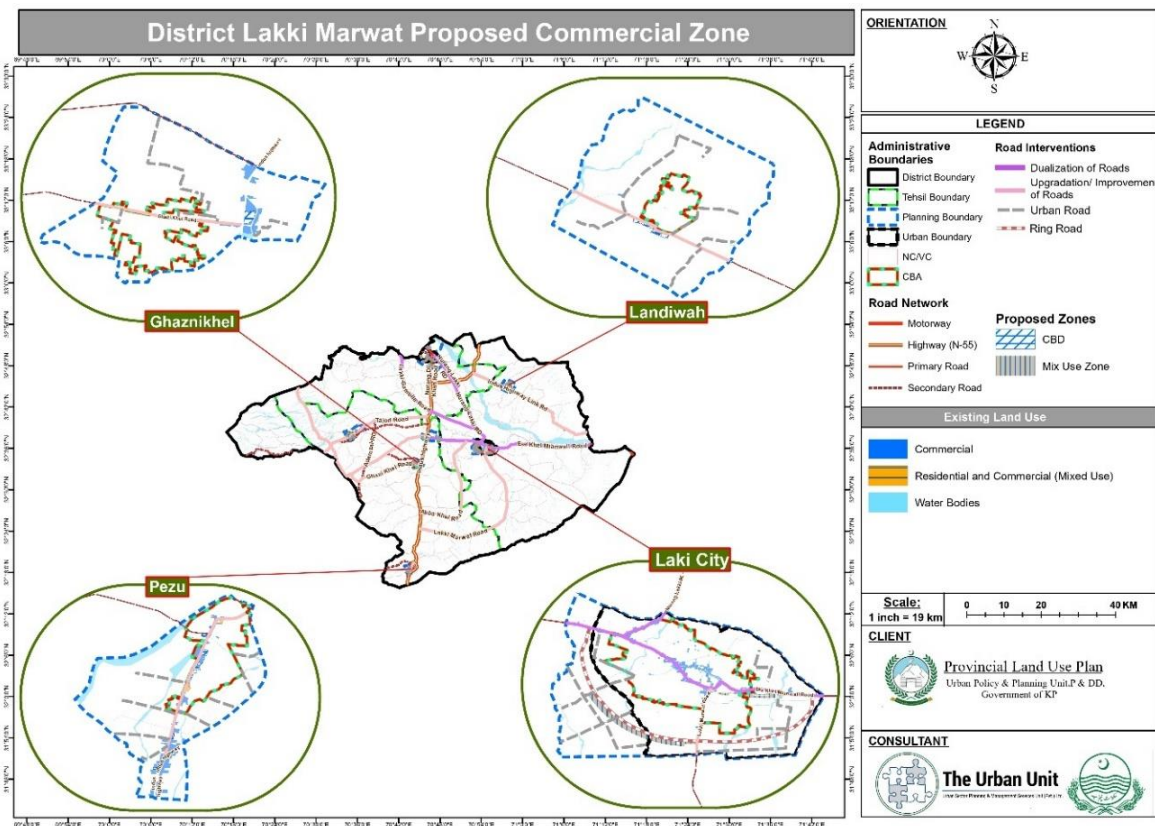
In addition to the dedicated commercial zones, mixed-use developments have been proposed to integrate residential, commercial, and institutional land uses in the most populous centers Lakki Marwat City and Serai Naurang to support compact and vibrant urban growth.

Table 7-4: Future Commercial Area Requirement 2045 for Mixed-Use

| Mixed Use | | | |
|---------------------|---------------------------------|----------------------|-------------------------|
| Urban Area | Additional Population (2025-45) | Mixed Use Population | Mixed Use required area |
| Lakki Marwat City | 80329 | 16066 | 53.55 |
| Serai Naurang Urban | 59195 | 11839 | 47.36 |



Map 7-2: District Lakki Marwat Proposed Commercial Zone



Map 7-3: District Lakki Marwat Proposed Commercial Zone

7.5.1 Commercial Zone (CBD) Locational Criteria

The allocation of **commercial zones (CBDs)** across District Lakki Marwat is guided by key locational criteria, including accessibility from major roads, central positioning within urban areas, proximity to residential neighborhoods, and the availability of suitable land parcels.

In **Lakki Marwat City**, the commercial zone is located on the **western side** of the city along the **proposed ring road**, with additional access from the **proposed urban road** to the north. It is surrounded by proposed **residential zones** on the north and east, a **recreational zone** to the southeast, and a **mixed-use zone** to the west, making it a strategically positioned and viable site for future commercial development.

In **Landiwa Urban Area**, the commercial zone is located on the **southern and southwestern sides** of the urban boundary, along the **Indus Highway link road**. This area is surrounded by existing and proposed residential neighborhoods and already exhibits established commercial activity, reinforcing its suitability as a central business hub.

In **Serai Naurang**, the CBD is situated on the **northwestern side** of the urban area along the **Bannu–D.I. Khan Road**. The location already features established commercial activities. It is bordered by **proposed mixed-use zones** to the east and northwest, and by **existing residential areas** to the west and south, making it a well suited location for the proposed CBD.

In **Ghazni Khel**, the commercial zone lies on the **eastern side** of the urban area along the **Indus Highway**. Surrounded by well-developed commercial activity, this area functions as the **commercial hub** of the urban settlement. A **recreational zone** is located to the northeast, enhancing its urban character and accessibility. These factors collectively make it a prime location for the CBD.

In **Pezu Urban Area**, the proposed CBD is located on the **northeastern side** of the urban area along **Pezu Road**. The zone already contains active commercial establishments, making it the **commercial core** of Pezu and easily accessible to residents. Its location ensures strong integration with surrounding residential areas and supports future commercial and economic growth.

In **Tajori Urban Area**, the CBD is positioned on the **southwestern side** along the **main Tajori Road**, adjacent to existing and proposed residential areas. The area already contains significant commercial activity, making it a **well-suited and functional site** for the central business district.

In **Tajazai**, the CBD is proposed at the **center of the urban area**, at the intersection of the **Indus Highway (N-55)** and **Essa Khan–Mianwali Road**. The zone lies adjacent to established commercial areas and is close to both existing and proposed residential neighborhoods. This central positioning makes it a **strategic and viable location** for further commercial development and investment.

7.5.2 Standards for Commercial Buildings (from KP Model Building Bye-Laws 2020)⁴⁴

1. Maximum Building Height

- The maximum height of commercial buildings shall not exceed 82 feet (24.99 meters) or 7 storeys, including the mezzanine floor whichever is less.
- Total height including stair tower/machine room may be up to 90 feet from the center of the adjacent road level.

2. Floor Heights

- Ground Floor: Minimum 9.5 ft
- First & Second Floors: 9.5 ft each (if applicable)
- Mezzanine Floor: Max height 7 ft; only allowed where clear height of room is ≥ 16 ft

⁴⁴ <https://www.jgkp.gov.pk/wp-content/uploads/2020/11/Public-Notice-of-draft-of-Model-Building-Bye-Laws-2020.pdf>

- Basement Height: Clear height minimum 9 ft
- Arcade Height: Max height from adjacent road level 10 ft 6 in.

3. Setbacks (Commercial & Mixed Use)

Table 7-5: Setbacks (Commercial & Mixed Use)

| Plot Size (sq. yd) | Arcade | Rear Setback | Side Setback |
|--------------------------|--------|--------------|--------------|
| Up to 151 (5 Marla) | None | 3 ft | None |
| 152-250 (5.1-8.3 Marla) | None | 5 ft | None |
| 251-400 (8.3-13.2 Marla) | None | 7.5 ft | None |
| 401-600 (13.2-20 Marla) | 8 ft | 7.5 ft | 5 ft |
| 601-999 (20-33 Marla) | 8 ft | 8 ft | 5 ft |
| 1000-1999 (33-66 Marla) | 8 ft | 10 ft | 7.5 ft |

4. Footprint & Floor Area Ratio (FAR)

Table 7-6: Floor Area Ratio

| Plot Size (sq. yd) | Ground Floor Coverage | Upper Floor Coverage | FAR |
|--------------------|-----------------------|----------------------|-----|
| Up to 80 | 100% | - | 1:6 |
| 81-250 | 95% | - | 1:6 |
| 251-400 | 90% | - | 1:6 |
| 401-600 | 85% | 75% | 1:6 |
| 601-999 | 80% | 70% | 1:6 |
| 1000-1999 | 70% | 65% | 1:6 |

7.5.3 Managing Existing Commercial Activities

The management of the existing commercial Activities is of greater importance in order to curtail and discourage its haphazard and uncontrolled growth. As Lakki Marwat land use plan designates the zoning and regulatory measures for future commercial needs of the city, existing commercial activities can be managed through these strategies:

a. Phased Regularization

- The existing commercial activities will be allowed to continue if they meet basic safety and zoning standards (e.g., structural integrity, fire safety).
- Require non-compliant structures (e.g., those violating setbacks or height limits) to be regularized within a set timeframe (e.g., 2-3 years) through retrofitting or partial demolition.
- Incentives like tax breaks or low-interest loans should be provided for businesses to comply with regularization.

Implementation:

- Conduct a survey of existing commercial structures along roads to identify non-compliant ones.
- Issue notices with clear regularization guidelines and timelines, enforced by a local building control authority.

b. Relocation of Non-Conforming Uses

- Identification of commercial activities that are incompatible with zoning plans (e.g., heavy industries in retail zones) and planning their relocation to designated industrial zones.
- Providing relocation incentives, such as subsidized land or infrastructure support, funded through public-private partnerships (PPPs) or ADB/AIIB grants.

Implementation:

- Mapping non-conforming commercial activities.
- Develop a relocation plan with timelines, funding sources, and stakeholder consultations.

c. Selective Freezing

- Freezing further expansion of non-compliant commercial structures (e.g., no additional floors or extensions) until they meet zoning and building standards.
- Allowing compliant structures to continue operating without restrictions.
- Enforcing freezing through strict monitoring by a local building control authority.

Implementation:

- The building control authority under the KP Land-Use and Building Control Act 2021 to monitor and enforce freezing.

Usage of land digitization (as recommended in KP Urban Policy 2030) to track compliance and prevent illegal expansions.

7.5.4 Proposals for Containment, Regulation, and Upgradation

The following policy interventions are proposed to address existing and future ribbon development in Lakki Marwat:

| Framework | Relevant Provisions | Application |
|--|---|---|
| KP Land Use & Building Control Act, 2021 | Sec. 21, 22, 31 | Legal basis for DCLs, development permissions, and urban improvement plans |
| KP Urban Policy 2022–2030 | Para 32, 37, 38 | Mandates compact growth, discourages ribbon development, promotes GIS monitoring |
| KP Building Regulations, 2023 | Setbacks, access rules | Technical standards for roadside development (e.g., minimum building lines, access control) |
| KP Local Government Act, 2013 | Tehsil and neighborhood council authority | Legal support for local monitoring, by-laws enforcement, and development control |

1. Establishment of Development Control Lines (DCLs)

- Define clear development boundaries along major corridors to prohibit new unplanned construction beyond designated limits.
- Enforced through the KP Land Use and Building Control Act, 2021 (Sections 21 & 22) which mandates permission-based land use conversion and construction within notified plans.

2. Regularization and Retrofit of Existing Ribbon Areas

- Existing residential and commercial units will not be demolished but instead retrofitted with:
- Service lanes or rear access where feasible
- Enforced setbacks and uniform building lines
- Basic infrastructure (water, sewerage, drainage, streetlights)
- This complies with **Section 31 of the KP Land Use and Building Control Act, 2021**, which allows urban design improvement plans for existing structures.

3. Restriction of Future Ribbon Development

- No new commercial conversion or subdivision shall be permitted outside of designated zones.
- Controlled through zoning provisions under the KP Urban Policy 2022–2030, which mandates contiguous and compact development (Para 32) and discourages linear growth.

4. Planned Commercial Clustering

- Identify and promote planned commercial hubs within the city core and future growth nodes to absorb new commercial demand, reducing pressure on linear roadside strips.

5. Community-Based Monitoring and Enforcement

- Empower Tehsil level councils and neighborhood units under the KP Local Government Act, 2013 to monitor encroachments and regulate roadside activity.

This supports decentralized enforcement and stakeholder participation in curbing unregulated construction.

8 Solid Waste Management (SWM) System

Like many other urban areas of the KPK province, the Lakki Marwat District faces significant challenges in managing solid waste due to rapid urbanization, an increasing population, and inadequate waste disposal infrastructure. This report proposes an effective SWM model to address these challenges in the Lakki Marwat District.

The situational analysis in Deliverable 3(Previous Report Submitted) highlighted significant gaps in Lakki Marwat's Solid Waste Management (SWM) system, including insufficient human resources, outdated machinery, and a lack of proper disposal infrastructure. Most waste is dumped at uncontrolled sites or drainage channels, with minimal door-to-door collection and weak public awareness. Financial constraints and poor inter-departmental coordination further hinder effective waste management.

To address these challenges, Deliverable 4 proposes a comprehensive SWM plan to develop a controlled landfill site with leachate and gas collection systems, invest in modern machinery, and hire additional sanitary staff and technical personnel. A capacity-building initiative will include staff training and public awareness campaigns to promote sustainable waste practices

8.1 Background

This report outlines a comprehensive Solid Waste Management (SWM) system for the Lakki Marwat District to improve waste collection, transportation, and disposal processes. The proposed framework addresses the distinct needs of both urban and rural areas, bridging resource gaps and incorporating modern techniques to optimize waste management services.

As of 2025, the population of Lakki Marwat District is estimated at 1.16⁴⁵ million, with an overall growth rate of 2.42⁴⁶%. The rural population has surged to 974,615, reflecting an extraordinary annual growth rate of 2.42%, whereas the urban population stands at 191,618, growing at 2.4 4% & (KPLUP shared data). This rapid population growth has significantly increased waste generation, making it imperative to implement effective measures to safeguard public health and enhance the quality of life in this pivotal district of Khyber Pakhtunkhwa (KPK).

Lakki Marwat's urban areas, in particular, face escalating challenges in municipal solid waste management due to rapid urbanization, population growth, and economic expansion. Waste generation in 2025 is estimated at 398 tons per day, based on per capita waste production rates of 0.45⁴⁷ kg/day in urban areas and 0.32 kg/day in rural areas. By 2045, waste generation is projected to exceed 773 tons daily, with an annual growth rate of 1.5%.

The proposed SWM system has been meticulously designed following an in-depth evaluation of existing infrastructure, as documented in the Situational Analysis Report (Lakki Marwat Deliverable-IV). The plan includes a strategic 20-year roadmap (2025–2045) to modernize waste collection, transportation, and environmentally sustainable disposal systems.

8.1.1 Objective

1. Proposed model for implementing an integrated Waste management system in Lakki Marwat District (Urban & Rural Tehsils).
2. To upgrade human resources (HR) and machinery for efficient waste collection and management.

⁴⁵ Primary Data Source-KPLUP

⁴⁶ <https://www.pbs.gov.pk/digital-census/detailed-results>

⁴⁷ Solid Waste Management sector in Pakistan reform road map for policy makers-March 2022.

3. Implementation of better disposal methods in the district in terms of developing a controlled dumpsite.
4. Introduce the 3R (Reduce, Reuse, Recycle) concept in the community through local bodies to control waste generation and minimize its environmental impact.
5. To build capacity for SWM staff, ensuring effective operations.

8.1.2 Approach

The approach to developing a suitable and pragmatic SWM plan for Lakki Marwat is based on the following principles:

- Design a waste management system for Lakki Marwat District that considers urban and rural needs and incorporates efficient collection, transportation, and sustainable disposal methods.
- Recruit and train additional staff to address workforce gaps and improve efficiency. Invest in modern equipment such as mini tipper with hydraulic lifting, compactors, dump trucks, mechanical sweepers, and skip loaders, ensuring regular maintenance for reliable operations.
- Proposed controlled landfill sites with features like leachate management, gas recovery, and proper waste layering.
- Promote the 3R (Reduce, Reuse, Recycle) approach within the community through local government initiatives, raising awareness to reduce waste generation and mitigate environmental impacts effectively.

Conduct capacity-building workshops and regular training for SWM staff to enhance technical and operational skills. Collaborate with experts for knowledge-sharing sessions and establish clear operational guidelines for improved efficiency.

8.1.3 Methodology

Solid waste in Lakki Marwat District will be collected using hand carts and mini-dumpers with Hydraulic lifting and stored in containers of 0.8m³. The waste will then be transferred to vehicles such as compactors, arm-roll trucks, and dumpers for transport to transfer stations or controlled disposal sites. This model ensures efficient waste handling and environmentally responsible disposal.

Additional staff will be recruited and trained in modern waste management practices to enhance operations. Upgraded machinery, including compactors and dumpers, will be procured, with regular maintenance to ensure reliable performance.

Disposal methods will include proposed new dumpsites/landfills with leachate management and gas recovery systems. Initiate community engagement programs to educate residents about the advantages of the 3R (Reduce, Reuse, Recycle) approach. Collaborate with local educational institutions, businesses, and community organizations to raise awareness about waste reduction, responsible disposal practices, and sustainable recycling methods. These initiatives will foster a culture of environmental responsibility, encouraging long-term behavioral change within the community.

Capacity-building programs for SWM staff will focus on technical skills, safety protocols, and best practices. Public awareness campaigns will promote community involvement in waste segregation and recycling for a more sustainable waste management system.

8.1.4 Land Use Area of Lakki Marwat District

The proposed land use plan for District Lakki Marwat covers a total area of approximately 13,812 acres, reflecting a strategic approach to balance agriculture, urban development, and environmental

conservation. The district remains predominantly agrarian, with the Agriculture Zone occupying about 57%, confirming its role as the backbone of the local economy and livelihood source for most residents.

The Residential zone constitutes around 28%, showing clear trends of urban expansion and population growth within the district. Meanwhile, smaller yet vital allocations are made for the Industrial zone 2%, the Institutional zone 1%, and the Mixed-use zone 2%, which together support economic diversification, service provision, and employment generation.

Social infrastructure is also strengthened through the inclusion of Educational and Health zones, ensuring access to learning and healthcare facilities for local communities. In addition, Recreational zones, Riverine Forest, and Future reserves indicate a commitment to sustainable urban planning and environmental conservation.

In terms of waste management, the proposed plan underscores the importance of developing proper Solid Waste Management (SWM) infrastructure, including collection, segregation, disposal, and recycling systems, to cater to growing residential and industrial areas. Effective SWM planning will help mitigate environmental pollution, support public health, and maintain ecological balance as Lakki Marwat transitions toward a more organized and sustainable urban framework.

Table 8-1: Proposed Land Use of Lakki Marwat District⁴⁸

| Planning Classes | Total Area (Acres) | % |
|--------------------|--------------------|------------|
| Agriculture Zone | 7822 | 57 |
| Buffer Zone | 61 | 0 |
| CBD | 83 | 1 |
| Educational Zone | 187 | 1 |
| Future Reserve | 281 | 2 |
| Health Zone | 182 | 1 |
| INDUSTRIAL ZONE | 220 | 2 |
| Institutional Zone | 71 | 1 |
| Mixed Use Zone | 255 | 2 |
| Recreational Zone | 183 | 1 |
| Residential Zone | 3823 | 28 |
| Revirine Forest | 192 | 1 |
| Bus Terminals | 8 | 0 |
| Public Buildings | 94 | 1 |
| Urban Farm Land | 349 | 3 |
| Total | 13,813 | 100 |

⁴⁸ Primary Data source KPLUP

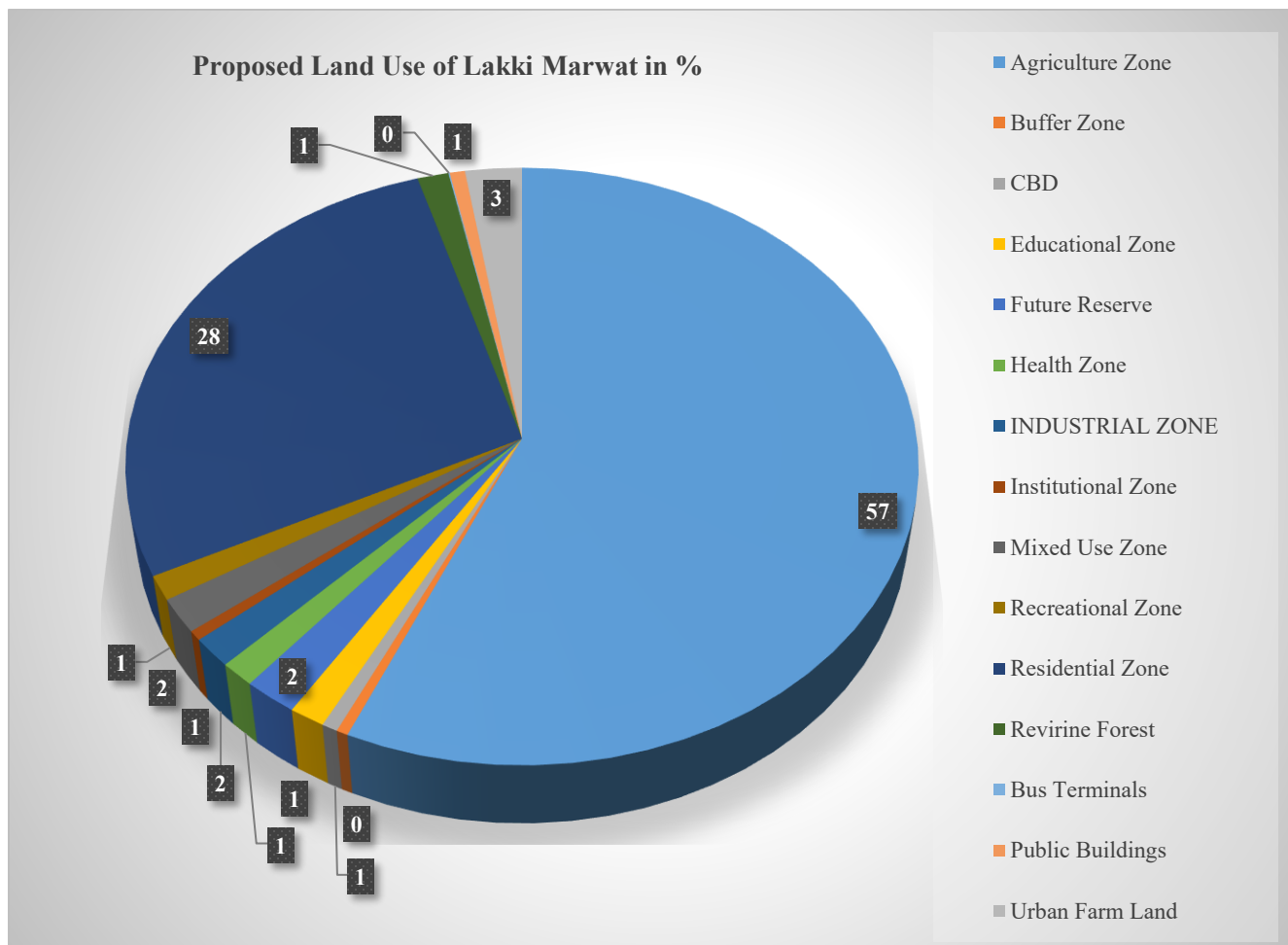


Figure 8-1: Graphical Representation of Lakki Marwat Land Use in %

8.1.5 Waste Generation

The urban tehsils of Lakki Marwat District are witnessing an increase in solid waste generation as urbanization intensifies across Lakki Marwat Urban, Landiwa, Serai Naurang, Ghazni Khel, Pezu, Tajori, and Tajazai. In 2025, these areas are projected to generate approximately 398 tons of municipal solid waste (MSW) per day, resulting in an annual total of 145,800 tons. Among these, Lakki Marwat Urban contributes 312 tons per day, followed by the Lakki Marwat, Landiwa, Serai Naurang, Ghazni Khel, Pezu, Tajori, and Tajazai generate 36, 7, 28, 2.5, 4, 4, and 7 tons respectively. By 2045, total MSW generation across these urban tehsils is expected to increase to 773 tons per day, totaling approximately 282,204 tons annually. Around 87% of the total waste is municipal solid waste from residential, commercial, and institutional sources, while the remaining 13% comprises bulk waste such as construction and demolition debris, sludge, dung, and desilted material⁴⁹. These projections emphasize the urgent need for a well-planned, efficient SWM system to address the mounting waste volumes in Lakki Marwat District’s growing urban landscape.

⁴⁹ Solid Waste Management sector in Pakistan-A reform road map for policy makers-March 2022.

- Total waste generation of District Lakki Marwat = 398 tons/day (87% MSW= 346tons/day, while 13% Bulk Waste= 52 tons/day)
- Total waste generation (District) = 145,800 tons/year **while**
- Total Waste generation of the Urban tehsils of Lakki Marwat = 86 tons/day
- Total waste generation of the Urban tehsils of Lakki Marwat = 31,473 tons/Year

The waste projection has been done to analyze the situation of waste generation for the next 20 years of the Lakki Marwat District for a proper solid waste management system.

Table 8-2: Population vs Waste Generation t/D Trends in Urban Areas (Lakki Marwat District)

| Urban Tehsils | Lakki Marwat | | Landiwa | | Serai Naurang | | Ghazni Khel | | Pezu | | Tajori | | Tajazai | |
|---------------|--------------|-----|------------|-----|---------------|-----|-------------|-----|------------|-----|------------|-----|------------|-----|
| | Population | W G | Population | W G | Population | W G | Population | W G | Population | W G | Population | W G | Population | W G |
| 2017 | 60,176 | 27 | 12,962 | 6 | 47,485 | 21 | 4,373 | 2 | 7,229 | 3 | 6,535 | 3 | 9,133 | 4 |
| 2025 | 79,553 | 36 | 16,116 | 7 | 62,042 | 28 | 5,437 | 2 | 8,989 | 4 | 8,125 | 4 | 11,356 | 5 |
| 2030 | 94,718 | 43 | 18,467 | 8 | 73,339 | 33 | 6,230 | 3 | 10,300 | 5 | 9,310 | 4 | 13,012 | 6 |
| 2035 | 112,775 | 51 | 21,160 | 10 | 86,706 | 39 | 7,138 | 3 | 11,801 | 5 | 10,668 | 5 | 14,909 | 7 |
| 2040 | 134,278 | 60 | 24,246 | 11 | 102,521 | 46 | 8,179 | 4 | 13,522 | 6 | 12,224 | 6 | 17,083 | 8 |
| 2045 | 159,882 | 72 | 27,781 | 13 | 121,237 | 55 | 9,372 | 4 | 15,495 | 7 | 14,006 | 6 | 19,574 | 9 |

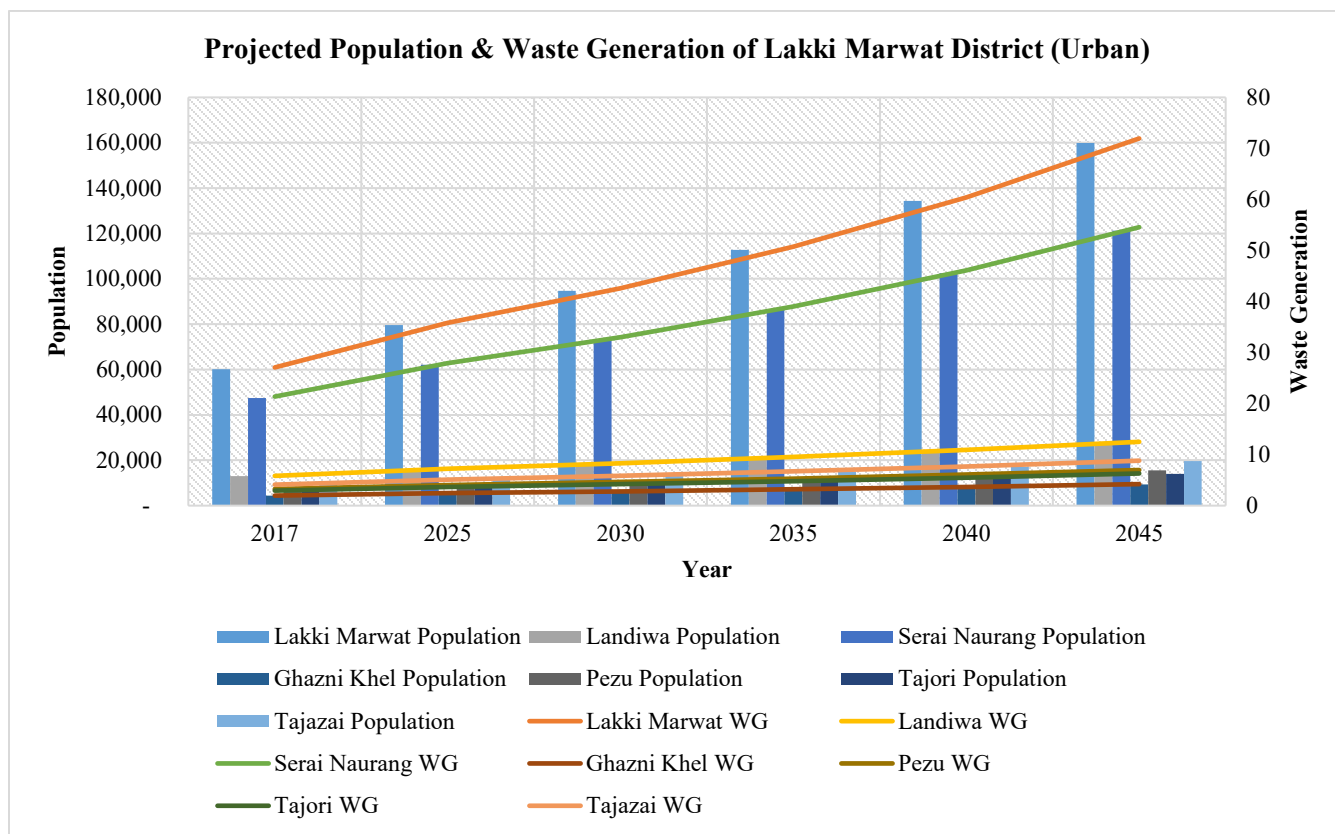
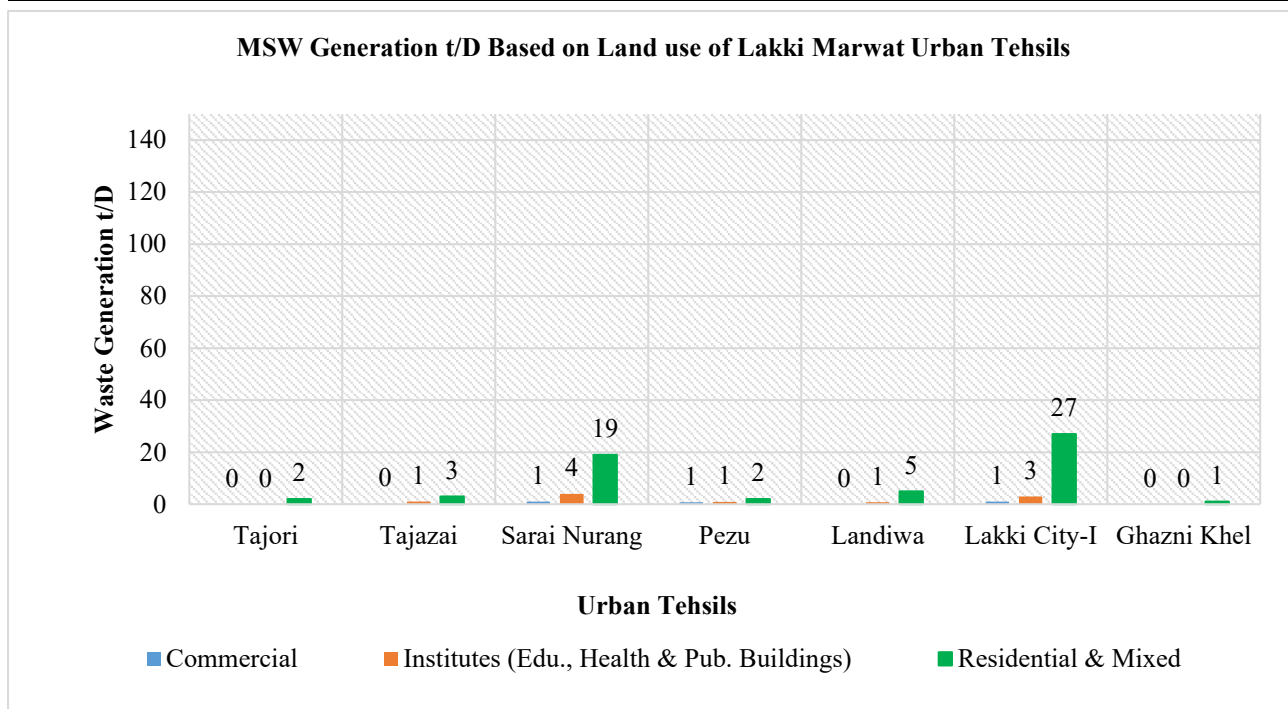


Figure 8-2: Graphical Representation of Population vs Waste Generation t/D Trends in Urban Areas

In the urban tehsils of Lakki Marwat District, most waste is generated from residential and mixed-use areas, reflecting the population density and daily household activities. Lakki Marwat and Sarai Naurang produce the highest waste due to their larger residential, commercial, and institutional presence. Tajori, Tajazai, Pezu, and Landiwa generate moderate waste, mainly from homes and some commercial and public facilities. Ghazni Khel contributes smaller amounts, mostly from residential zones of waste daily. Overall, residential areas are the dominant source of waste across all tehsils.

Table 8-3: Municipal Waste Generation based on Land Use of Lakki Marwat District (Urban)

| Land-use | Tajori | Tajazai | Sarai Naurang | Pezu | Landiwa | Lakki City-I | Ghazni Khel |
|--|--------|---------|---------------|------|---------|--------------|-------------|
| Commercial | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| Institutes (Edu., Health & Pub. Buildings) | 0 | 1 | 4 | 1 | 1 | 3 | 0 |
| Residential & Mixed | 2 | 3 | 19 | 2 | 5 | 27 | 1 |
| Total | 2 | 4 | 24 | 4 | 6 | 31 | 1 |

**Figure 8-3. MSW generation t/D based on Land Use**

Waste generation in the rural areas of Lakki Marwat District is steadily increasing in line with population growth across all tehsils. By 2025, rural areas collectively generate approximately 312 tons per day, which amounts to 113,835 tons annually. This includes contributions from Lakki Marwat Tehsil, Sarai Naurang, Ghazni Khel, and Bettani, with each area experiencing a noticeable increase in daily waste due to the expansion of residential settlements and related activities. By 2045, the total rural waste generation is projected to reach 608 tons per day, equaling 221,867 tons annually. This continuous rise underscores the urgent need to enhance waste management infrastructure in rural regions, enabling them to handle increasing waste volumes effectively and sustainably over the coming years.

Table 8-4: Population vs Waste Generation Trends in Rural Areas

| Rural Tehsils | Lakki Marwat | | Serai Naurang | | Ghazni Khel | | Bettani | |
|---------------|--------------|-----|---------------|-----|-------------|-----|------------|----|
| | Population | WG | Population | WG | Population | WG | Population | WG |
| 2017 | 222,772 | 71 | 245,026 | 78 | 260,491 | 83 | 26,359 | 8 |
| 2025 | 276,984 | 89 | 327,673 | 105 | 323,884 | 104 | 46,074 | 15 |
| 2030 | 317,377 | 102 | 392,950 | 126 | 371,114 | 119 | 65,319 | 21 |
| 2035 | 363,659 | 116 | 471,226 | 151 | 425,233 | 136 | 92,601 | 30 |
| 2040 | 416,691 | 133 | 565,098 | 181 | 487,244 | 156 | 131,281 | 42 |
| 2045 | 477,457 | 153 | 677,671 | 217 | 558,300 | 179 | 186,117 | 60 |

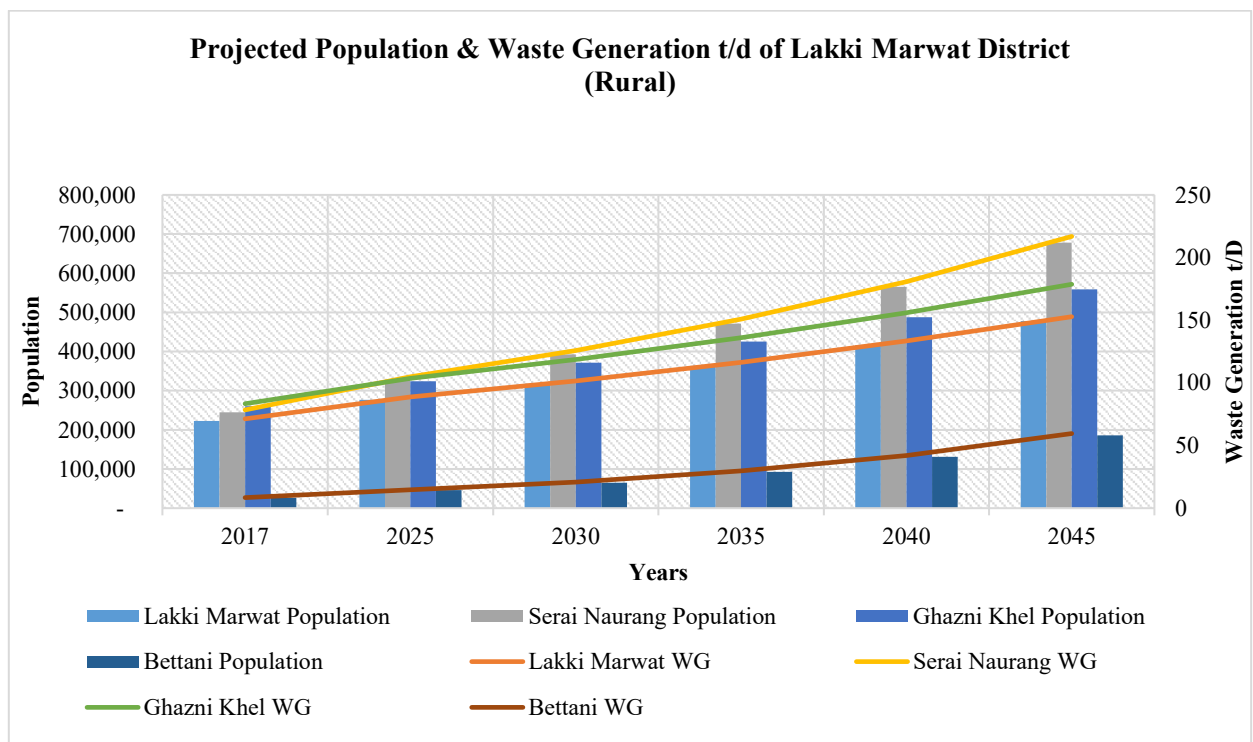


Figure 8-4. Graphical Representation of Population vs Waste Generation T/D (Rural)

8.2 Proposed Solid Waste Management Plan

A comprehensive Solid Waste Management (SWM) system is crucial for addressing waste management challenges in the urban areas of Lakki Marwat. The plan, designed from 2025 to 2045, aims to transform current waste management practices into a more efficient and advanced system. This long-term strategy focuses on waste collection from households, commercial establishments, institutions, offices, public spaces, and parks, ensuring proper storage in containers and environmentally safe transportation to controlled dumpsites, unlike the existing practice of open dumping.

The proposed SWM system for Lakki Marwat's urban areas will consist of four major components:

- Primary & Secondary collection system
- Waste Transportation
- Final Disposal

This system will identify the necessary resources and infrastructure required to manage solid waste in the Lakki Marwat district for the next 20 years, aiming to modernize the operations and enhance the efficiency of SWM practices.

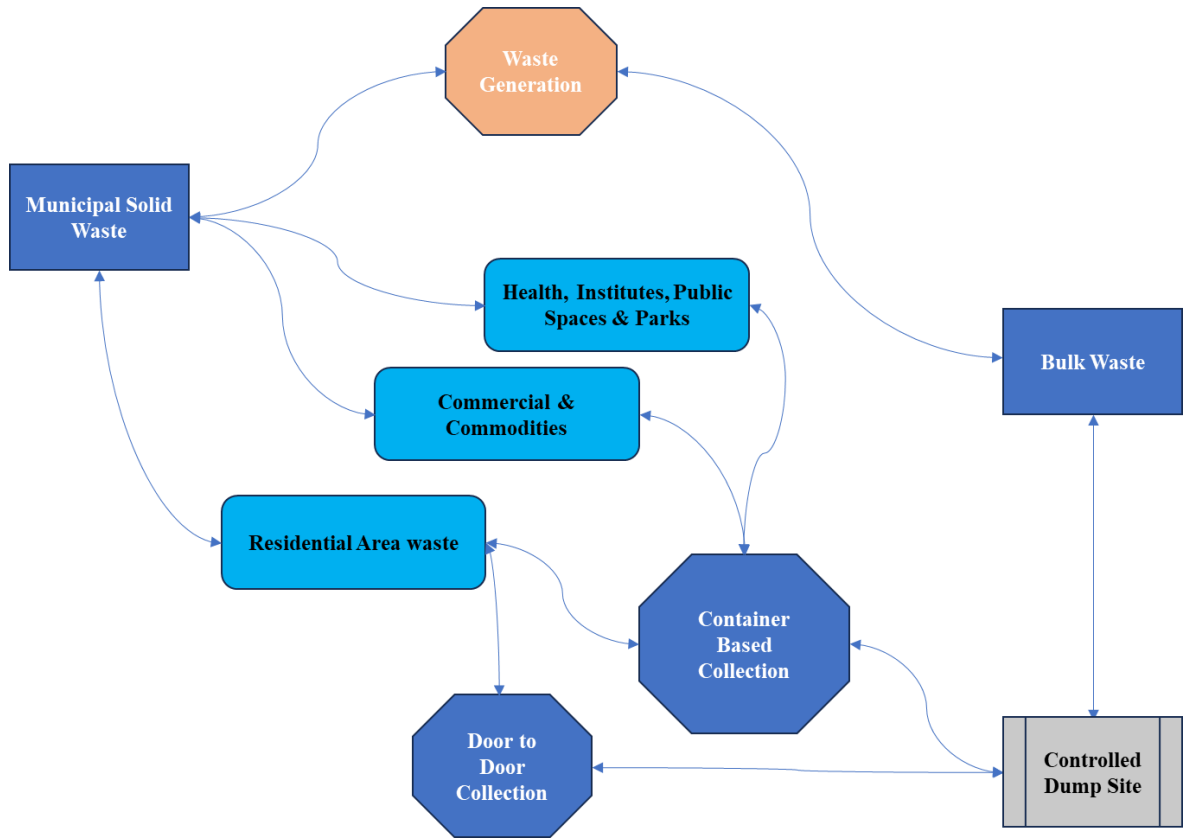


Figure 8-5: Proposed Waste Management Model for Lakki Marwat (Urban)

8.2.1 Design Standards and Criteria

Service level benchmarks have been established based on key performance indicators (KPIs). These KPIs encompass service delivery, operational efficiency, institutional strength, and financial sustainability. The present study identifies specific indicators to assess Solid Waste Management (SWM) services, along with their current status and targeted improvements. The objectives for outsourcing SWM services have also been outlined to ensure better performance over time.

Table 8-5: Service Delivery Indicators

| Service Delivery Indicators | Current Status (Baseline) | Target (2026) | Target (2028) | Target (2030) | Target (2035) |
|--|--|-------------------------------|--|--|--|
| Household-level waste collection (door-to-door service) | 10% covered under door-to-door collection through Hand carts | 30% coverage in planned areas | 50% coverage in planned areas | 70% coverage in planned areas | 90% coverage in planned areas |
| Collection Efficiency (Percentage of waste transported to the final disposal site) | 30% collection efficiency | 50% efficiency | 60% efficiency | 85% efficiency | 90% efficiency |
| Mechanical Sweeping Coverage | 5km | 15 km | Expansion as per infrastructure improvements | Expansion as per infrastructure improvements | Expansion as per infrastructure improvements |

To effectively plan a Solid Waste Management (SWM) system for any area, it is crucial to analyze its existing infrastructure, socio-economic conditions, available development resources, and topographical characteristics. The Urban Unit team conducted field visits across the Lakki Marwat urban area and tehsils to evaluate the specific needs and requirements for the proposed SWM system.

Table 8-6: System Indicators

| System Parameter | Existing System | Proposed System |
|-----------------------------|---|--|
| Street Sweeping | Conducted irregularly without a fixed schedule | Daily sweeping, litter clearance, and organized waste collection from households and shops |
| Waste Containment | Waste is dumped in open heaps and transferred to collection points, causing health and environmental hazards. | Introduction of hand carts and waste containers . Urban/rural areas will have 0.8m³ waste containers . |
| Waste Transportation | Waste is transported in open vehicles, leading to pollution and health risks | Garbage compactors and Arm roll vehicles of various capacities, according to requirements , will be used in urban areas to ensure safer and more hygienic waste transportation. While in Urban areas waste will be collected and transported by using tractor trolleys, dumpers, mini dumpers with hydraulic lifting, and loader models will be proposed. |
| Waste Disposal | Waste is disposed of in open disposal sites in an uncontrolled manner | Controlled dumpsites are proposed in Urban areas for safer waste disposal and leachate management. |

For the Lakki Marwat urban area, various parameters have been gathered from secondary data sources, validated through field surveys, and analyzed using statistical models to project future requirements. The proposed Solid Waste Management (SWM) system has been designed considering the following key factors:

- Projected population growth to estimate future waste management needs.
- Waste generation trends across different zones of the urban Tehsils.
- Area classification based on demographics and land use characteristics.

8.2.2 Operational Design Modules:

The operational design for the Lakki Marwat urban area integrates various waste streams into the main waste collection system. Key modules are outlined below:

Table 8-7: Operational Design Modules for Lakki Marwat Urban Area

| Modules | Description | Methodology |
|------------------------|---------------------------------------|--|
| Design Module I | Door-to-Door (D.t.D) Waste Collection | Collection using Handcarts with waste emptied into mini dumpers or in containers placed at main roads /streets |

| | | |
|--------------------------|---|---|
| Design Module II | Container-Based Collection | Waste is collected from containers (0.8 m ³) using compactors. |
| Design Module III | Commercial Waste Collection | Containers 0.8m ³ in commercial areas were emptied using Mini tippers modified with a hydraulic jack. This design was modified by considering local circumstances and the small amount of waste generated from scattered commercial areas. |
| Design Module IV | Waste from Health, Edu, Industry & Amenities | Waste from healthcare units, Edu, Industry & bus stands, sports facilities, is collected using a mini dumper with hydraulic lifting from (0.8 m ³) containers. |
| Design Module V | Manual Sweeping | Workers deployed based on population ratio (1 worker per 900 population for urban areas, 1 worker per 1400 population for rural areas). |
| Design Module VI | Bulk Waste Collection (Green Waste, Debris, Desilted Waste) | Collection using Front End loader, and Dumper 5 m ³ in Lakki Marwat, while in other tehsils, Tractor Trolley and Tractor loader are proposed. |
| Design Module VII | Mechanical Sweeping and Washing | Main roads were cleaned using mechanical sweepers (4 m ³ capacity) for the urban area as per requirement. |

8.2.3 Basic Principles and Standards Used:

The Solid Waste Management (SWM) system in the Lakki Marwat urban area has been designed to focus on economic feasibility, social impact, environmental sustainability, and equitable service delivery. The key design standards for SWM operations are outlined below:

Table 8-8: Design Standards

| Sr. No. | Activity | Standards |
|---------|-------------------------------|---|
| 1 | Waste Storage Containers | <ul style="list-style-type: none"> 0.8m³ containers compatible with garbage compactors. |
| 2 | Door-to-Door Waste Collection | <ul style="list-style-type: none"> Handcarts and Mini Tipper/Dumber (1m³) for household waste collection, preventing littering, collecting waste bags from streets, and lifting sludge. Garbage compactors (7m³) for planned areas. |
| 3 | Mechanical Sweeping | Mechanical sweepers will cover 10-15 km of road length daily. |
| 4 | Waste Transportation | <ul style="list-style-type: none"> Three trips per day to the landfill by 7m³ compactors. Two trips per day by Dumper 5m³ and also used Tractor Loader. Chain Arm roll Vehicles compatible with 5m³ Containers in Lakki Marwat. |
| 5 | Manual Sweeping Standard. | Each sanitary worker will cover 800 meters per day |
| 6 | Sanitation Workforce | One worker will be allocated per 900 residents in Urban while in rural one worker is allocated on 1400 persons. |

8.2.4 Proposed Waste Handling Design/ Scheme

Based on a thorough assessment of sanitation operations, administrative jurisdiction of Lakki Marwat Municipal Corporation, and existing waste management infrastructure, including transfer stations (Waste transfer station is not proposed for urban area due to small amount of generated waste but for rural areas it is proposed in case of transfer distance exceed 15km from city center and landfill sites, the following recommendations are proposed for improving MSW handling in Lakki Marwat urban area:

- The MSW generated from residential, commercial, and institutional sectors has been analysed based on tonnage estimates
- Waste collection varies by area: mini dumpers (1 m³), compactors (7 m³), and Chain Arm roll vehicles 5m³ will be utilized for waste collection from residential and commercial centers, and 0.8m³ containers support waste storage. The machinery at the controlled dumpsite will do the final disposal.

A new controlled dumpsite is proposed in the Urban areas of the Lakki Marwat district, as it will serve as a cost-effective solution. The site area is calculated in this report, which will accommodate waste disposal for the next 20 years.



Figure 8-6. Solid Waste Management System for Lakki Marwat Urban Tehsils

Lakki Marwat District’s rural tehsils, with a combined population of approximately 974,615 and 123,402 households, generate an estimated 312 tons of waste daily. Of this, around 271 tons are municipal solid waste (MSW), while 41 tons consist of bulk waste. These figures highlight the pressing need for a structured and context-sensitive solid waste management system.

Rural areas in Lakki Marwat, including Sarai Naurang, Ghazni Khel, and Bettani Tehsils, face significant challenges such as poor road infrastructure, dispersed populations, and limited formal waste collection and disposal mechanisms. Given these constraints, a community-driven and adaptive approach is essential. Establishing small-scale transfer stations, promoting waste segregation at the

source, and involving local communities in waste management activities can help improve sanitation and reduce environmental and public health risks.

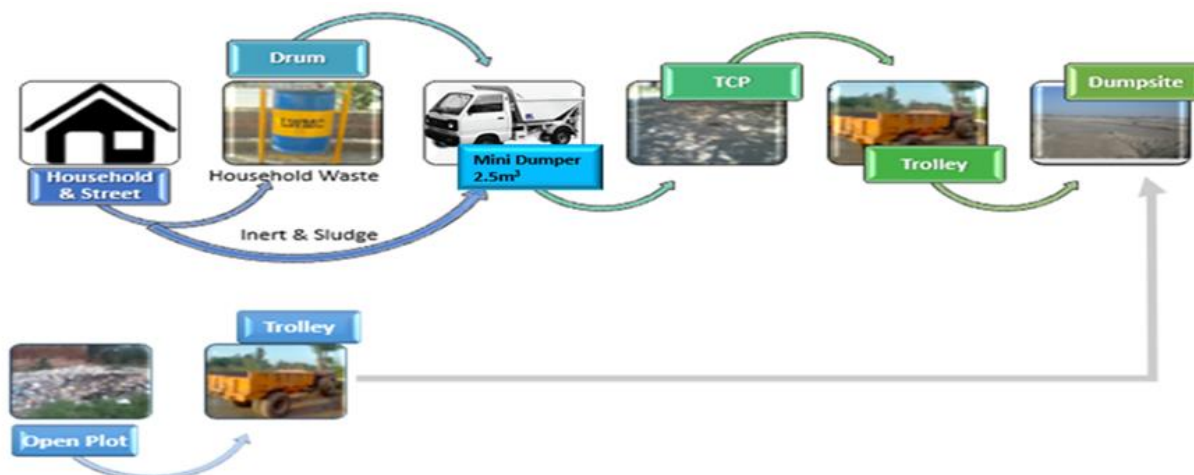


Figure 8-7: Solid Waste Management System for Rural Tehsils of District Lakki Marwat

Hand carts and Mini Dumpers (2.5m³) will be used for door-to-door waste collection twice a week, particularly in villages where narrow streets prevent access by larger vehicles.

- **Tractor Trolleys** will be deployed to lift waste from open plots and temporary collection points, facilitating easy disposal for rural households.
- **Small-scale Dumpers (10m³) and loaders** will transport waste from these designated spots to transfer stations located at accessible points in each tehsil.
- **Front-end Loaders** will be used to move bulk waste efficiently, ensuring transportation to final disposal sites without overburdening smaller collection vehicles.

This rural-focused waste management strategy is designed to improve cleanliness, reduce health risks, and ensure sustainable waste disposal across the rural tehsils of Lakki Marwat District, including Serai Naurang, Ghazni Khel, and Bettani Tehsil. The initiative aims to enhance overall living conditions and support environmental protection in these areas.

8.3 Modes of Solid Waste Collection, Haulage, and Way Forward (Urban-Tehsil)

8.3.1 Primary Waste Collection:

The proposed primary waste collection system for District Lakki Marwat aims to establish an efficient and sustainable mechanism under the supervision of respective Tehsil Municipal Administrations (TMAs). In residential areas, waste will be collected through a **door-to-door system using handcarts (HCs)** operated by sanitary workers to ensure 100% household coverage and prevent open dumping. In **commercial zones**, a **Container-Based Collection (CBC)** system will continue, utilizing **mini dumpers (1 m³)** with hydraulic lifters for quick and hygienic waste handling.

For **bulk waste** from open plots, roadsides, and public spaces, **front-end loaders and loader tractors** will be used to transport waste to designated collection points or dumpsites. To strengthen operations, the proposal includes the **procurement of new machinery** such as handcarts, mini dumpers, and compactors (7 m³), along with **capacity building and awareness programs** for sanitary staff and communities.

Overall, the proposed system focuses on achieving **100% waste collection coverage**, improving operational efficiency, and ensuring environmentally sound waste management to enhance cleanliness and safeguard public health across all urban tehsils of Lakki Marwat District.

Table 8-9: Proposed Modes for Primary Waste Collection

| Lakki Marwat Urban Tehsils | Residential Waste (Ton/Day) (D.t.D Waste Collection) | Residential Waste (Ton/Day) (C.B.C Waste Collection) | Proposed Waste Collection Mode | Commercial Waste (Ton/Day) (C.B.C Waste Collection) | Proposed Waste Collection Mode | Way Forward |
|----------------------------|--|--|--|---|--|------------------------------|
| Lakki Marwat | 3 | 25 | Container-based and hand carts are provided to pick up waste from households & Transfer to the Dumpsite by mini dumpers (1 m ³) and Compactor (7m ³) | 1 | CBC via Mini Dumper with hydraulic lifting (1 m ³) | Procurement of new machinery |
| Landiwa | 0 | 4 | | 0 | | |
| Serai Naurang | 2 | 17 | | 1 | | |
| Ghazni Khel | 0 | 1 | | 0 | | |
| Pezu | 0 | 2 | | 1 | | |
| Tajori | 0 | 2 | | 0 | | |
| Tajazai | 0 | 3 | | 0 | | |
| Total | 5 | 54 | 106 | 3 | 100% | |
| | 10% | 90% | 100% | 100% | 100% | |

8.3.2 Secondary Waste Collection:

Lakki Marwat's urban tehsils are currently grappling with unregulated waste disposal practices, largely due to the absence of a formal transfer station. Waste is often dumped in open plots, along roadsides, or in unmanaged heaps, creating significant environmental and public health concerns. The lack of a structured secondary collection and transfer system further undermines efficient waste management. To address this, a strategy is proposed wherein waste will be transported directly from collection points to controlled dumpsites, bypassing the need for a transfer station in urban areas. Moreover, bulk, debris, and construction & demolition (C&D) waste will be reused for road construction and site development. To strengthen operations, TMA Lakki Marwat will invest in modern waste collection and haulage machinery, enhancing efficiency, minimizing pollution, and ensuring a cleaner, more sustainable urban environment.

Table 8-10: Proposed Modes for Secondary Waste Collection in the Lakki Marwat Urban Area

| Intermediate Facilities | Way forward |
|---|--|
| Collection Points/Containers | By TMA Lakki Marwat |
| Waste from Containers | Containers lifted by Compactors (7m ³), arm roll 5m ³ . and Mini dumper (1m ³) to the Controlled Dumpsite |
| Bulk/ Debris/ C&D Waste | Utilization for road infrastructure at the disposal facility or open plots |
| Resources for Secondary Waste Collection & Haulage at Disposal Facility | Procurement of Machinery by TMA Lakki Marwat |

8.3.3 Machinery/ Fleet Required for Waste Handling

The summary of the total resources required to perform waste collection from the urban tehsil is calculated and explained in the Table below

Table 8-11: Summary of total proposed resources for the Lakki Marwat urban area

| SN | Heterogeneous Fleet | Lakki Marwat | Landiwa | Serai Naurang | Ghazni Khel | Pezu | Tajori | Tajazai | Total Qty. |
|----|---------------------|--------------|---------|---------------|-------------|------|--------|---------|------------|
| 1 | Compactor 7cum | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 5 |
| 2 | Mini Tipper 1cum | 3 | 1 | 2 | 1 | 3 | 1 | 2 | 13 |
| 3 | T Loader (4*4) | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 3 |
| 4 | Front End Loader | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 5 | Dumper 5cum | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 6 | Container 0.8cum | 127 | 23 | 99 | 7 | 17 | 12 | 18 | 303 |
| 7 | Trolleys | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 3 |
| 8 | Mech Sweeper 4 m3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 9 | Drivers | 8 | 4 | 7 | 1 | 5 | 1 | 4 | 30 |
| 10 | Helpers | 12 | 5 | 10 | 2 | 6 | 2 | 4 | 40 |
| 11 | Workers | 88 | 18 | 69 | 6 | 10 | 9 | 13 | 213 |

8.3.4 Container-Based Collection (CBC):

The Container-Based Collection (CBC) system offers a more efficient and convenient approach for municipalities by providing communal storage bins or containers that are easily accessible for residents to dispose of waste. The proposed resources required to manage 49 tons per day of waste through the CBC system are outlined in the following table;

Table 8-12: Container-Based Collection in the Lakki Marwat Urban Area

| Waste Category | Resources | Lakki Marwat | Landiwa | Serai Naurang | Ghazni Khel | Pezu | Tajori | Tajazai | Total Fleet |
|----------------|------------------|--------------|---------|---------------|-------------|------|--------|---------|-------------|
| CBC | Compactor 7cum | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 4 |
| | Mini Tipper 1cum | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 4 |
| | Container 0.8cum | 111 | 18 | 76 | 4 | 9 | 9 | 13 | 240 |
| | Handcarts | 44 | 9 | 34 | 3 | 5 | 5 | 6 | 106 |
| | Drivers | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 8 |
| | Helpers | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 16 |
| | Workers | 88 | 18 | 69 | 6 | 10 | 9 | 13 | 213 |



Figure 8-8: Container-Based Collection in Lakki Marwat Urban Area

8.3.5 Door-to-Door with Mini Dumpers

A Door-to-Door (D.t.D) collection system using hand carts is proposed to collect 5 tons/day of waste from the populated residential areas of Lakki Marwat urban tehsils. This system is tailored to the local context, taking into account the city's road infrastructure, socio-economic conditions, and the presence of congested, mountainous urban pockets. To ensure efficient waste collection, the plan includes the deployment of 106 hand carts and a workforce of 213 sanitary workers. Waste will be collected directly from households using hand carts and then transferred to 1m³ mini dumpers and 0.8m³ containers, establishing a structured and effective solid waste management system across the tehsils.

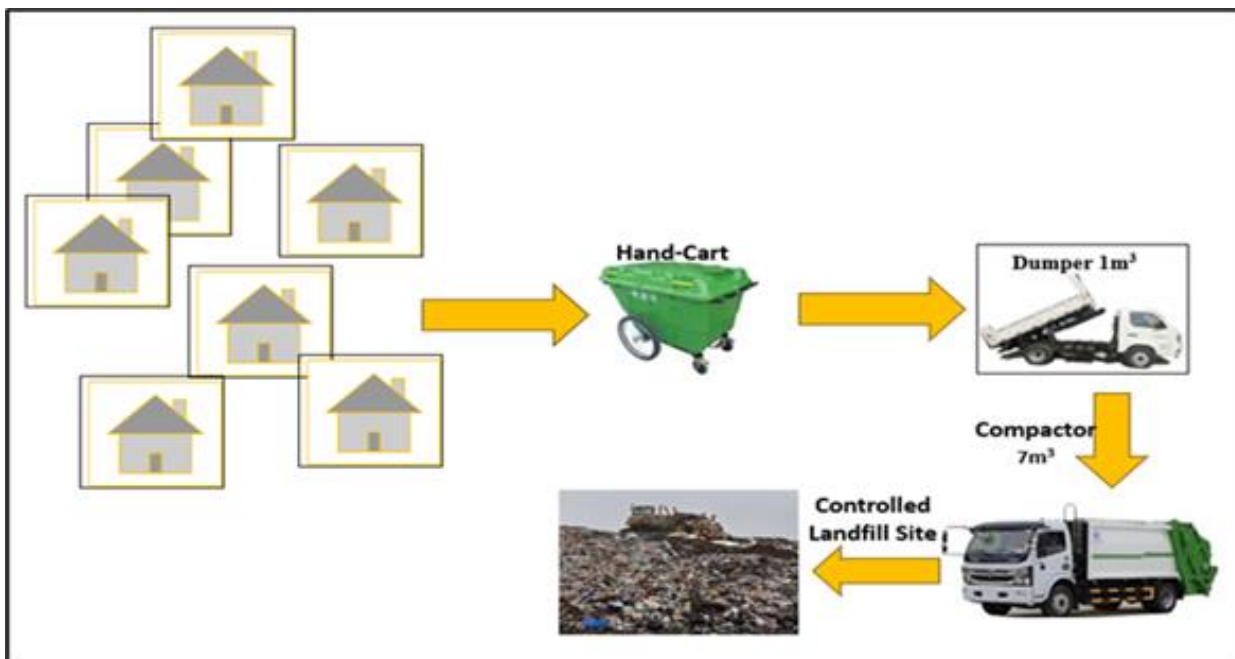


Figure 8-9: Door-to-Door Collection Modes in the Lakki Marwat Urban Area

8.3.6 Commercial Waste Collection

The commercial areas of Lakki Marwat urban tehsils generate a considerable amount of waste, requiring a robust and efficient collection and disposal system. To address this, a Container-Based Collection (CBC) model utilizing Mini Tippers with hydraulic lifting systems is proposed to ensure 100% coverage of commercial zones and markets. This system, customized to suit Lakki Marwat’s urban dynamics and informed by global best practices, will involve 0.8m³ containers emptied by 1m³ mini dumpers equipped with container lifter arms. The initiative aims to improve overall waste handling, enhance the city's visual appeal, reduce informal scavenging, and support greater recovery of recyclable materials. The proposed resources for commercial waste collection are detailed in the table below;

Table 8-13: Modes for Commercial Waste Collection of the Lakki Marwat urban area

| Waste Category | Resources | Lakki Marwat | Landiwa | Serai Naurang | Ghazni Khel | Pez u | Tajori | Tajazai | Total Fleet |
|------------------------|--------------------------------|--------------|---------|---------------|-------------|-------|--------|---------|-------------|
| Commercial & Commodity | Mini Tipper Cum Compactor 1cum | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 3 |
| | Container 0.8cum | 4 | 2 | 4 | 1 | 2 | 1 | 2 | 16 |
| | Drivers | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 3 |
| | Helpers | 2 | 0 | 2 | 0 | 2 | 0 | 0 | 6 |



Figure 8-10: Proposed resources for commercial Area waste collection mode

8.3.7 Health, & Educational Institutions, Industry & Amenities:

Municipal Solid Waste (MSW) generation in Lakki Marwat urban tehsils from health and educational institutions, industries, and civic amenities amounts to approximately 11 tons per day. This waste stream includes a diverse mix of food waste, packaging materials, plastic bags, bottles, paper, and general litter. The institutional buildings, such as offices, educational and healthcare facilities, and government establishments, are the key contributors to this category of waste, significantly adding to the urban waste burden.

To address this, a structured collection and disposal system has been proposed, involving 1m³ mini tipper cum compactors, 7m³ compactors, and 0.8m³ containers, supported by trained drivers and helpers tailored to each urban tehsil's needs. The system has been planned for Lakki Marwat, Sarai Naurang, Landiwa, Tajori, & Tajazai while Pezu, and Ghazni Khel do not require additional resources for this category.

This initiative will streamline institutional waste handling, reduce environmental and public health risks, and enhance the overall sanitation of urban Lakki Marwat. The detailed resource allocation is summarized in the table below:

Table 8-14: Proposed resources for Institutional & Industrial Areas Waste collection mode

| Waste Category | Resources | Lakki Marwat | Landiwa | Serai Naurang | Ghazni Khel | Pezu | Tajori | Tajazai | Total Fleet |
|---|--------------------------------|--------------|---------|---------------|-------------|------|--------|---------|-------------|
| Health, Edu, Industry & Civic Amenities | Mini tipper Cum Compactor 1cum | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 4 |
| | Compactor 7cum | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | Container 0.8cum | 12 | 3 | 19 | 2 | 6 | 2 | 3 | 47 |
| | Drivers | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 5 |
| | Helpers | 2 | 2 | 2 | 0 | 2 | 0 | 2 | 10 |

8.3.8 Bulk Waste Collection and Handling:

Managing bulky construction and demolition (C&D) waste is a growing need in Lakki Marwat's urban areas as they develop and transform. With an estimated 11 tons per day of debris and bulk waste being generated, it's essential to handle this separately from regular household waste to ensure cleaner streets and a healthier environment.

To address bulk waste management, a dedicated collection system is being implemented. In both Lakki Marwat and Serai Naurang urban Tehsil, one 5m³ dumper and one front-end loader will be deployed in each tehsil to collect and transport waste from renovation and development sites. In the remaining urban tehsils, tractor trolleys and tractor loaders will be provided to meet local requirements. Tajori & Ghazni Khel, with a population of fewer than 1,000, will not have any vehicles or machinery proposed for this category.

The overall fleet includes 2 dumpers, 3 trolleys, 2 front-end loaders, 3 tractor loaders 10 drivers, and 2 helpers, ensuring a well-coordinated system that keeps pace with urban growth while supporting sustainable and responsible waste management.

Table 8-15: Proposed resources for the Bulk waste collection mode

| Waste Category | Resources | Lakki Marwat | Landiwa | Serai Naurang | Ghazni Khel | Pezu | Tajori | Tajazai | Total Fleet |
|----------------|------------------|--------------|---------|---------------|-------------|------|--------|---------|-------------|
| Bulk | Dumper 5cum | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| | Trolleys | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 3 |
| | Front End Loader | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| | Tractor Loader | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 3 |
| | Drivers | 2 | 2 | 3 | 0 | 2 | 0 | 1 | 10 |
| | Helpers | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |

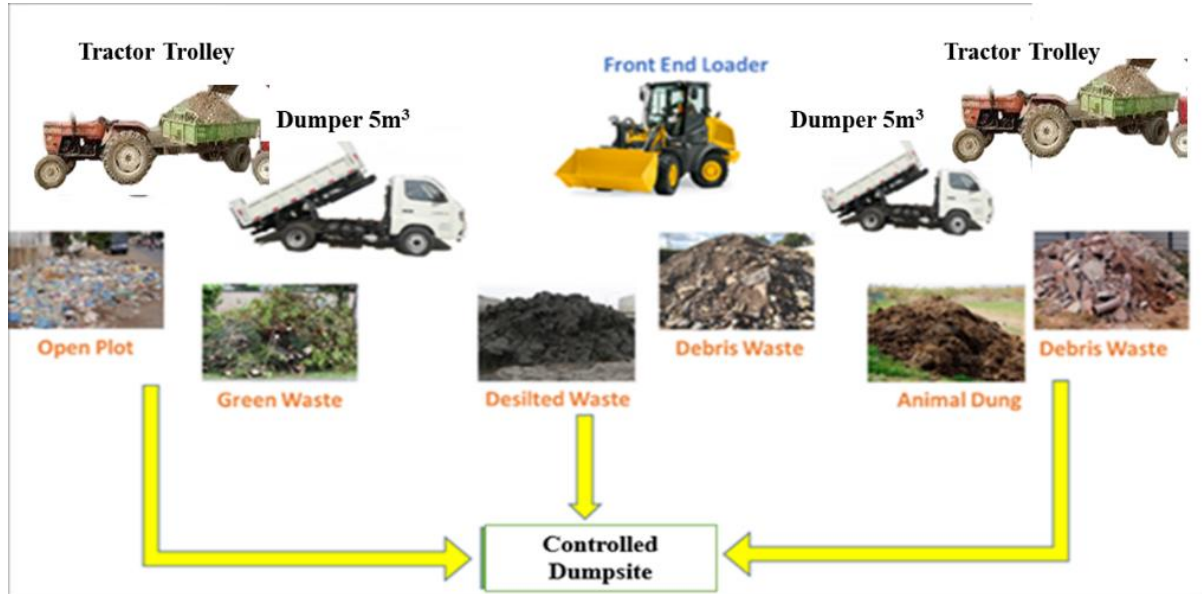


Figure 8-11. Modes for Bulk Waste Collection

8.3.9 Mechanical Sweeping & Washing:

Advancements in technology have brought forward highly efficient mechanical sweeping machines that are quieter, more economical, and environmentally friendly. The integration of such equipment in Lakki Marwat is expected to significantly reduce dependency on general labor while creating opportunities for skilled personnel, like trained drivers and street sweepers.

Table 8-16: Proposed resources for the Bulk waste collection mode

| Waste Category | Resources | Lakki Marwat | Landiwa | Serai Naurang | Ghazni Khel | Pezu | Tajori | Tajazai | Total Fleet |
|-------------------------------|------------------|--------------|---------|---------------|-------------|------|--------|---------|-------------|
| Mechanical Sweeping & Washing | Mech Sweeper 4m3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| | Drivers | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| | Helpers | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |

Considering the climatic conditions of Lakki Marwat, mechanical sweeping is proposed for major roads on alternate days. Additionally, urban infrastructure, marketplaces, and footpaths will be washed weekly, if recommended. This integrated approach aims to significantly enhance sanitation standards and promote improved urban hygiene across Lakki Marwat.



Figure 8-12: Mechanical Sweeping and Road Washing in the Lakki Marwat urban area

8.3.10 Manpower & Manual Sweeping Operation

In Lakki Marwat urban and its rural tehsils, solid waste management relies heavily on manual labor, with workers involved in waste collection, transfer, and disposal. However, a lack of proper training on equipment uses, maintenance, and health risks poses challenges. Inefficiencies arise due to limited coordination among local authorities, affecting waste management operations. The required number of sanitary workers is based on a standard ratio of one worker per 900 residents. Given Lakki Marwat's developing status, manual sweeping with basic tools like brooms, shovels, and hand carts remains essential, particularly in residential areas. However, improper waste disposal by residents, due to weak enforcement and cultural habits, contributes to unclean streets. Daily manual sweeping is necessary to maintain cleanliness, but resource limitations hinder effective implementation. The resources offered for manual sweeping mode in Lakki Marwat Urban tehsils are given here in the Table below;

Table 8-17: HR & Machinery Proposed for the Lakki Marwat urban area

| Waste Category | Resources | Lakki Marwat | Landiwa | Serai Naurang | Ghazni Khel | Pezu | Tajori | Tajazai | Total Fleet |
|-----------------|-----------|--------------|---------|---------------|-------------|------|--------|---------|-------------|
| Manual Sweeping | Handcarts | 44 | 9 | 34 | 3 | 5 | 5 | 6 | 106 |
| | Workers | 88 | 18 | 69 | 6 | 10 | 9 | 13 | 213 |

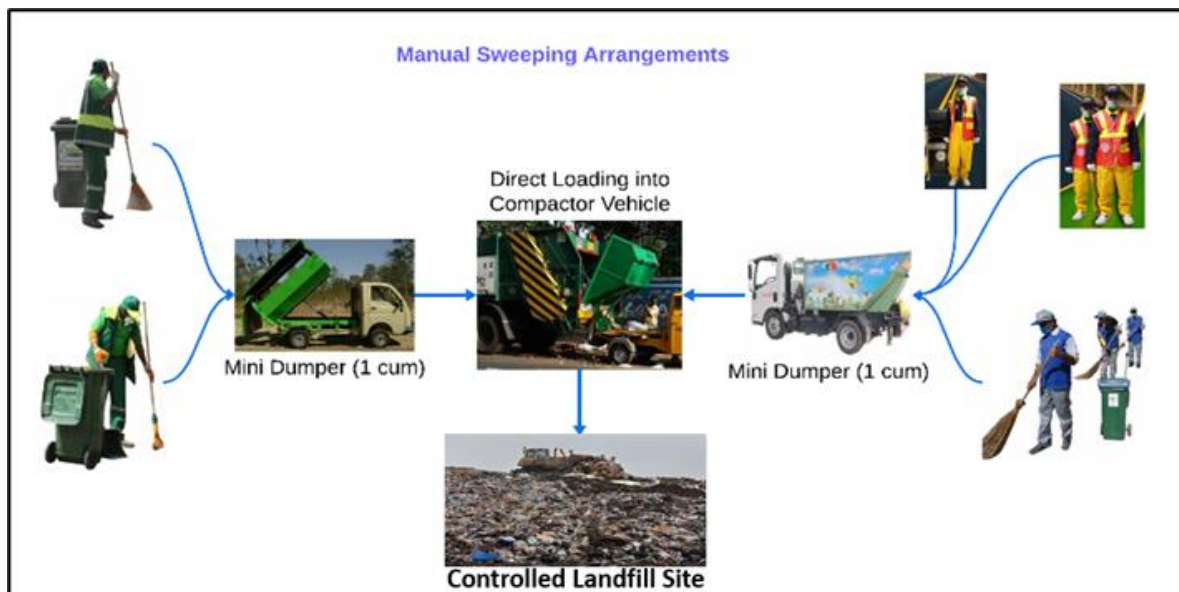


Figure 8-13: Pictorial Representation of Manual Sweeping

8.3.11 Working Hours:

Government offices typically operate for 8 hours per day, and the TMAs of tehsils within the district maintain this standard, working hours schedule. In the proposed system, these working hours will remain unchanged; however, various task teams may operate in two shifts to improve efficiency. For example, street sweeping may be conducted early in the morning, while mechanical washing takes place during the night shift.

8.3.12 Digital Monitoring of the Operations

It is proposed that the Lakki Marwat TMAs of the tehsils install tracking devices and Radio Frequency Identification (RFID) cards on all compactors, mini dumpers, dumpers, mechanical sweepers, and washer vehicles. This initiative aims to enable real-time online monitoring of the fleet in the field and track the number of trips to the dumping site. The monitoring system will enhance transparency in waste collection by comparing the collected tonnage with the fuel issued for operations. Additionally, the attendance of field staff is proposed to be recorded through an Android application to ensure accountability and efficiency. The cost of the IT-based monitoring system is included in the cost estimate section.

8.3.13 Drain Cleaning

The TMAs of Lakki Marwat tehsils are responsible for cleaning drains and sewers. Currently, the removed sludge is often left along roadsides for extended periods. Within the urban limits, numerous smaller drains fall under the maintenance of the TMAs, along with multiple open drains.

It is proposed that a dedicated drain cleaning team be deployed in urban areas, with manpower allocated based on population density and drain length. The team should follow a structured, year-round desilting schedule, ensuring each drain is cleaned at least once per quarter.

8.3.14 Controlled Landfill Site Selection and Demarcation for Urban Centers

Effective and sustainable solid-waste management in Lakki Marwat District calls for the careful selection of controlled landfill sites, in line with World Bank guidelines, and taking both environmental and social issues into account. To this end, the site-selection study employed GIS analysis complemented by field visits within the district to support an integrated solid-waste-management plan.

The planning process incorporated environmental, technical, and socio-economic parameters to ensure minimal adverse impacts and durability of service over a 15- to 25-year horizon. It is noted that different studies apply a variety of criteria to site selection, largely because standards must be adapted to regional and facility-specific conditions.

The following are the various factors that are kept in focus during landfill site selection;

- **Airports:** If a landfill is located within a specified distance of an airport, the owner or operator must demonstrate that the Landfill will not present a bird hazard to aircraft. The minimum acceptable distance of the Landfill from the airport is 5 to 8 km.
- **Flood plains:** For landfills located on a 100-year flood plain, the owner or operator must demonstrate that the Landfill will not restrict the flow of a 100-year flood, reduce the storage capacity of the flood plain, or result in the washout of solid waste.
- **Wetlands:** New landfills and lateral expansions can only be located in wetlands with no practical alternative.
- **Fault areas:** New landfills and lateral expansions must not be located within 200 feet of a fault area.
- **Seismic zones:** New landfills and lateral expansions are restricted in areas susceptible to ground motion resulting from earthquakes.
- **Unstable areas:** Unless it can be demonstrated otherwise, landfills must not be located in areas susceptible to natural or human-induced events or forces capable of impairing the integrity of landfill components. Examples of unstable areas are those with poor foundation conditions, areas susceptible to mass movements (landslides, rock falls, etc.), and areas with karst terrains (sinkholes).
- **Sensitive land uses (schools, religious sites):** Minimum 1 km setback.
- **Road access:** Within 10–15 km of waste generation centers, connected by all-weather roads.
- **Land ownership/cost:** Preference for government or low-cost land to ensure economic feasibility. It is suggested to confirm the proposed landfill site's ownership status. If it is government-owned, it is feasible, but if the land is private, then the land acquisition process is required to be conducted.
- **Water bodies:** Minimum 500 m distance to prevent contamination risks.

These criteria were mapped as spatial layers in the ArcGIS environment, which enabled a systematic screening of potential sites. The final locations were selected based on their ability to satisfy all these conditions while also ensuring efficient transport logistics, environmental safety, and cost-effectiveness.

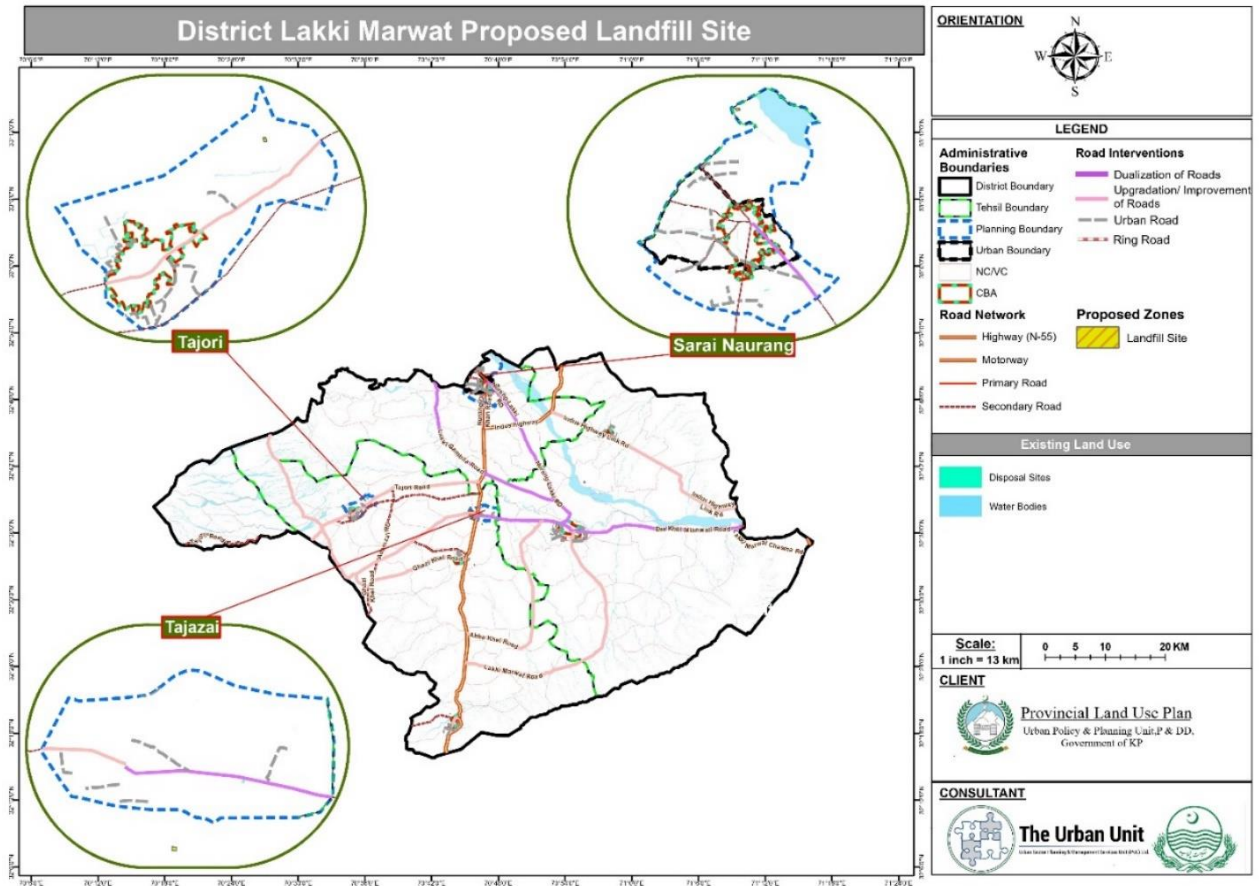
For the best site selection of the proposed controlled landfill sites for each urban area, along with the required land area based on projected waste generation over the planning period. The proposed landfill site summary is explained in a tabular form below:

Table 8-18: Summary of Proposed Landfill Sites for Lakki Marwat District

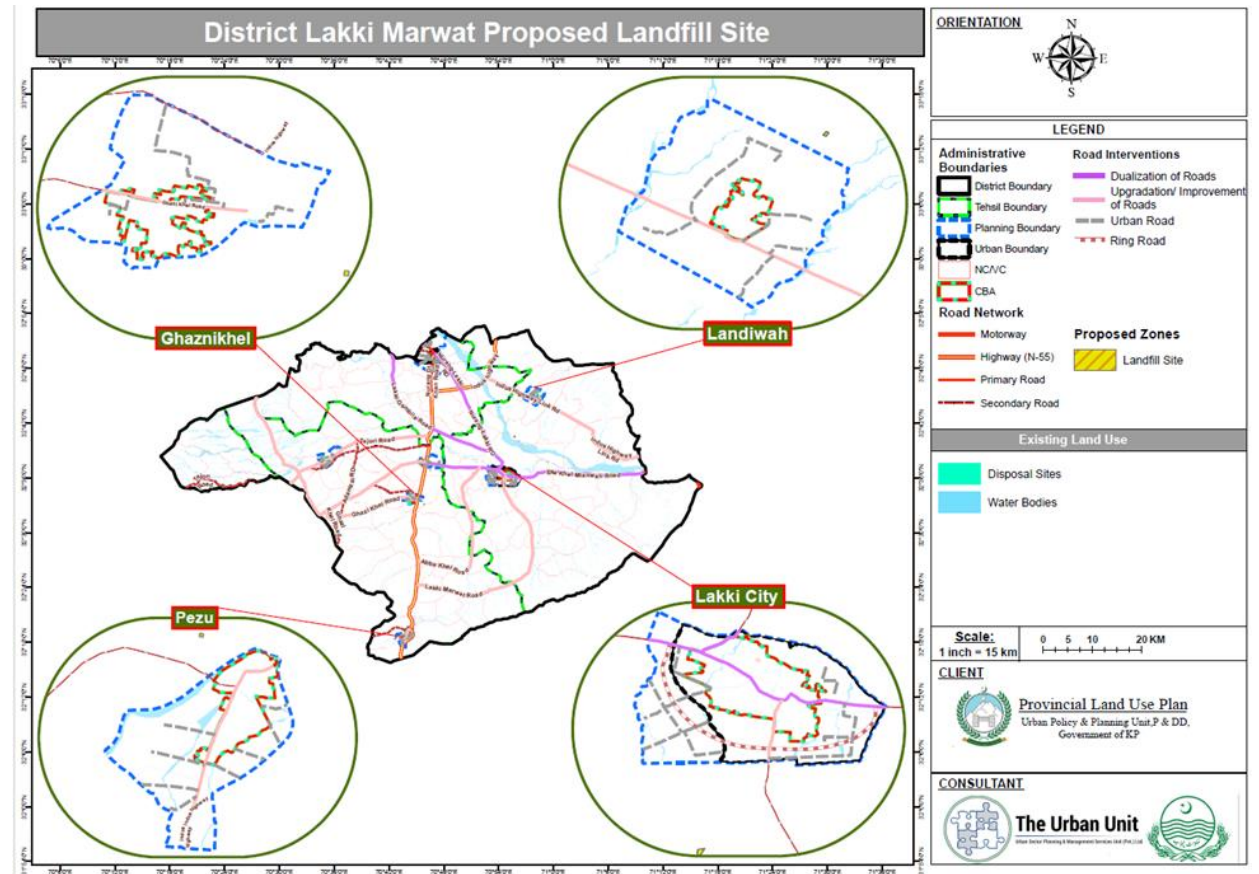
| Tehsil | Urban Area | Waste Generated (t/d) | Landfill Area-proposed (Acre) | Distance from city center (km) | Inside/Outside the Boundary |
|--------------|--------------|-----------------------|-------------------------------|--------------------------------|-----------------------------|
| Lakki Marwat | Lakki Marwat | 36 | 5 | 4.3 | outside |
| | Landiwa | 7 | 1 | 1.8 | outside |
| | Ghazni Khel | 2 | 1 | 2.5 | outside |

Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | |
|------------------|---------------|----|---|-----|---------|
| Ghazni Khel | Pezu | 4 | 1 | 1.7 | outside |
| | Tajori | 4 | 1 | - | Inside |
| | Tajazai | 5 | 1 | 1.6 | outside |
| Sarai Naurang | Sarai Naurang | 28 | 3 | - | Inside |



Map 8-1: Proposed Landfill Site Demarcation of Sarai Naurang, Tajazai & Tajori



Map 8-2: Landfill site demarcation of Lakki City, Landiwa, Ghazni Khel and Pezu

8.3.14.1 Lakki Marwat Urban Area (Lakki Marwat Tehsil)

Lakki City, the primary urban center of **Lakki Marwat Tehsil**, generates approximately **36 tons of solid waste per day**. To accommodate this quantity, a **5-acre landfill site** has been proposed **outside the urban boundary**, located **4.3 kilometers from the city center**. The site was selected based on GIS-based spatial analysis and the application of standard buffer distances from residential, institutional, and environmental features. Its location outside the city minimizes potential health and environmental risks while maintaining convenient access through the existing road network, making it a technically and environmentally sound option for long-term waste disposal.

- **Proposed Land Area:** 5 acres
- **Annual waste:** 13,140 tons/annum (about 36 tons/day)

8.3.14.2 Landiwa Urban Area (Lakki Marwat Tehsil)

Landiwa is a newly developed urban area within Lakki Marwat Tehsil, currently generating around 7 tons of solid waste per day. A 1-acre landfill site has been proposed 1.8 kilometers from the city center, situated outside the urban boundary. The site was delineated following GIS buffer analysis to ensure adequate separation from populated zones and water bodies. Its location supports efficient waste transport and aligns with environmental protection requirements, making it suitable for managing the urban area's growing waste generation as the area develops further.

- **Proposed Land Area:** 1 acre
- **Annual waste:** 2,646 tons/annum (about 7 tons/day)

8.3.14.3 Sarai Naurang Urban Area (Sarai Naurang Tehsil)

The proposed landfill site for Sarai Naurang lies within the urban limits of Sarai Naurang Tehsil, as highlighted on the district map. Based on a daily waste generation of approximately 28 tons, a landfill area of 3 acres has been proposed. The site was delineated using GIS spatial analysis, applying a 500-meter buffer from all environmentally and socially sensitive areas such as schools, residences, and water bodies. This buffer ensures compliance with World Bank and environmental protection guidelines. The selected site shows no conflict with nearby road networks or sensitive land uses and is located in a geologically stable area suitable for long-term solid waste disposal operations.

- **Proposed Land Area:** 3 acres
- **Annual waste:** 10,220 tons/annum (about 28 tons/day)

8.3.14.4 Tajazai Urban Area (Ghazni Khel Tehsil)

The Tajazai urban area, located in Ghazni Khel Tehsil, is one of the newly developed zones shown in the southern section of the district map. The settlement produces about 5 tons of solid waste per day. To accommodate this, a 1-acre landfill site has been proposed 1.6 kilometers southwest of the urban core, situated outside the urban boundary. The site was selected through GIS-based screening to maintain a sufficient buffer from built-up and environmentally sensitive areas. Its location near the primary road network ensures ease of waste transport while minimizing potential nuisance or environmental degradation within populated zones.

- **Proposed Land Area:** 1 acre
- **Annual waste:** 1,825 tons/annum (about 5 tons/day)

8.3.14.5 Tajori Urban Area (Ghazni Khel Tehsil)

The Tajori urban area, also falling under Ghazni Khel Tehsil, generates around 4 tons of waste daily. A 1-acre closed landfill site has been identified within the tehsil's urban boundary, as shown in the

northwest portion of the district map. The site complies with buffer-based selection criteria, maintaining adequate separation from residential clusters and surface water bodies. Its location benefits from proximity to existing secondary road access, enabling efficient waste transport and management. The site is suitable for small-scale controlled disposal, with limited environmental and social impacts, ensuring sustainability for the tehsil's projected growth.

- **Proposed Land Area:** 1 acre
- **Annual waste:** 1,460 tons/annum (about 4 tons/day)

8.3.14.6 Ghazni Khel Urban Area (Ghazni Khel Tehsil)

The Ghazni Khel urban area, located within Ghazni Khel Tehsil, produces approximately 2 tons of solid waste daily. Although the waste volume does not currently necessitate a large-scale landfill, a 1-acre landfill site has been proposed outside the urban boundary, about 2.5 kilometers from the city center, to manage future waste disposal needs. The site complies with World Bank-aligned selection criteria, ensuring it remains safely distanced from residential settlements and sensitive land uses while providing space for potential expansion if required.

- **Proposed Land Area:** 1 acre
- **Annual waste:** 730 tons/annum (about 2 tons/day)

8.3.14.7 Pezu Urban Area (Ghazni Khel Tehsil)

Pezu, also part of Ghazni Khel Tehsil, generates roughly 4 tons of solid waste per day. Due to its proximity to a seismic zone, the proposed landfill site has been strategically located outside the urban boundary, approximately 1.7 kilometers from the city center. The proposed landfill covers an area of 1 acre, offering adequate space for current and near-future waste management operations. The selected location minimizes seismic and environmental risks, providing a safe and sustainable disposal solution that aligns with national environmental safety and siting standards.

- **Proposed Land Area:** 1 acre
- **Annual waste:** 1460 tons/annum (about 4 tons/day)

8.4 Modes of Solid Waste Collection, Haulage, and Way Forward (Rural-Tehsils)

8.4.1 Primary Waste Collection

In the rural tehsils of Lakki Marwat District, including Lakki Marwat Tehsil, Sarai Naurang, Ghazni Khel, and Bettani, waste management is being shaped by local realities and resource limitations. With no formal municipal waste collection systems in place, the primary mode of waste collection relies on hand carts and mini tippers (2.5m³). A total of 117 hand carts and 18 mini tippers are distributed across the four tehsils, forming the backbone of the collection process. Additionally, 3 trolleys are available to support the system.

To manage the collected waste efficiently, a transfer station-based approach will be adopted. Waste gathered from homes and neighbourhoods will first be brought to these local transfer stations. From there, it will be transported using larger vehicles, i.e., tractor loaders, 10m³ & 25m³ dumpers, to designated disposal sites outside the settlements.

Supporting this system, sanitary teams, assigned at a ratio of one worker per 1,400 residents, will operate twice weekly in each tehsil. Their work will focus on cleaning public spaces, parks, and graveyards, promoting a healthier and more dignified living environment for the people of rural communities.

Table 8-19: Primary Collection Modes for Lakki Marwat Rural Tehsils

| Modes | Lakki Marwat Tehsil | Serai NAurang Tehsil | Ghazni Khel Tehsil | Bettani Tehsil | Total |
|-------------------------------|---------------------|----------------------|--------------------|----------------|------------|
| Hand Carts | 33 | 39 | 39 | 6 | 117 |
| Mini Tipper 2.5m ³ | 5 | 6 | 6 | 1 | 18 |
| Trolleys | 1 | 1 | 1 | 0 | 3 |

8.4.2 Bulk and MSW Waste

The rural tehsils of Lakki Marwat District require targeted resources and planning for the effective management of Municipal Solid Waste (MSW) and bulk waste. Among them, Sarai Naurang rural tehsil is the largest contributor, generating 105 tons/day (t/d) of total waste, including 91 t/d of MSW and 12 t/d of bulk waste.

Lakki Marwat Tehsil follows with 89 t/d total waste (77 t/d MSW, 12 t/d bulk waste), while Ghazni Khel Tehsil produces 104 t/d (90 t/d MSW, 13 t/d bulk). Bettani tehsil, which is totally a rural area, generates 15 t/d (13 t/d MSW, 2 t/d bulk).

Collectively, these rural tehsils generate 312 tons of waste daily, including 271 t/d of MSW and 41 t/d of bulk waste. To manage this volume efficiently, each tehsil requires appropriate resources for the collection of waste, i-e, vehicles, trained workforce (HR), and strategically placed collection points. Without these, the risk of waste accumulation and environmental degradation remains high. A comprehensive, locally tailored waste management plan is essential to ensure effective collection, transport, and environmentally sound disposal across the rural tehsils of the district.

Table 8-20: Bulk and MSW in Rural Tehsils of Lakki Marwat

| Tehsil | MSW Portion | Bulk Waste |
|----------------------|-------------|------------|
| Lakki Marwat Tehsil | 77 | 12 |
| Serai Naurang Tehsil | 91 | 14 |
| Ghazni Khel Tehsil | 90 | 13 |
| Bettani Tehsil | 13 | 2 |

The proposed waste management system includes the deployment of sanitary workers, loaders, dumpers, and tractor trolleys, aimed at ensuring timely and efficient waste collection and transportation. Special attention must be given to bulk waste, such as construction and demolition (C&D) debris and garden waste, which requires separate handling mechanisms and designated vehicles for safe transfer to disposal sites. The graphical representation of rural waste generation across Lakki Marwat clearly illustrates the distribution between Municipal Solid Waste and bulk waste, emphasizing the need for a differentiated and well-coordinated response to waste management in each locality.

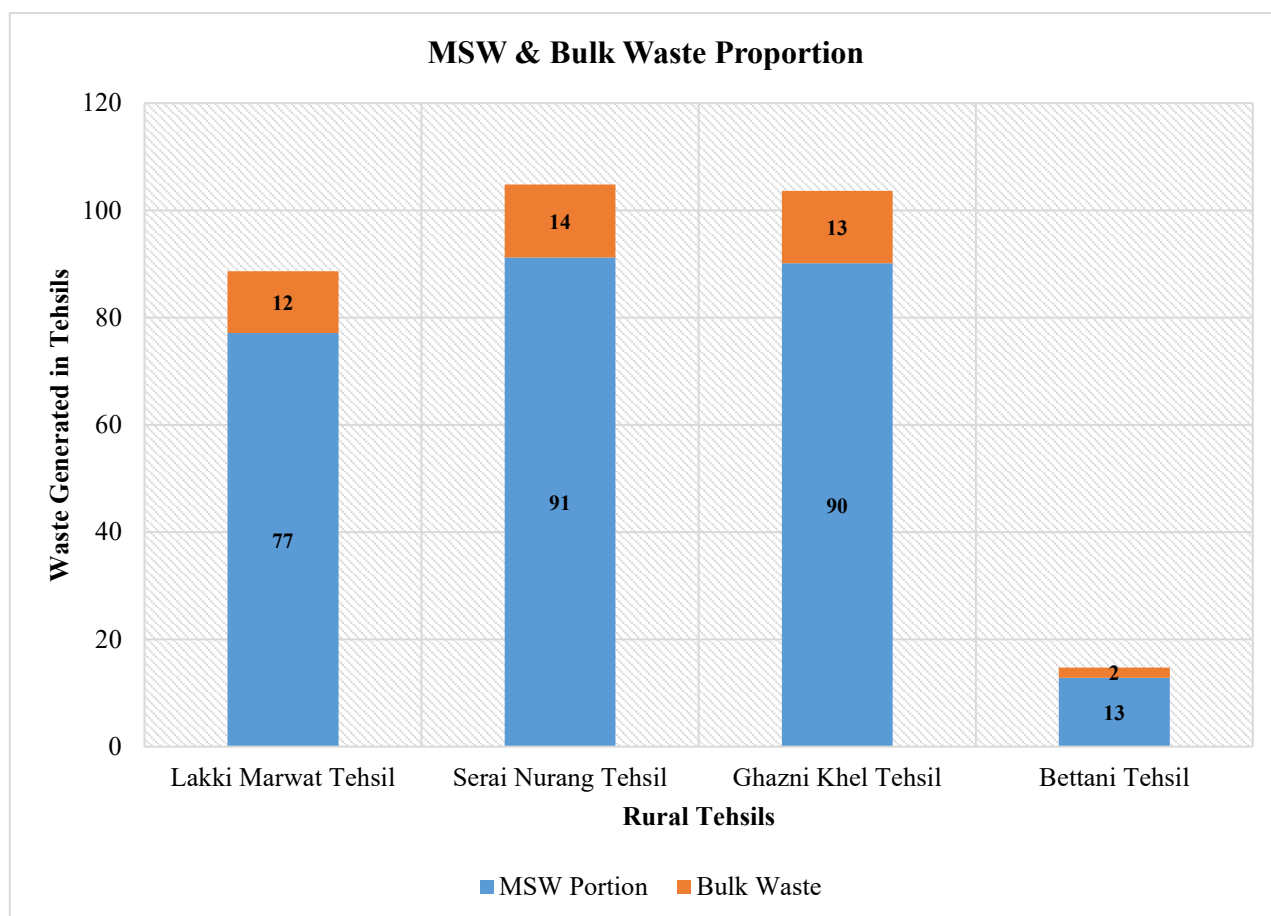


Figure 8-14: Graphical Representation of Bulk and MSW in Rural Tehsils

8.4.3 Machinery/ Fleet Required for Waste Handling

Efficient waste management across the rural tehsils of Lakki Marwat requires both adequate machinery and a dedicated human resource structure to support day-to-day operations. Given the scale of waste generated and the geographic spread of settlements, a comprehensive system has been designed to ensure timely collection, transportation, and disposal.

The machinery deployed includes a large number of hand carts and mini tippers (2.5m³) to enable primary waste collection directly from households and narrow streets. These tools are essential for maintaining regular collection cycles in scattered or informal residential areas. For areas with greater accessibility, mini tippers serve as a bridge between the initial collection points and local transfer stations.

To manage secondary transport, the fleet includes dumpers with capacities of 10m³ and 25m³, which are critical for transferring large volumes of waste to designated disposal sites. Trolleys supplement this operation by assisting in smaller or more difficult-to-access zones. Heavy equipment, front-end loaders, is used to handle bulk waste, particularly construction and demolition debris, green waste, and other heavy materials that cannot be managed manually. Additionally, waste drums are strategically placed in public spaces and along streets to act as fixed collection points, allowing communities to dispose of waste conveniently and responsibly.

Table 8-21: Summary of Total Proposed Machinery Resources for Lakki Marwat Tehsils (Rural)

| Tehsil Wise Rural Resources (Proposed) | | | | | |
|--|---------------------|----------------------|--------------------|----------------|-------------|
| Resources | Lakki Marwat Tehsil | Serai Naurang Tehsil | Ghazni Khel Tehsil | Bettani Tehsil | Total Fleet |
| Hand Carts | 33 | 39 | 39 | 6 | 117 |

| | | | | | |
|-------------------|-----|-----|-----|----|-----|
| Mini Tipper 2.5m3 | 5 | 6 | 6 | 1 | 18 |
| Trolleys | 1 | 1 | 1 | 0 | 3 |
| Dumpers (10CM) | 4 | 4 | 4 | 1 | 13 |
| Loaders | 2 | 2 | 2 | 0 | 6 |
| Dumpers (25CM) | 1 | 2 | 2 | 0 | 5 |
| Front End Loader | 1 | 1 | 1 | 0 | 3 |
| Drums | 185 | 218 | 216 | 31 | 650 |

Complementing this machinery is a well-structured human resource setup. A total of 232 sanitation workers has been assigned across the rural tehsils to perform manual sweeping and street cleaning duties, ensuring cleanliness in both residential and public areas. These workers are supported by 18 helpers designated for door-to-door waste collection, facilitating the smooth transfer of household waste to collection vehicles. Each tehsil has at least one dedicated drain cleaner to maintain open drains and prevent blockages, which are crucial for public hygiene and environmental health.

To ensure smooth field operations and effective supervision, eight supervisors are deployed across the tehsils, providing oversight and addressing day-to-day logistical or performance issues. The transportation operations are supported by a fleet of 88 trained drivers who operate the various collection and transport vehicles, maintaining timely and efficient movement of waste within and between tehsils.

Table 8-22: Summary of total proposed HR Resources for Lakki Marwat Tehsils (Rural Area)

| Tehsil | Helpers DTD | Workers Manual Sweeping | Drain Cleaner | Supervisors | Drivers |
|---------------------|-------------|-------------------------|---------------|-------------|-----------|
| Lakki Marwat Tehsil | 5 | 66 | 1 | 2 | 25 |
| Serai Nurang Tehsil | 6 | 78 | 1 | 3 | 29 |
| Ghazni Kheil Tehsil | 6 | 77 | 1 | 3 | 29 |
| Bettani Tehsil | 1 | 11 | 1 | 0 | 5 |
| Total | 18 | 232 | 4 | 8 | 88 |

8.4.4 Transfer Station or Disposal Site for Waste

The rural tehsils of Lakki Marwat District, which operate under the jurisdiction of their respective Tehsil Municipal Administrations (TMAs), face unique challenges in solid waste management due to their dispersed population and large geographic areas. Waste collection points in these rural areas are often located far from centralized disposal sites, making direct transportation inefficient and costly. To address these challenges and promote sustainable waste management, the establishment of transfer stations is essential. Transfer stations act as intermediate collection and consolidation points where waste from multiple small collection points is temporarily gathered, sorted if necessary, and then transported in bulk to the final disposal site.



Figure 8-15: Lakki Marwat Rural Tehsil: Transportation of Waste to the Disposal Site

This approach significantly reduces transportation costs by optimizing fleet routes and decreasing the number of trips needed to reach distant disposal sites. Moreover, transfer stations help minimize health hazards by preventing uncontrolled dumping along transportation routes and improving waste handling practices. The rural tehsils of Lakki Marwat, where disposal sites are often located beyond this range, would greatly benefit from such infrastructure. The Solid Waste Management (SWM) team of The Urban Unit supports this view, suggesting that proper transfer stations be established where the distance to disposal sites exceeds 15 kilometers, further emphasizing the importance of these facilities in reducing fleet costs and environmental risks. Therefore, implementing transfer stations/temporary collection points in rural tehsils under TMA's is critical for enhancing the efficiency, sustainability, and environmental safety of solid waste management systems in these areas.

8.5 Phase-wise Proposed Interventions for Solid Waste Management

8.5.1 Proposed SWM Interventions for Urban & Rural Areas

Table 8-23: Proposed SWM Interventions

| Proposed Intervention Term | Key Aspects | Identified Urban & Rural |
|----------------------------|---|---|
| Short-Term (2025–2030) | <ul style="list-style-type: none"> Upgradation of the SWM fleet, HR, and collection points in urban areas. Establish Temporary Collection Points (TCPs) in rural areas for efficient rural waste handling and transfer to landfill. Support regular performance reporting and stakeholder/community engagement. Implementation of preventive measures and capacity building of the sanitation staff | Identified landfill site for all Urban & TCPs for Rural |
| Long-Term (2030–2045) | <ul style="list-style-type: none"> Establish a robust monitoring and evaluation system (compliance checks through M & E checks, service quality validation i.e., third party, vehicle tracking systems, weighbridges installations and calibration, route optimization). Develop a controlled Landfill site (site selection, preparation, design, construction, and environmental monitoring). Expand PPP models to ensure the financial sustainability of SWM services. Promote segregation-at-source initiatives by public awareness campaigns across urban and rural surroundings. | For all Urban & Rural Areas |

8.5.2 Short-term interventions for the period of 5 years are

Table 8-24: Short-term Interventions for Lakki Marwat District

| Short Term Intervention – SWM | Key Aspects | Coverage |
|-------------------------------------|--|---------------|
| Human Resources Enhancement | <ul style="list-style-type: none"> • Conduct staffing needs assessment. • Recruit Managers, Supervisors, Sanitary Workers, Drivers, Helpers, and Admin Staff. Provide foundational training on SWM operations. • Continuous professional development. | Urban & Rural |
| Infrastructure & Fleet Requirements | <ul style="list-style-type: none"> • Assess fleet gaps. • Procure Machinery, i.e., compactor trucks, arm-roll vehicles, mini tippers, and loader rickshaws. • Set up collection points across urban and TCPs for rural. | Urban & Rural |
| Maintenance and Operations | <ul style="list-style-type: none"> • Develop a preventive & emergency maintenance schedule. • Train staff in vehicle operations. • Ensure readiness for special events (Eid al-Adha, & al-Fitr, and Ashura). | Urban & Rural |
| Capacity Building | <ul style="list-style-type: none"> • Yearly capacity building initiatives of Waste Management officials, i.e, supervisors, zonal officers, Inspectors, Assistant managers, & Managers. | |

8.5.3 Long-term Interventions (2030-2045)

Table 8-25: Long-term Intervention for Lakki Marwat District

| Long Term Intervention – SWM | Key Aspects | Coverage |
|--|--|---------------|
| Controlled Dumpsite Development | <ul style="list-style-type: none"> Site selection in the Lakki Marwat urban Tehsils, build engineered landfill: access roads, fencing, drainage, liner, leachate & gas systems, ops facilities. Maintain environmental safeguards (groundwater, emissions, leachate monitoring). Establish waste collection points in urban and TCPs in rural. | Urban & Rural |
| Monitoring & Evaluation System | <ul style="list-style-type: none"> Establish compliance checks and service quality metrics. Install RFID vehicle tracking. Install weighbridges at the landfill. Route optimization through GPS. | Urban & Rural |
| Awareness Campaigns & | <ul style="list-style-type: none"> Launch awareness campaigns through schools, madrassahs, mosques, community workshops, and media. Distribute color-coded bins (biodegradable, non-biodegradable, hazardous). | Urban & Rural |
| Circular Economy & Recycling Facilities | <ul style="list-style-type: none"> Develop recycling, composting, and waste-to-energy plants after feasibility studies of waste composition, depending upon local dynamics. Cluster-based system to serve both urban and the surrounding rural. Promote 3Rs (Reduce, Reuse, Recycle) at household and institutional levels Expand PPP models on a BOT (Build Operate Transfer) basis to ensure the financial sustainability of SWM services. | Urban & Rural |
| Stakeholder Engagement & Reporting | <ul style="list-style-type: none"> Regular monthly/annual reports on landfill and SWM performance. Structured stakeholder consultations with urban and rural. | Urban & Rural |

8.6 Proposed 3R System (Reduce, Reuse, Recycle) for Lakki Marwat District

To promote sustainable waste management in Lakki Marwat District, it is important to introduce simple, community-friendly 3R practices, i.e., Reduce, Reuse, and Recycle, that are realistic and effective in the local context.

8.6.1 Reduce (Minimize Waste at the Source)

- Launch local awareness campaigns to discourage the use of plastic bags and promote cloth or jute bags.
- Encourage buying in bulk to reduce packaging waste at homes and shops.
- Promote use of reusable containers for daily shopping, especially in markets.

- Encourage schools and mosques to spread messages about reducing waste in daily life.

8.6.2 Reusing (Use Again Instead of Throwing Away)

- Promote the culture of donating old clothes, utensils, and school supplies to neighbours or community centres.
- Encourage households to reuse jars, bottles, and plastic containers instead of throwing them away.
- Support local repairmen (e.g., cobblers, electricians, tailors) who can fix broken items instead of replacing them.
- Introduce weekly “reuse days” in schools to teach children the value of extending product use

8.6.3 Recycling (Turn Waste into Useful Products)

- Encourage simple waste separation at home: organic (kitchen waste), recyclable (plastic, paper), and non-recyclable waste.
- Promote composting of food and garden waste in homes or communities, especially in rural areas, for use as natural fertilizer.
- Support informal waste pickers and small recycling businesses by providing community drop-off points for items like bottles, cardboard, and cans.
- Organize regular community clean-up and collection drives with support from local authorities.

8.7 Proposed Capacity Building for Sustainable SWM in Lakki Marwat District

To achieve an effective and sustainable solid waste management system in Lakki Marwat District, the following comprehensive capacity-building plan is required:

- **Machinery & Equipment:** Procure modern waste-collection vehicles, mechanical sweepers, and appropriate landfill-site management tools to raise operational efficiency.
- **Financial Management:** Ensure allocation of sufficient budget for SWM operations, explore public-private partnership (PPP) models, and implement revenue-generation mechanisms (for example, user/collection fees) that can help make the system financially viable.
- **Human Resource Development:** Recruit competent staff, provide targeted training to personnel of the Tehsil Municipal Administration (TMA) in waste-management practices, and conduct capacity-building programs (with technical support if required) to strengthen institutional skills.
- By strengthening these three core areas, Lakki Marwat District will improve its waste-collection and disposal capacity, support long-term environmental sustainability, and deliver better solid-waste services.

8.8 Future Direction

The **Tehsil Municipal Administration (TMA) Lakki Marwat**, which holds the responsibility for solid waste management across the district, faces several operational and resource-based challenges due to outdated equipment and limited financial and technical capacity. To strengthen the existing system and ensure sustainable waste management, the TMA should prioritize the following actions:

- **Immediate Procurement:** Initiate urgent procurement of essential equipment, vehicles, and services required to operationalize the proposed SWM system. This step will help establish a baseline for future waste management planning and improve service efficiency.
- **Data Management:** Currently, no reliable mechanism exists to monitor waste generation, collection efficiency, or daily disposal volumes. The TMA should appoint trained personnel dedicated to data collection, monitoring, and reporting to support evidence-based planning and decision-making.
- **Private Sector Participation:** Since private contracting for waste collection and disposal is not practiced in Lakki Marwat, the TMA should explore opportunities for collaboration with private partners to address gaps in technical and managerial expertise, particularly for waste transport, recycling, and treatment operations.
- **Capacity Building:** Institutional capacity must be enhanced through regular training programs for TMA staff on modern SWM practices. Technical assistance from the **Urban Unit** or other specialized agencies can help strengthen operational planning, monitoring, and enforcement capacities.
- **Sustainable Waste Management:** The TMA should develop long-term strategies and formal agreements for environmentally sound waste treatment and disposal practices, ensuring that operations align with sustainability goals and minimize adverse environmental impacts.

8.9 Early Actions Required

To ensure the timely and efficient implementation of the solid-waste management project, the SWM department must carry out the following preparatory tasks:

- **Procurement & Monitoring:** Secure a new collection fleet, recruit additional personnel, and install a weighbridge at the dumping facility to monitor waste collection and transfers.
- **Landfill Site Selection:** Given that the current dumpsite presents environmental and public-health risks, it is essential to identify and assess potential new controlled landfill or disposal sites for the urban and rural tehsils in accordance with screening criteria.
- **Site Infrastructure:** Develop foundational infrastructure at the designated proposed Landfill to allow waste reception during night shifts, so that operations can begin even before private-sector partners are mobilized
- **Urban Infrastructure Improvement:** Upgrade TMA-level infrastructure to support operations such as mechanical street sweeping and efficient waste-collection services

9 Water Supply, Sewerage and Drainage

9.1 Introduction

The Land Use Plan Report for Water and Sanitation (WATSAN) establish a structured framework for the efficient utilization and management of land to support sustainable water and sanitation services in Lakki Marwat district. The objectives and scope of the report are discussed in the section below.

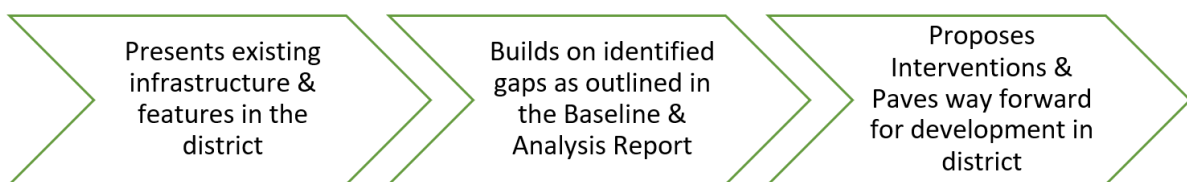
9.1.1 Purpose & Objectives of Land Use Plan

The primary purpose of the Land Use Plan for Water and Sanitation (WATSAN) is to establish a structured framework for the efficient utilization and management of land to support sustainable water and sanitation services in Lakki Marwat. This plan seeks to address the challenges posed by rapid urbanization, population growth, and environmental degradation, ensuring the availability and accessibility of water resources while maintaining adequate sanitation facilities. It aims to optimize the allocation of land for essential municipal services, including water supply systems, wastewater treatment plants, and drainage networks, while safeguarding natural water bodies and promoting environmental conservation.

The objectives of this section of Land Use Plan includes integrating water and sanitation considerations into urban and rural planning, identifying suitable zones for WATSAN infrastructure development, and reducing the risk of environmental contamination. The plan emphasizes equitable access to safe drinking water and sanitation services, particularly for underserved communities. It also seeks to enhance the resilience of water and sanitation systems to climate change impacts and promote efficient land-use patterns that align with sustainable development goals.

9.1.2 Scope of the Report

The Draft Land Use Plan Report builds upon the findings of the Baseline and Analysis Report for District Lakki Marwat, leveraging its detailed insights into the existing infrastructure pertaining to water and sanitation in the district. It begins by presenting a comprehensive review of the existing WATSAN infrastructure as outlined in the Baseline Land Use Plan, including key assets such as water supply networks, wastewater treatment facilities, and drainage systems. The report then transitions to identifying gaps, challenges, and opportunities for improvement, paving the way for strategic interventions. Finally, it outlines proposed extensions and enhancements in the Future Land Use Plan, ensuring alignment with sustainability goals and the evolving needs of the district's population and economy.



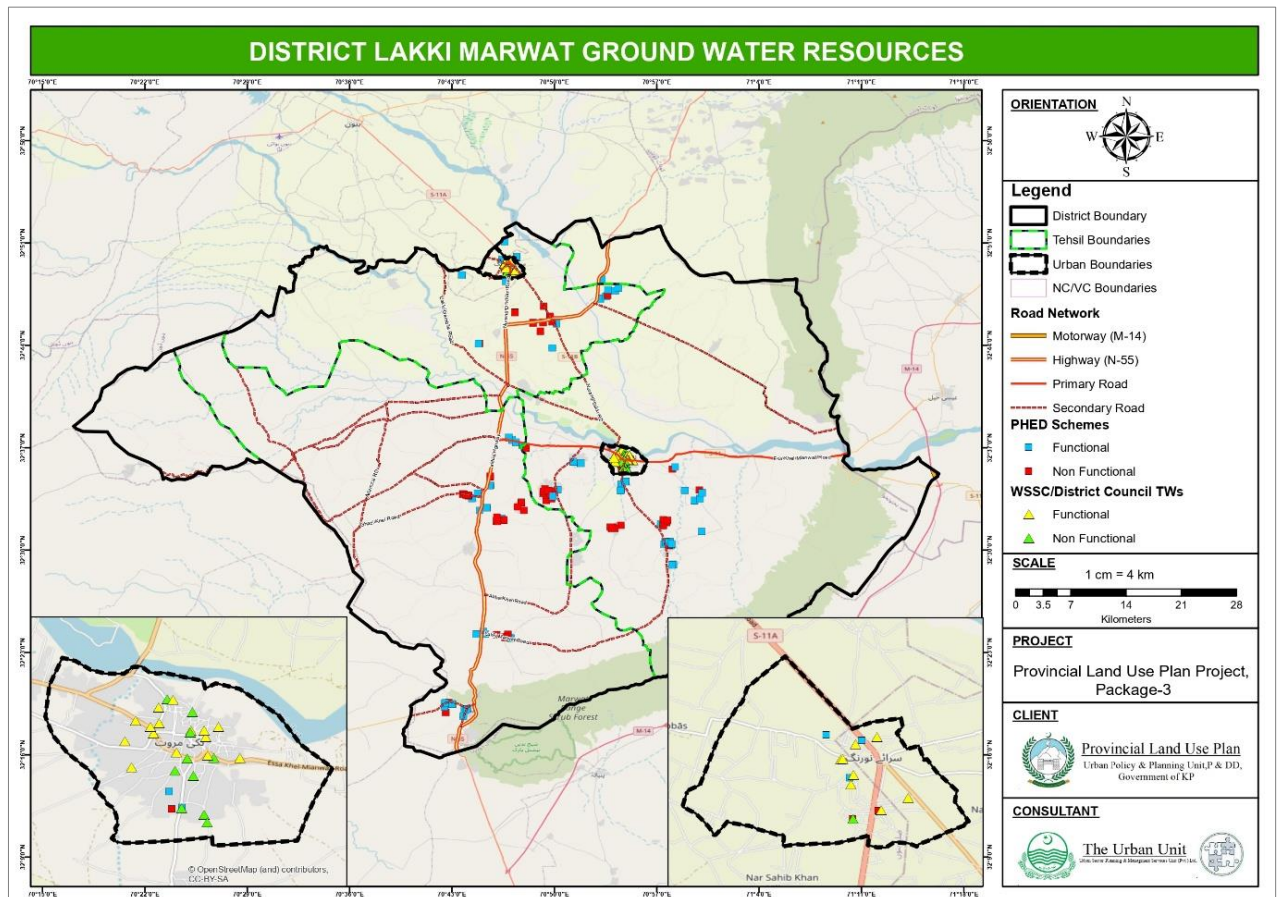
9.2 Water Supply & Sanitation

Water is one of the most significant natural resources available at the disposal of humans. It is facing increasing global demand and challenges thus, a considerable decline in its availability is observed due to mismanagement/misuse, which has culminated in an intricate scenario in terms of water availability to various regions.

9.2.1 Overview of Existing Land Use Plan

The surface water sources of Lakki Marwat District primarily include the Kurram River, which forms part of the district's boundary and serves as the main perennial watercourse. The hydrology of the region is further influenced by the Gambila River, which, after traversing Bannu, joins the Kurram River near Lakki Marwat. In addition to these rivers, several ephemeral streams and hill torrents convey surface runoff towards the main water bodies during rainstorm events. Moreover, multiple small dams have been proposed within the district to enhance surface water storage, including the Longar, Barakhel, and Phezo Dams.

Groundwater serves as the primary source of drinking water in Lakki Marwat District, predominantly extracted through tube wells operating under small-scale schemes dispersed across the region. The discharge capacity of these schemes varies with the groundwater potential, which is largely influenced by local hydrogeological conditions. High groundwater potential exists along the Kurram River floodplains near Lakki Marwat city, supported by permeable alluvial deposits that facilitate recharge. Conversely, the northern and western areas of the district face limited groundwater availability due to rugged topography and low-permeability hard rock formations, restricting aquifer development.



Map 9-1: Existing Water Resources of District Lakki Marwat

9.3 Current and Future Water Demands

The current and future water demands, as calculated for the district's urban and rural settlements have been discussed in detail in the Baseline and Analysis Report for District Lakki Marwat. The section below discusses the observed trend and projected water needs for the residents of Lakki Marwat district.

9.3.1 Water Demand Estimation

Water demands have been calculated for the urban and rural areas of District Lakki Marwat, keeping in view the population augmentation and the minimum per capita water demand of 30 GPCD for urban areas and 15 GPCD for rural areas of the district.

Water Demands for Urban Areas

The current and future water demands have been calculated for the urban settlements of Lakki Marwat District. Lakki Marwat, Naurang, Ghazni Khel tehsils host the major urban settlements in the district. The current water demand for the urban areas of Lakki Marwat district is approximately 7.43 MGD, which is expected to reach 14.25 MGD by the end of 2045. Based on the population forecasts and water demand factors, the relative demands of urban areas for various planning horizons will be as follows:

Table 9-1: Average Daily Water Demands for Urban Settlements of Lakki Marwat District

| Urban Settlements | Average Daily Demand (MGD) | |
|---------------------|----------------------------|------|
| | 2025 | 2045 |
| Lakki Marwat Tehsil | 3.69 | 7.24 |
| Naurang Tehsil | 2.42 | 4.73 |
| Ghazni Khel Tehsil | 1.32 | 2.28 |

The trend of water demand increase over the project's planning period has been pictorially represented in the graph below.

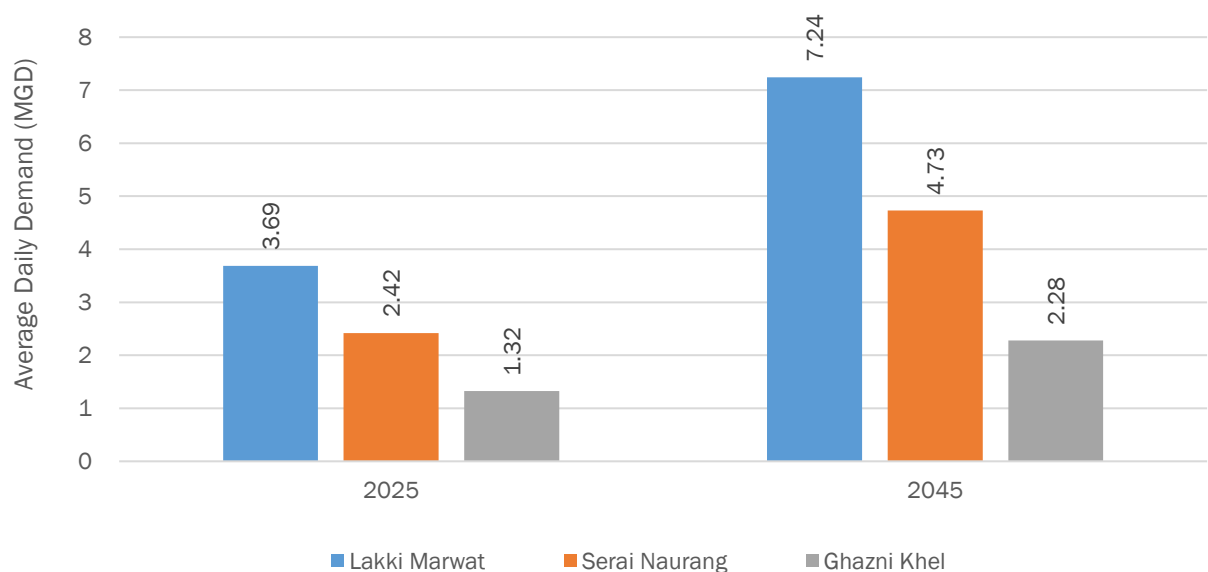


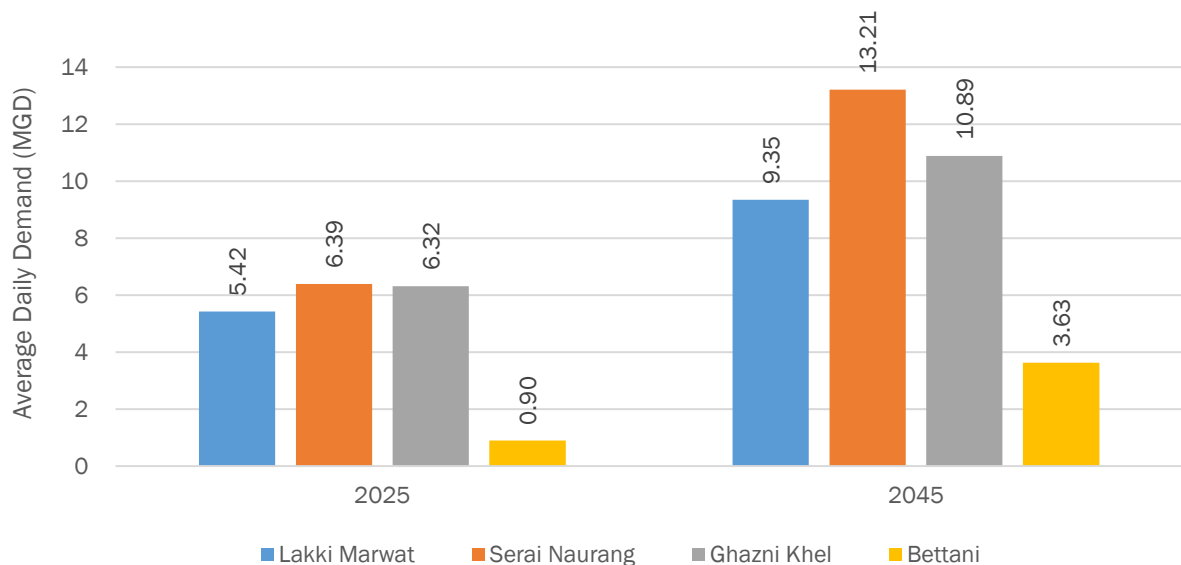
Figure 9-1: Average Daily Demands of Urban Settlements of Lakki Marwat District**Water Demands for Rural Areas**

The rural areas of Lakki Marwat District consist of the rural populations of the Lakki Marwat, Naurang, Ghazni Khel and Bettani Tehsils. The current water demand for rural areas of Lakki Marwat is approximately 19.03 MGD and is expected to reach 37.08 MGD by the end of 2045. The current and future water demands have been calculated for the rural settlements in these Tehsils based on the population forecast and the relative water demand factors, as tabulated below.

Table 9-2: Average Daily Demands for Rural Settlements of Lakki Marwat District

| Rural Settlements | Average Daily Demand (MGD) | |
|---------------------|----------------------------|-------|
| | 2025 | 2045 |
| Lakki Marwat Tehsil | 5.42 | 9.35 |
| Naurang Tehsil | 6.39 | 13.21 |
| Ghazni Khel Tehsil | 6.32 | 10.89 |
| Bettani Tehsil | 0.90 | 3.63 |

The trend of water demand increase over the project's planning period has been pictorially represented in the graph below.

**Figure 9-2: Average Daily Demand for Rural Settlements of Lakki Marwat District****9.3.2 Wastewater Generation**

Sewerage Flow is calculated using 30 GPCD as Average Water Demand, including Non-Revenue Water or Losses. In addition, 10% of Commercial, 10% of Institutional and 10% of Industrial water demand is also calculated and added. The provision of stormwater has also been added as 50% of the peak sewage flow to cater for the rainwater run-off into the sewerage system.

The wastewater flows from Lakki Marwat District collectively for urban and rural areas is estimated to be around 97.92 MGD at the end of 2045. The urban areas contribute 28% of this wastewater, whereas the rural communities generate the remaining 72%. The details of sewage flow for urban and rural areas have been provided below.

Waste Water Flows for Urban Areas

The wastewater generated by the urban settlements, including Lakki Marwat, Naurang and Ghazni Khel has been forecasted and tabulated below.

Table 9-3: Wastewater Flows for Urban Settlements of Lakki Marwat District

| Urban Settlements | Sewage Flow (MGD) 2025 | Sewage Flow (MGD) 2045 |
|-------------------|------------------------|------------------------|
| Lakki Marwat | 7.03 | 13.81 |
| Naurang | 4.62 | 9.02 |
| Ghazni Khel | 2.52 | 4.35 |

It is evident from the table that the total sewage flow of the urban areas of Lakki Marwat tehsil is expected to reach 13.81 MGD by the end of 2045. The trend of wastewater generation over the project's planning period has been pictorially represented in the graph below.

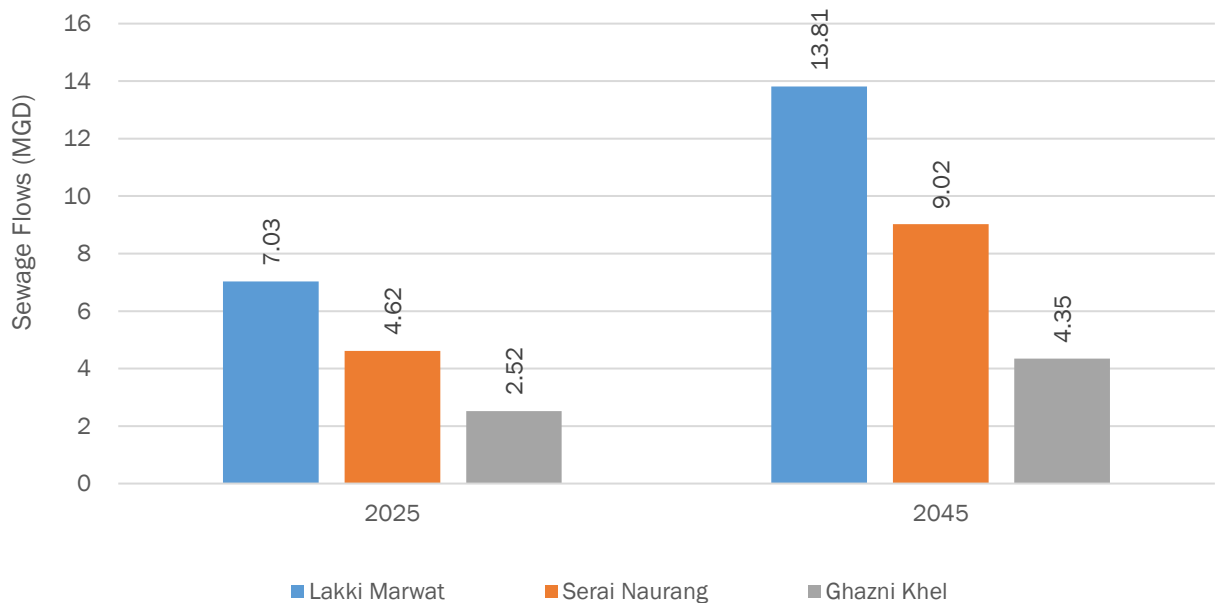


Figure 9-3: Waste Water Generation for Urban Settlements of Lakki Marwat District

Waste Water Flows for Rural Areas

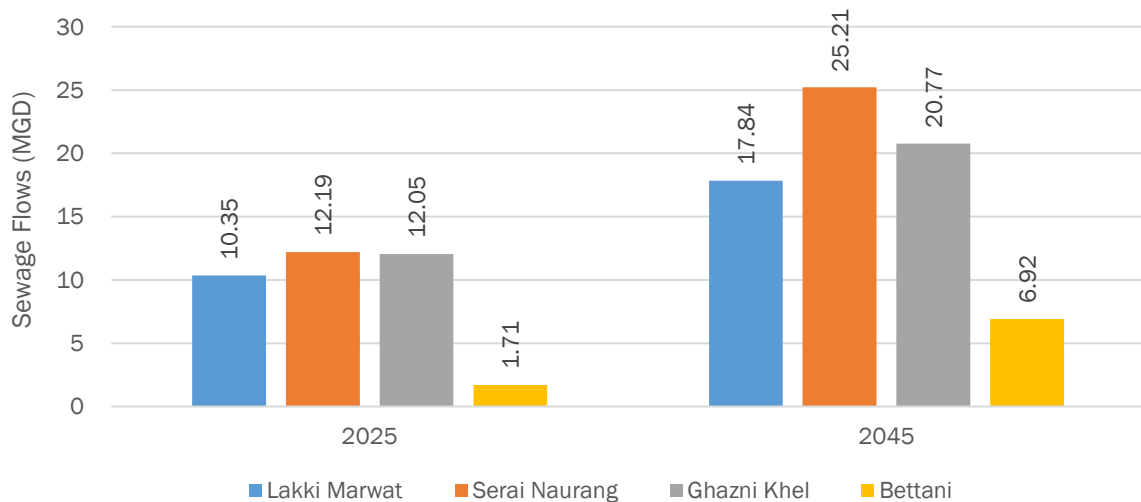
The wastewater generated by the rural settlements of Lakki Marwat District has been forecasted and **Tabulated** below.

Table 9-4: Wastewater Flows for Rural Areas of Lakki Marwat

| Rural Settlements | Sewage Flow (MGD) 2025 | Sewage Flow (MGD) 2045 |
|-------------------|------------------------|------------------------|
| Lakki Marwat | 10.35 | 17.84 |
| Naurang | 12.19 | 25.21 |
| Ghazni Khel | 12.05 | 20.77 |
| Bettani | 1.71 | 6.92 |

It is evident from the table above that the rural settlements of Naurang Tehsil are the major contributors to the sewage flow generation from the rural areas of Lakki Marwat District. The total sewage flow of all the rural areas of the district is expected to reach 70.74 MGD by the end of 2045.

The trend of wastewater generation over the project's planning period has been pictorially represented in the graph below.

**Figure 9-4: Wastewater Generation for Rural Settlements of Lakki Marwat District**

9.3.3 Comparative Analysis & Implications

The projected water consumption and wastewater generation trends for Lakki Marwat District reveal a distinct distribution pattern, with rural areas accounting for a significantly higher share of both water demand and wastewater production. By 2045, urban settlements are expected to consume approximately 28% (14.25 MGD) of the total water demand, while the remaining 72% (37.08 MGD) will be required by rural areas. This disparity reflects the predominantly rural demographic profile of the district.

Similarly, wastewater generation forecasts align with this distribution. By 2045, urban areas will contribute around 22% (27.18 MGD) of the total projected wastewater flows, whereas rural communities will generate approximately 78% (70.74 MGD). Notably, Naurang Tehsil's rural settlements emerge as the largest contributors to wastewater generation within the rural segment.

This marked imbalance between urban and rural water and wastewater loads necessitates a dual-pronged infrastructure development strategy. Urban areas will require focused investments in augmenting water supply systems, sewerage networks, and centralized treatment facilities to accommodate increasing demands. Conversely,

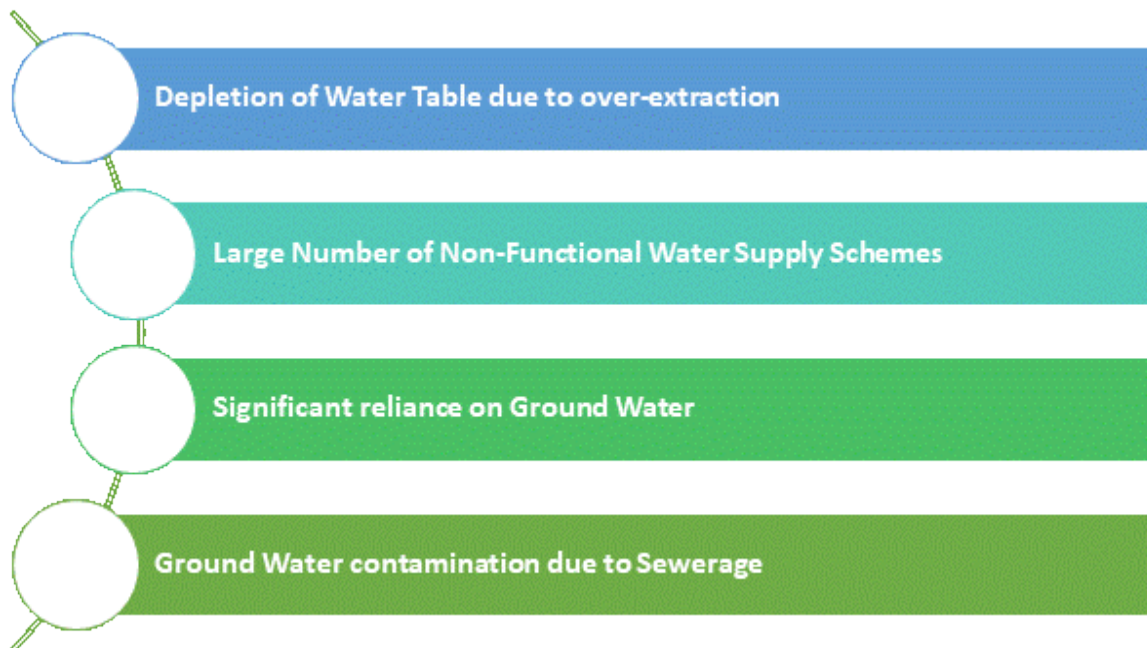
the substantial rural share underscores the urgent need for expanding decentralized, community-based water supply schemes and onsite wastewater management solutions. Recognizing these divergent patterns is essential for formulating equitable, sustainable water resource management strategies and infrastructure planning that address both the rural majority and the urbanizing pockets of Lakki Marwat District.

9.4 Constraints & Recommendations

Major constraints pertaining to the sewerage and drainage systems of the Lakki Marwat district have been identified through analysis of the existing situation. Some of the key constraints identified are as follows.



Major constraints pertaining to the water supply system of Lakki Marwat have also been identified through analysis of existing surveys and field visits. Some of the key constraints identified are as follows.



9.5 Future Plan & Strategic Intent

The high-level future plan in terms of strategic directions to answer what, where and how questions have been proposed as per the existing situation and projected growth trends in the district. However, it should be noted that these plans are representative of only an abstract of the solution and are subject to detailed design and master planning. The focus is on Short, Medium and Long-Term phases.

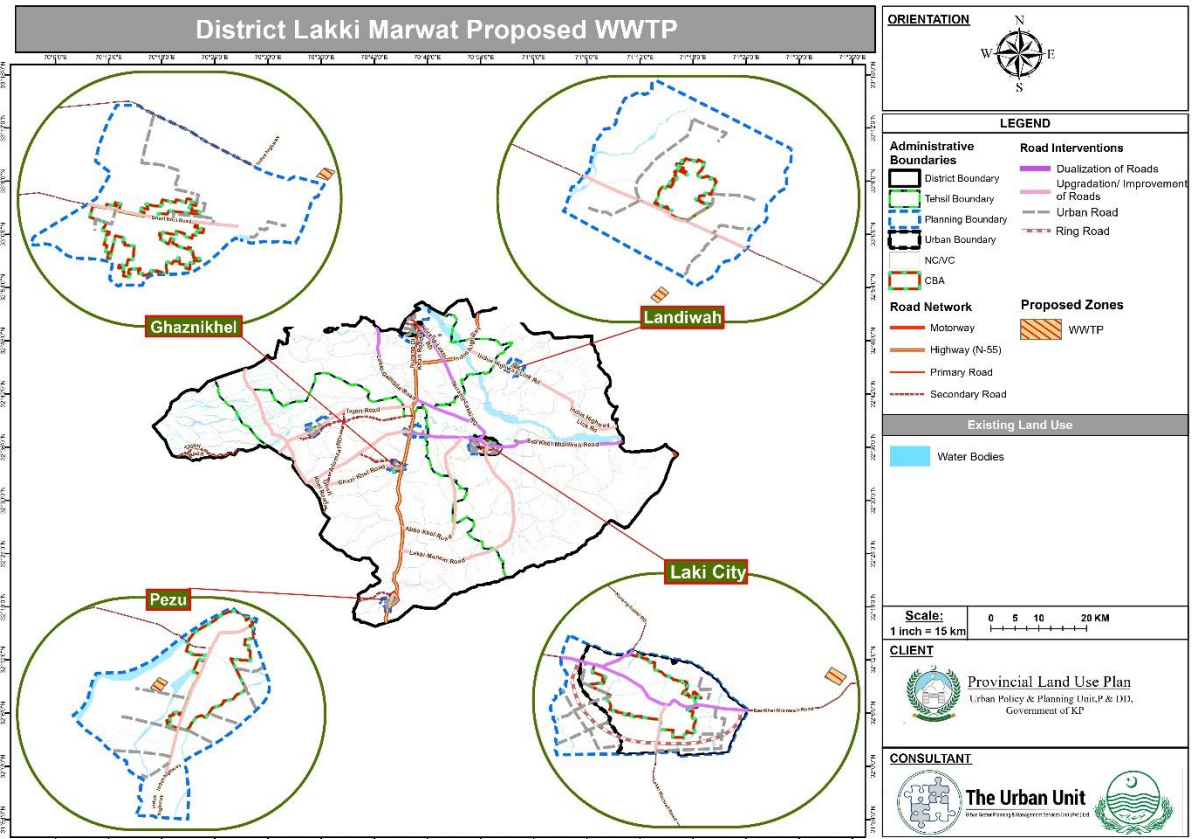
Table 9-5: Future Plan

| Sr. | Period | Area | Project | Scope | Stakeholder |
|-----|--------|--|---|--|--|
| 1 | Short | Lakki Marwat, Naurang, Bettani and Ghazni Khel | Rehabilitation of existing water supply infrastructure in rural areas of Lakki Marwat, Naurang, Bettani and Ghazni Khel | Rehabilitation of Tubewell including repair of Pumping Machinery, Electrical Panels, Civil Structure of Pump House along with replacement of distribution network (as per requirement) of existing non-operational water supply schemes | PHED Lakki Marwat District |
| 2 | Short | Lakki Marwat, Naurang, Bettani, Pezu and Ghazni Khel (Urban & Rural) | Extension of Sewerage System to Unserved Areas of Lakki Marwat District in of Lakki Marwat, Naurang, Bettani, Pezu and Ghazni Khel (Phase-I) | Design & Execution of integrated sewerage system complete with trunk & lateral sewer lines, pumping stations, manholes and other related works with solar and integration of SCADA | Local Govt./ TMAs in Lakki Marwat, Naurang, Bettani, Pezu and Ghazni Khel |
| 3 | Medium | Lakki Marwat, Naurang, Bettani and Ghazni Khel (Rural) | Provision of new Water Supply Schemes for rural areas of Lakki Marwat District in Tehsils of Lakki Marwat, Naurang, Bettani and Ghazni Khel (Phase-I) | Provision of surface water or ground water-based schemes complete with machinery, pump-house, well bores, valves, bulk meters, chlorinators and other related works. | PHED Lakki Marwat District |
| 4 | Medium | Lakki Marwat, Ghazni Khel, Naurang, Pezu | Rehabilitation of existing & provision of new Water Supply Schemes for urban areas of Local Govt. in Lakki Marwat district | Provision of water supply schemes (surface water or groundwater based) complete with machinery, pump-house, valves & meters, chlorinators and other related works, including rehabilitation of existing water supply infrastructure (as per requirement) | Local Govt. / TMAs in Lakki Marwat, Ghazni Khel, Naurang, Pezu |

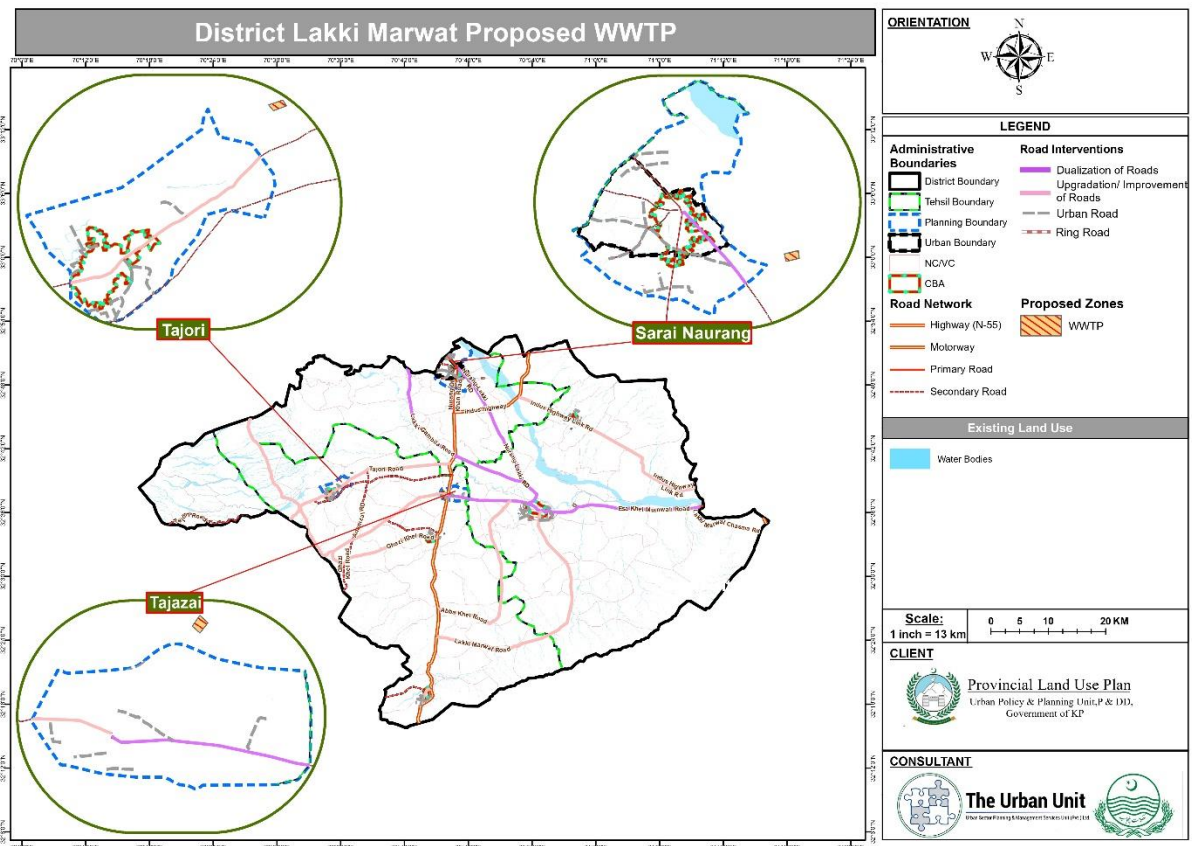
Task-C: Draft Land Use Plan of District Lakki Marwat

| | | | | | |
|---|------|---|--|---|---|
| 5 | Long | Lakki Marwat, Naurang, Bettani, Pezu and Ghazni Khel (Urban & Rural) | Provision of Filtration Plants in Lakki Marwat district | Installation of filtration plants (RO or UV as per requirements) with complete structure, machinery, boring and other appurtenances. | Local Govt. in Lakki Marwat, Naurang, Bettani, Pezu and Ghazni Khel |
| 6 | Long | Lakki Marwat, Landiwa, Serai Naurang, Ghazni Khel, Pezu, Tajori, Taja Zai | Construction of WWTPs for Urban Areas of Lakki Marwat district | Construction of WWTPs of type WSP completed with construction of ponds, civil works, and other auxiliary infrastructure works as required | Local Govt. in Lakki Marwat, Naurang, and Ghazni Khel tehsils |
| 7 | Long | Lakki Marwat District (Rural) | Construction of decentralized WWTPs for Rural Areas of Lakki Marwat district | Construction of low-cost wastewater treatment solutions such as Waste Stabilization Ponds (anaerobic, facultative, and maturation ponds), Constructed Wetlands, Septic Tanks with Soak Pits/Leach Fields, Imhoff Tanks, Anaerobic Baffled Reactors, Aerated Lagoons, and Oxidation Ditches, complete in all aspects including mechanical works, civil works, and land acquisition as per settlement requirements. | District Council Lakki Marwat / Local Governing Bodies for Rural Areas of Lakki Marwat District |

The below maps illustrates the proposed locations for Waste Water Treatment Plants (WWTPs) in District Lakki Marwat, including specific sites in all 4 Tehsils. These proposed WWTP zones are strategically placed to support existing and proposed urban areas.



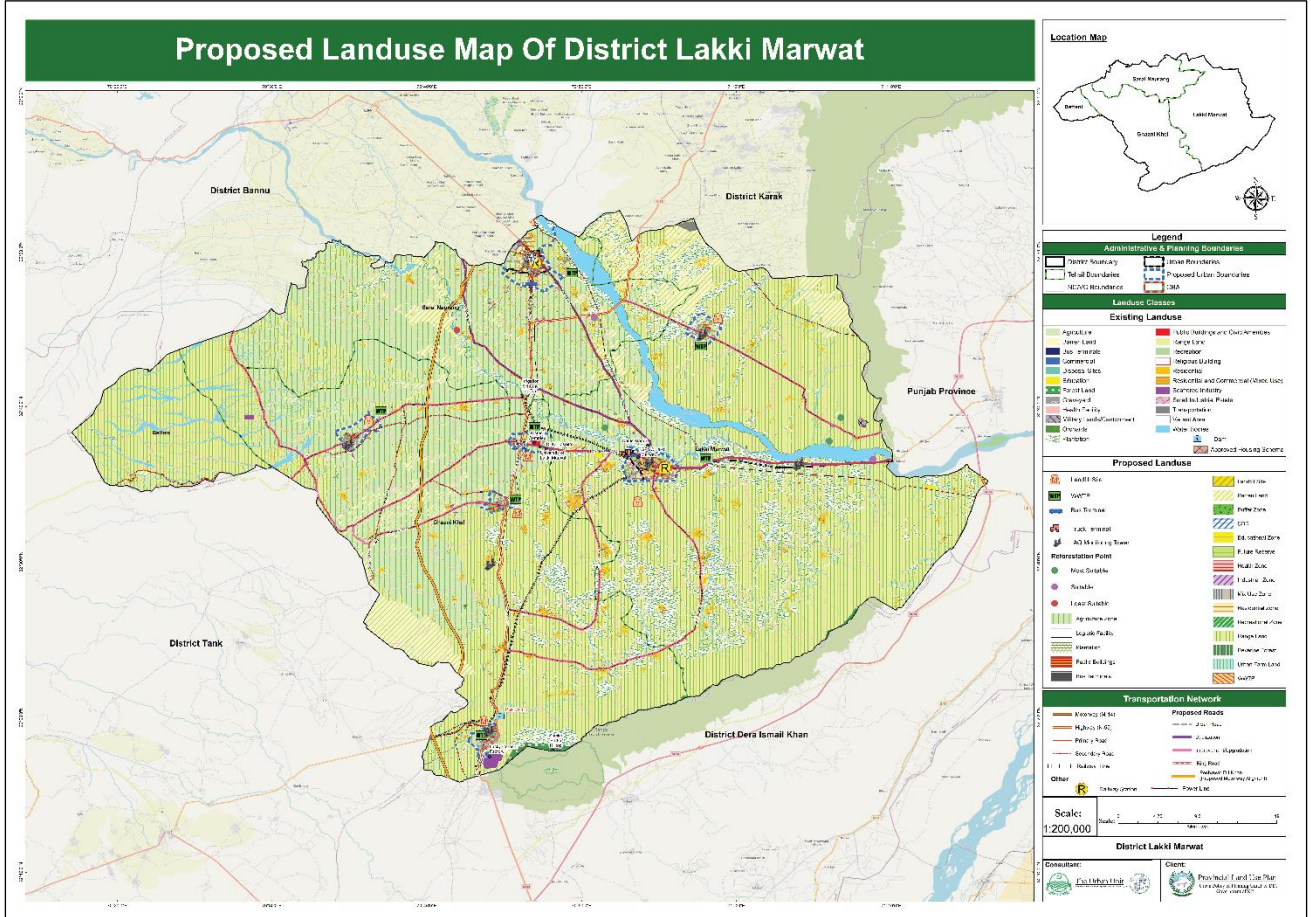
Map 9-2: District Lakki Marwat Proposed Wastewater Treatment Plan



Map 9-3: District Lakki Marwat Proposed Waste Water Treatment Plant

9.6 Proposed District Land Use Plan

The section discusses the proposed land use plan of District Lakki Marwat, with a specific focus on the existing and planned water and sanitation infrastructure. It highlights key urban and rural settlements, water supply networks, wastewater systems, and areas designated for future development. This visualization serves as a critical reference for understanding the spatial distribution of resources and infrastructure, aiding in effective planning and decision-making for the water and sanitation sector.



Map 9-4: Proposed Landuse Map of District Lakki Marwat

10 Environment

The District Land Use Plan for Lakki Marwat proposes a sustainable future in which environmental conservation and sound forestry management are critical to establishing ecological balance and encouraging socioeconomic growth throughout the province. Lakki Marwat's unique environmental profile, characterized by its arid to semi, sub-tropical climate, agricultural dependency, and diverse natural resources, faces pressures from urbanization, deforestation, water scarcity, habitat loss mining & industrial sectors, and climate change.

Land use is considered a critical indicator of a complex interaction among natural processes and city dimensions in which environmental landscape is paramount for the sustainable development of cities. Thus, the of the existing state of the environment and relevant policy and legal framework is integral to understanding the prevailing issues of each district of the project area.

Lakki Marwat is home to diversified ecological habitats situated in an arid region, the district faces frequent droughts, erratic rainfall, and rising temperatures, which threaten both biodiversity and natural habitats. Degradation of rangelands and deforestation for fuel and grazing have significantly reduced biodiversity and increase risk of threats on native flora and fauna. . An effective conservation measures may enhance the potential of reforestation and biodiversity richness in the region. Local community engagement in

conservation and protection of wildlife habitats will enhance the regional biodiversity. A balanced land use strategy prioritizes afforestation, watershed management, and the protection of ecologically sensitive zones to enhance biodiversity potential. Integrating climate-resilient and community-based conservation programs can help to preserve biodiversity while ensuring livelihoods. Additionally, zoning regulations prevent encroachment on forests and wetlands. Lakki Marwat is sheltering ground of migratory bird species like the common crane and demoiselle crane.

10.1 Issues and Constraints

The following major issues are identified through background studies, on-ground field surveys, analysis of legal gaps, and consultations with government departments and local communities;

- Human activities and a changing climate are endangering wildlife day by day. Habitat destruction of district natural ecosystem is major threat of habitat loss as well as Land degradation.
- Air Pollution is another area of concern due to the haphazard urbanization, unregulated development, unsustainable mining practices, lack of enforcement of environmental quality standards and limited environmental monitoring.
- The dense canopy forest cover is decreasing annually at the ratio of 1% per annum which leads to migration and declination of animal's populations
- Some of the important species of Lakki Marwat under threaten category of the region due to deforestation and other human interacting factors (Hunting, Pouching and wildlife trading).
- The climate change adaptation and mitigation measures are insufficient to manage the frequent episode of climatic events like heat waves, floods and droughts in the district.
- Community unawareness is also a major threat towards effective preservation, conservation and management of natural resources. Community conservation frameworks can be helpful to promote ecological balance and biodiversity richness.
- Wetland degradation is also responsible for the decline of migratory fauna at wetlands associated with district Lakki Marwat.

The key constraints are as follows;

- Lack of baseline data and resource statistics at district and tehsil level are found to be major constraints in understanding the current state of environment in the district.
- Mainstreaming of climate change adaptation and mitigation at district and tehsil levels.
- Institutionalization of environment and climate change component at the lower tier of the government with clear set of roles and responsibilities.
- Weak enforcement and monitoring and limited resources (HR, funds, equipment's) are restraining the efforts to implement environmental standards in the district.

10.2 Recommendations and Future Directions

In order to propose future interventions, a comprehensive primary and secondary data analysis was done of protected /environmentally sensitive areas of district Lakki Marwat.

For Restoration and Forest Management, a Criteria was developed for field assessments to identify the needs for restoration activities and to plan future interventions. The criteria and the assessment results of the selected sites are **Tabulated** below;

Table 10-1: Site Suitability in Lakki Marwat District

| Name | Forested Land | Blank Area | Soil Suitability | Plantable Area | Category* |
|---------------------|---------------|------------|------------------|----------------|-----------|
| Thanedarwala | ● | ● | ● | ● | A |
| Crane wildlife Park | ● | ● | ● | ● | B |
| Pahar Khel Thal | ● | ● | ● | ● | A |

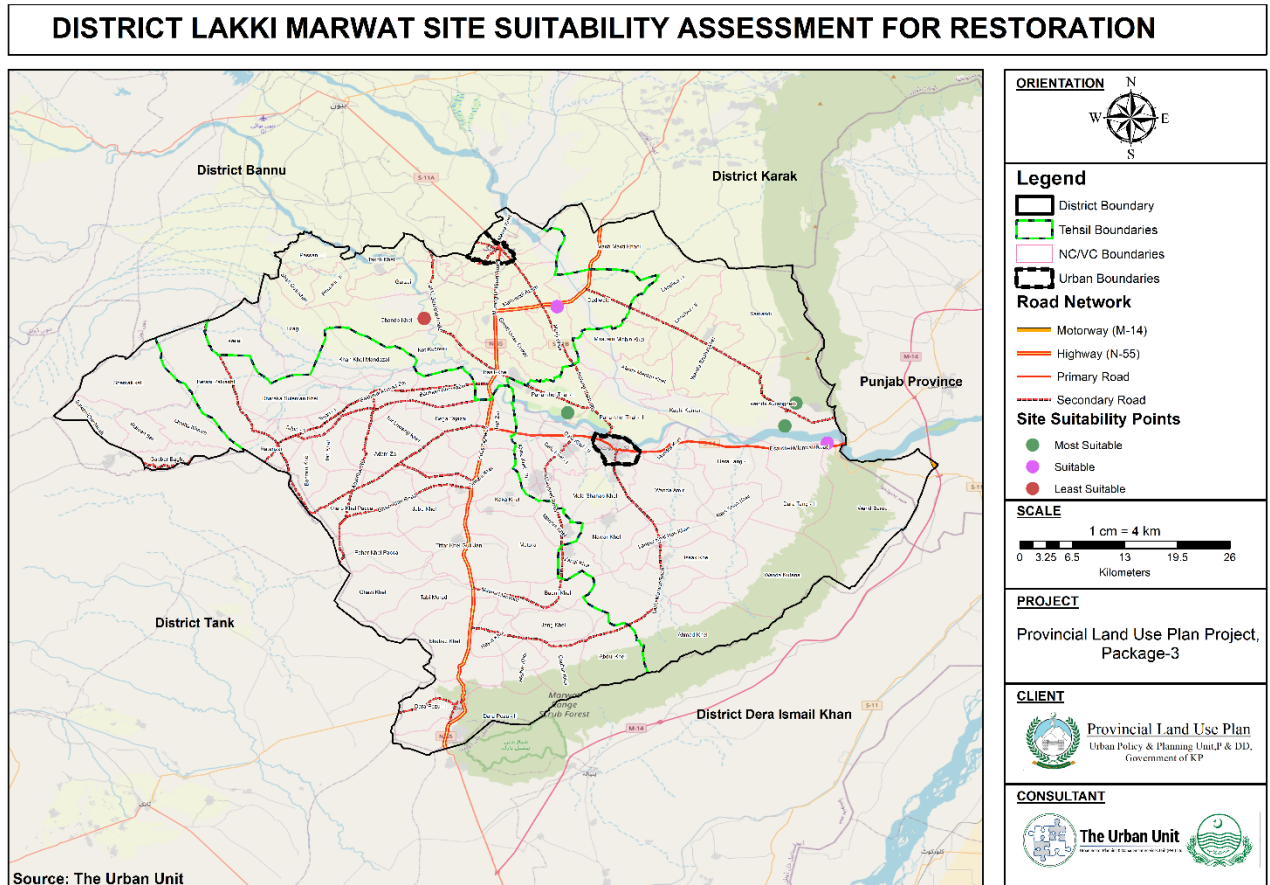
| | | | | | |
|----------|---|---|---|---|---|
| Musaabad | ● | ● | ● | ● | B |
| Daratang | ● | ● | ● | ● | C |

*Classification

A: More Suitable for Reforestation and Forest Management

B: Moderate Suitable for Reforestation and Forest Management

C: Less Suitable for reforestation and Forest Management



Map 10-1: Forest Site Suitability for Forestation in District Lakki Marwat

10.3 Future Plan of Action

| What | How | When | Who | Where | Why |
|--------------|-----------------------------------|-----------------|--|--|--|
| Green Spaces | Rehabilitation of existing parks; | ADP 2025 | Local Government ⁵⁰ | All Public Parks | Better Air Quality; recreation; social cohesion |
| | Greening of Cities | ADP 2025-Onward | Local Government; Forestry, Environment & Wildlife Department; | Open spaces, public buildings and institutions; newly constructed buildings; green belts; road site plantations; | Reduce Urban Heat Island Effect; Act as permeable surface to hold heavy precipitation; improve environmental |

⁵⁰ The KP Local Government Act, 2013 Section 2 (r) while defining the scope of 'municipal services' also include the public parks, gardens, arboriculture and landscaping in the mandate of local Governments and local areas development authorities.

| What | How | When | Who | Where | Why |
|---|--|----------------------|--|---|---|
| | | | | landscape development | quality; Increase aesthetics and land market value |
| Air Quality Monitoring | Installation of AQ Monitors/ Sensors | ADP 2025-Onward | EPA KP | Mining Sites; Industrial Sites; Main Highways (Congestion Points) | To improve environmental quality and reduce air attributed disease burden |
| Reforestation | Seed Broadcasting and Planting Native Species | Spring 2025-Onward | Forest & Wildlife Department, KP | Protected Areas | Habitat Restoration, Forest Conservation and Environmental Improvement |
| Community Involvement and Academia Engagement | Awareness and Community Based Organization | Throughout the year | Forest & Wildlife Department; Environment Protection Agency; LGs | All Protected areas | Conservation of threatened Species |
| Enhance Technical Capacities | Training Programs – Environmental Protection, Climate Resilience, Forestry and Biodiversity Conservation | As per Training Plan | EPA and Forest Department and other Relevant Departments | District and NC/VC | Increased knowledge on the technical aspects will lead to better planning and implementation. |

10.4 Greening of District

Lakki Marwat district characterized by sparse vegetation with only 241 acres of forest land and largely depends on rangelands areas of district which covers around 30% of total land area. Water scarcity, soil erosion, overgrazing, and fuelwood collecting are the leading concern of district Lakki Marwat. In district, a very low tree cover, mostly planted along the roads and water channels. The recreational opportunities and urban green spaces are being underdeveloped, and does not meet the required minimum space i.e. 0.9 hectares per 1000 persons. Therefore, Lakki Marwat required urgent need to develop existing public green spaces and established new green spaces to meet per capita requirement for betterment of community health and wellbeing.

10.4.1 Policy and Regulatory Measures

The following measures needs to be taken for Lakki Marwat to enhance the environmental sustainability and resilience of the district.

- Strict enforcement of existing laws and action plans enacted to provincial scale like KP Environmental Protection Act, 2014 and the KP Wildlife and Biodiversity (Protection, Preservation, Conservation and Management) Act, 2015, KP Climate Action Plan 2022, etc. along with KP Land-Use and Building Control Act, 2021 and the KP Urban Areas Development Authorities Act, 2020 and other related instruments to ensure environmental sustainability at district scale.
- Introduce heavy fines for illegal felling of trees to deter deforestation and encourage responsible construction practices in Lakki Marwat district.

- Ensure that only indigenous tree species should be planted in public spaces, parks, and along roads for ecological compatibility and preserve local biodiversity. This would also help maintain Lakki Marwat's natural habitat and enhance the beauty of urban areas.
- Develop urban green corridors to improve the environmental values and beautification of Lakki Marwat urban centers. These urban corridors are linear parks and green belts that can connect existing green spaces. The green corridor may also develop along railway lines, roads, canals, and nullahs in the district. The linear plantation can also be done through extensive ornamental plantation. Such green corridors not only cool urban areas and improve air quality by creating cool air paths but also provide significant benefits for urban biodiversity.
- Given Lucki Marwat's proximity to agricultural and semi-arid regions, there should be a concerted effort to green the canal roads and surrounding tracts. Planting trees along these routes would serve as natural windbreaks, prevent soil erosion, and improve the visual landscape.
- Encourage private property owners to convert rooftops of 100 m² or larger into green roofs, which can help in managing storm water, improving air quality, and creating green urban spaces. Green roofs would also provide significant insulation and reduce the urban heat island effect.
- Ensure that a minimum of 0.9 hectares per 1000 persons of accessible, urban green space is provided. This includes parks, gardens, and tree-lined streets. This would improve public health, reduce pollution, and provide recreational spaces for growing urban population.
- In all large development and construction projects, including housing societies, the removal of trees should be prohibited unless absolutely necessary. If the removal is required, it should be mandated that new trees are planted according to the area's ecological needs.

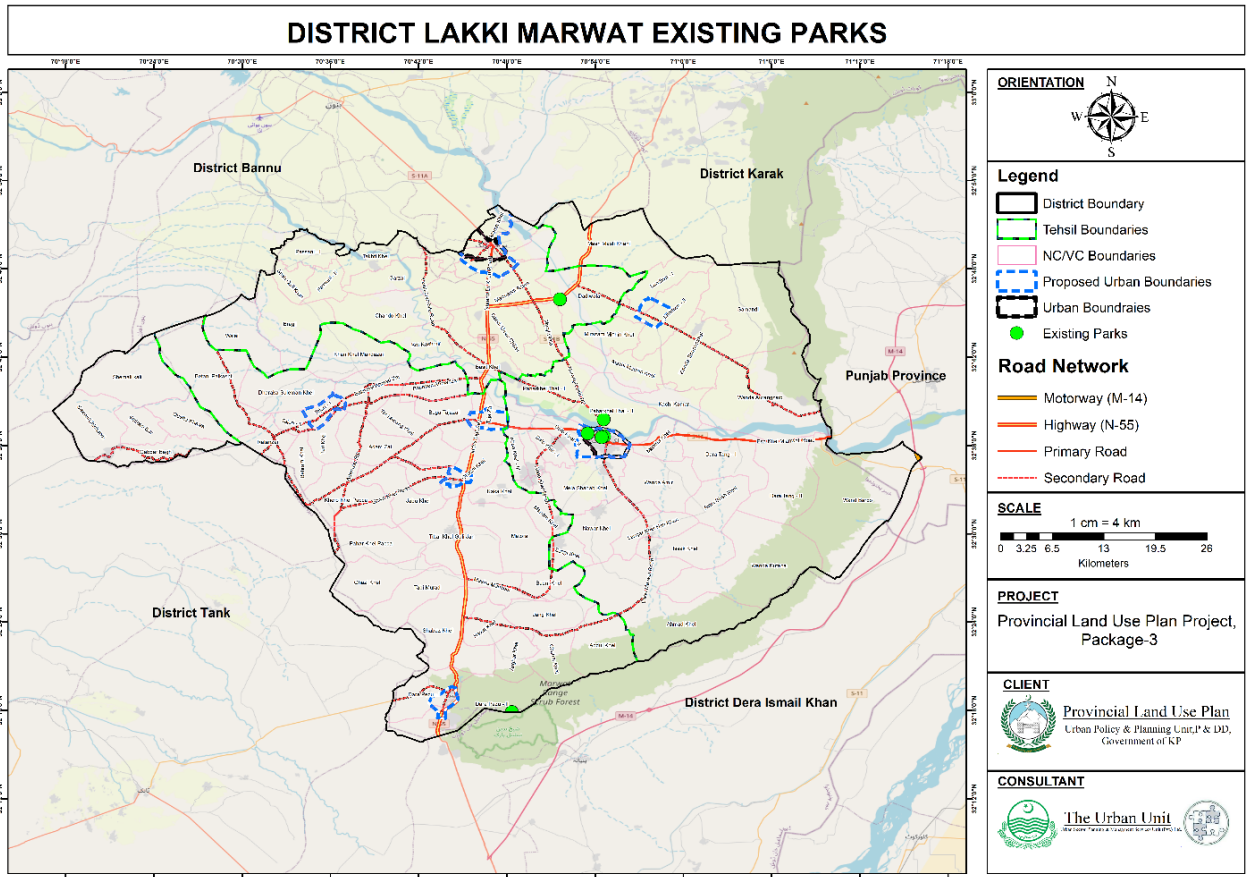
10.4.2 Urban Greening Monitoring Framework

- Create a monitoring framework to measure success of greening efforts in the district, including tree planting, park development, and green roof initiatives.
- Adopt city biodiversity index Practices to assess the status of urban biodiversity. City Biodiversity richness enhances the biodiversity conservation and ecosystem sustainability.
- Create a community-based geo tagging system that allows residents to crowd source information about tree locations and upload photos of them. This method engages residents in conservation efforts and creates a real-time database of urban trees for planning and upkeep.
- Regular assessments should be conducted to ensure that district-wide greening goals are met, and corrective measures should be adopted as needed.

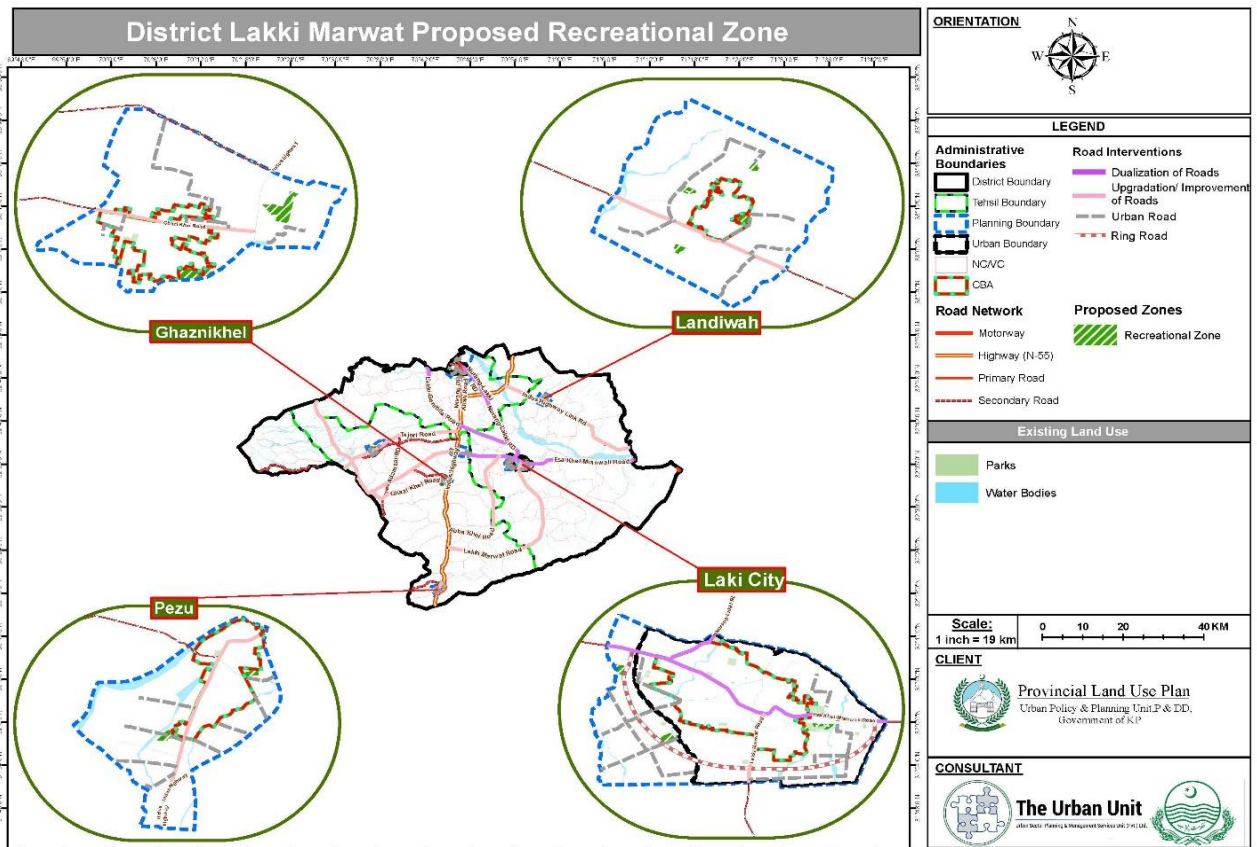
10.5 Rehabilitation of Existing Parks

Parks are essential for striking green spaces, promoting sustainability and improved the visual appeal of urban areas. Lakki Marwat district is facing unplanned urban expansion and land use, coupled with few parks for whole district.

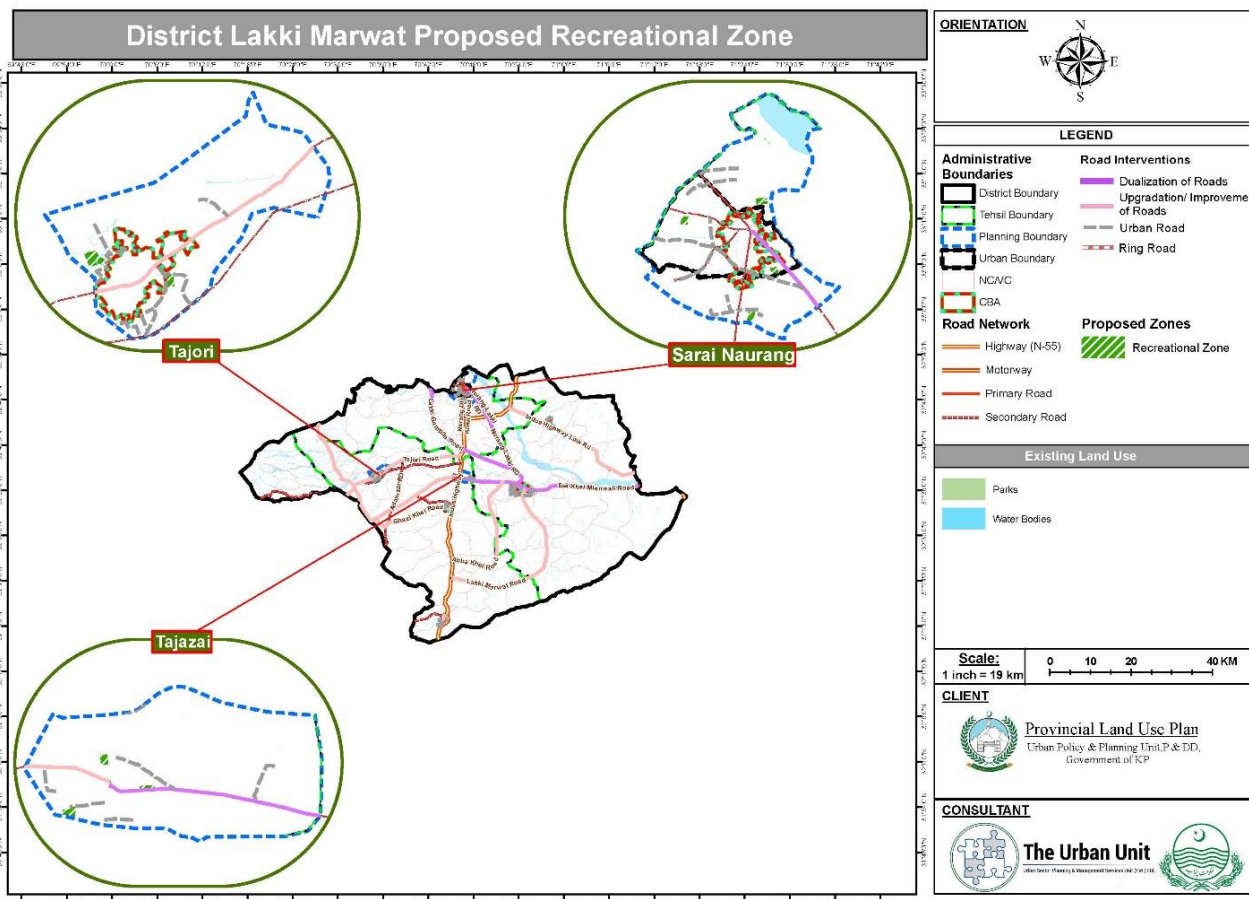
Green spaces are essential to promote the sustainable urban development in urban settings. On the other hand, careless urban growth with poorly developed or unavailability of open green space not only effect the area's sustainability but also negatively impacts communal health and well-being. One of the urgent need for developing sustainable cities is to gives priority to the developed the accessible urban green space for the community. This standard offers valuable guidance for sustainable land use planning to mitigate green spaces challenges. Below **Map** shows the existing parks followed by the proposed parks in the urban centers of District Lakki Marwat.



Map 10-2: Existing Parks in District Lakki Marwat



Map 10-3: Proposed Recreation Zone in Urban Centers



Map 10-4: Proposed Recreation Zone in Urban Centers

10.5.1.1 Conceptual Design

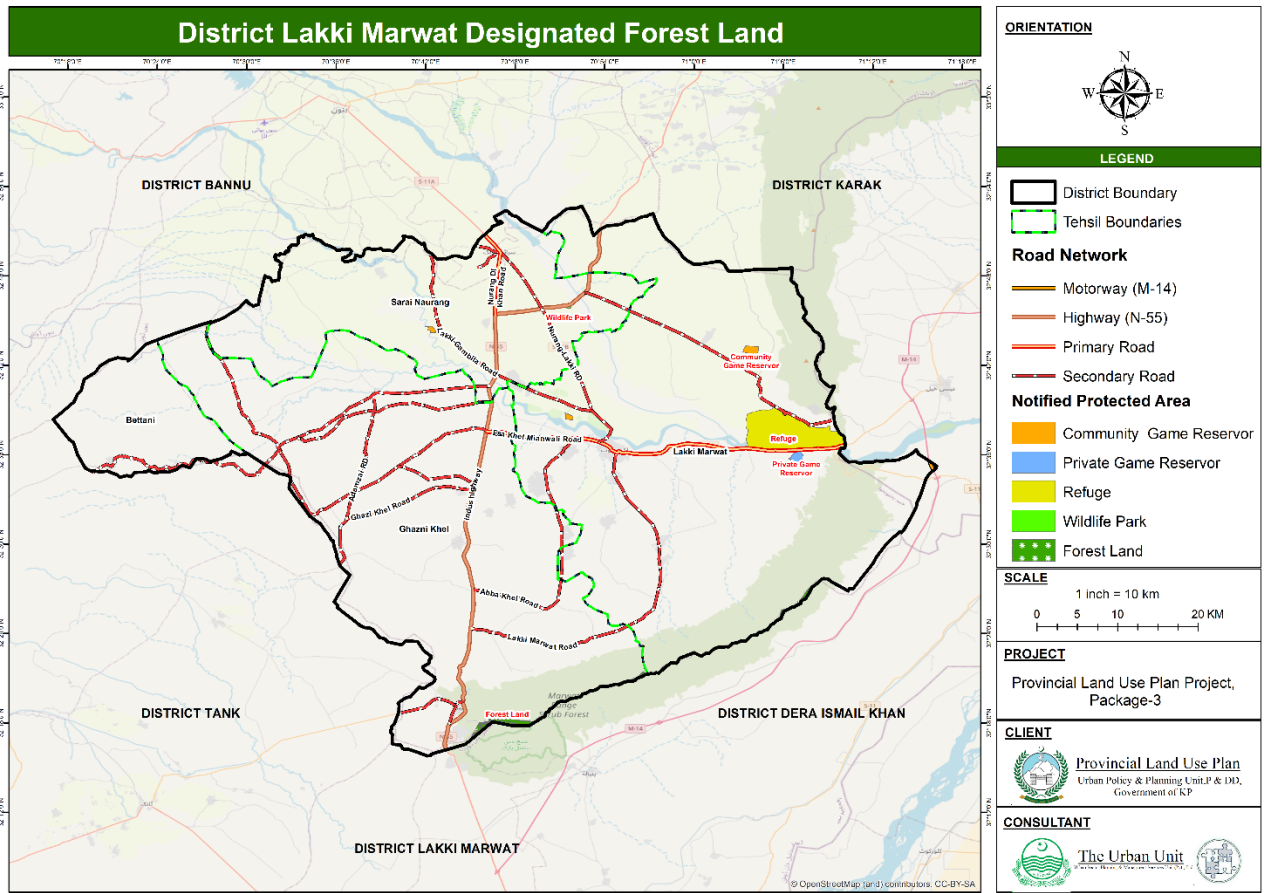
The proposed conceptual design for provision of parks in Lakki Marwat strives to create an inclusive, sustainable, and vibrant green space that caters to the diverse needs of the local community, with particular attention to gender aspects. The following elements are recommended for rehabilitation of existing parks and development of new parks;

- Provision of soft scape including grassy lawns, a rose garden, and scattered plantation to enhance aesthetic appeal, promote biodiversity, and provide a peaceful environment for all visitors.
- Proposed plantation of indigenous, ornamental, medicinal, flowering, and fruiting plants, which will support faunal diversity, especially attracting regional birdlife and contributing to the ecological balance.
- Hardscaping components such as a parking area, toilet block, jogging track, recreational facilities like swings, playland, and a cycling track to encourage physical activity and provide entertainment options for the entire community.
- Women’s-only spaces within the park, such as dedicated walking tracks, sitting areas, and outdoor exercise zones, to create a comfortable and secure environment for women.
- Seating areas designed with a focus on comfort and safety, encouraging social interaction, relaxation, and inclusive participation from all genders.
- Child-friendly zones with designated play areas and safe, shaded seating to cater to families, with special consideration for mothers and caregivers.
- Water features such as small ponds or fountains that contribute to a serene ambiance while creating spaces for quiet reflection and social interaction.
- Lighting designed to ensure safe evening use, with a particular focus on well-lit pathways and areas frequented by women and children.

- Gender-sensitive public restrooms, with separate facilities for women and men, ensuring privacy and security.
- Accessibility features, such as ramps and wide pathways, to accommodate people with disabilities, ensuring that the park is inclusive for all members of society.
- Waste management facilities like bins and recycling stations that promote cleanliness and environmental consciousness while ensuring convenience and accessibility for all visitors.

10.5.2 Urban Afforestation

Currently, only 241 acres (0.03%) of the total land area (3,164 km²) of Lakki Marwat District is designated as protected forest land. The district's forested area is divided into two categories i.e. private plantations and protected forests under the forest act, 1927 (amended 2015).



Map 10-5: District Lakki Marwat Designated Forest Land

The forest plantation initiative in the district aims to significantly expand tree cover by planting native species on barren, degraded, and ecologically suitable lands. This effort focuses on selecting tree species that are well-adapted to the local climate, soil, and ecological conditions, thereby boosting biodiversity and creating valuable wildlife habitats. Land currently under forest cover, there is an urgent need for large-scale plantation activities. By introducing a diverse range of tree species, this initiative will help restore habitat connectivity, combat deforestation, and address land degradation and water scarcity. Furthermore, integrating land use planning and fostering community participation in forest land management will ensure sustainable and effective stewardship of these resources for future generations.

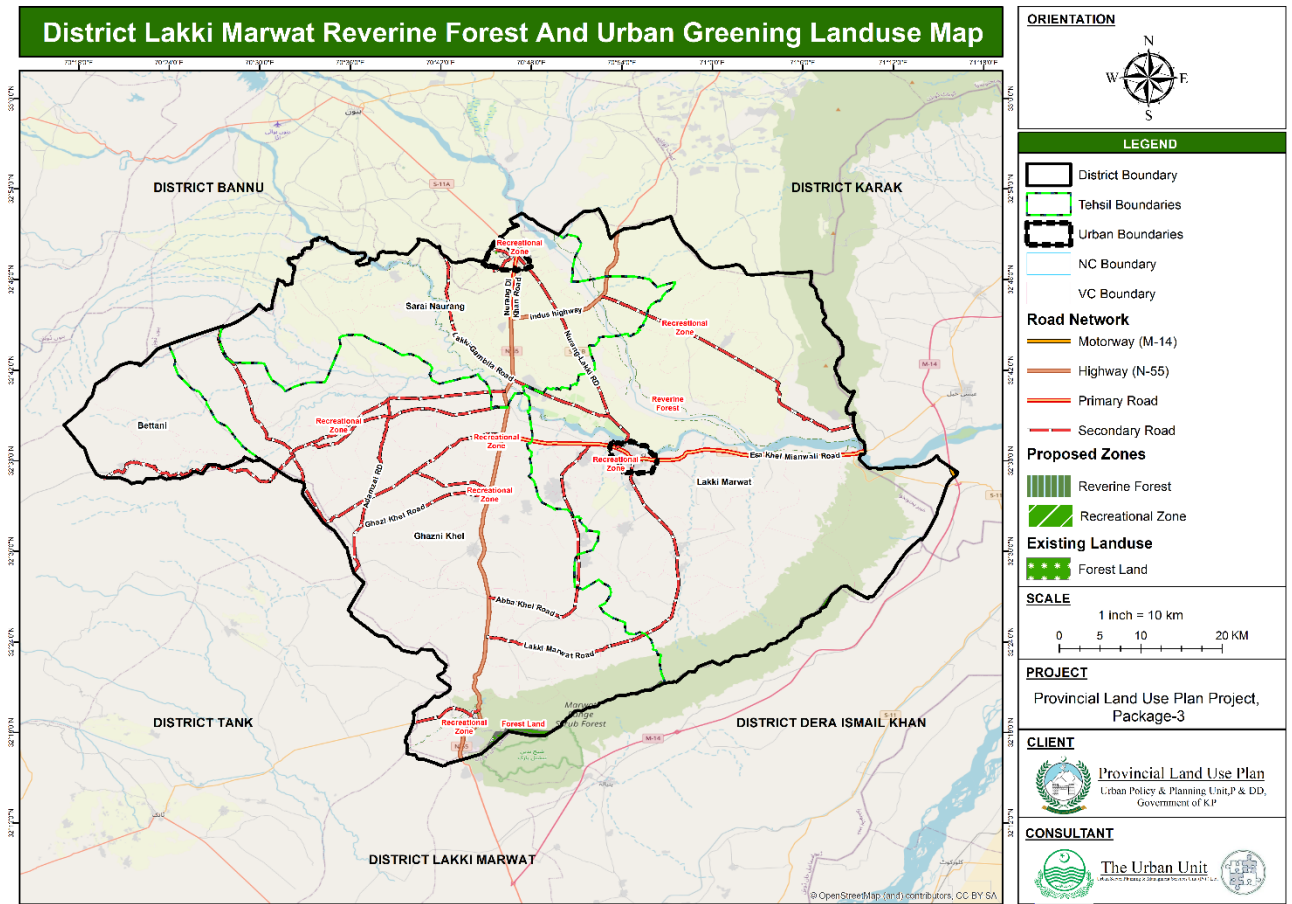
10.5.2.1 Proposed Sites

- Daratang
- Musabad
- Thanedaar wala
- Urban Forest Spaces
- Private Plantation Initiatives through PPP

- Along Roads and Water Channels
- Development of Green Corridos

10.5.2.2 Conceptual Design

- The seedling plantation and seed dispersal may carry based on mixed indigenous plantation to attain desired tree cover and conserve the wild diversity of the region.
- The species selection based on indigenous plant species which are native to the division includes:
 - *Acacia modesta* (Phulai)
 - *Acacia nilotica* (Kikar)
 - *Ziziphus nummularia* (Beri)



Map 10-6: District Lakki Marwat Riverine Forest and Urban Greening

10.6 Enhance Air Quality

Lakki Marwat district is facing moderate air quality issues that are mainly associated with industries (including brick kilns and cement factories), mining and transport sector. To maintain the air quality below the national ambient quality standards, it is important that sound policy and physical measures are included in the future plan to attain the desired results.

10.6.1 Policy and Regulatory Measures

- Provide eco-friendly transportation infrastructure to ease commuting, reducing traffic jams, better connectivity and reduce environmental pollution.
- Stringent enforcement of environmental quality standards in the pollution hotspot areas and industries.
- Encourage industries to focus on renewable energy sources, such as solar or wind, to reduce reliance on fossil fuels.
- Monitor and impose a fine on stubble or waste burning.

- Increase in tree cover through tree plantation campaigns along roadsides, in public parks, and around industrial zones to act as natural air filters and accord environmental approval of all development projects as per KEPA 2014.
- Implement stricter regulations on mining operations, particularly concerning dust control and emissions.
- Promote the use of non-motorized vehicles, such as bicycles, as a means to reduce pollution from mobile sources.
- Improvement of road infrastructure to avoid dust and noise with a provision of dedicated bike paths, pedestrian zones, and repair & maintenance work.
- Inspections and regulation for proper use of PPEs by workers related to mining industry.

10.6.2 Technology Transfer

- Technology diffusion in brick kilns to manage black smoke.
- **Remote Sensing & GIS:** For environmental impact assessment and monitoring illegal mining activities.
- Greening of all industries located in Lakki Marwat district and ensure installation of emission control system.
- Introduce dust suppression technologies such as water spraying systems on mining sites and roads used by mining trucks.
- **Solar and Wind Energy Technologies:** For clean, decentralized power generation.
- Introduction of low-impact, energy-efficient, and water-conserving mining equipment to reduce environmental degradation. These technologies minimize land disturbance, reduce greenhouse gas emissions, and limit water consumption during mineral extraction processes.

10.6.3 Air Quality Monitoring

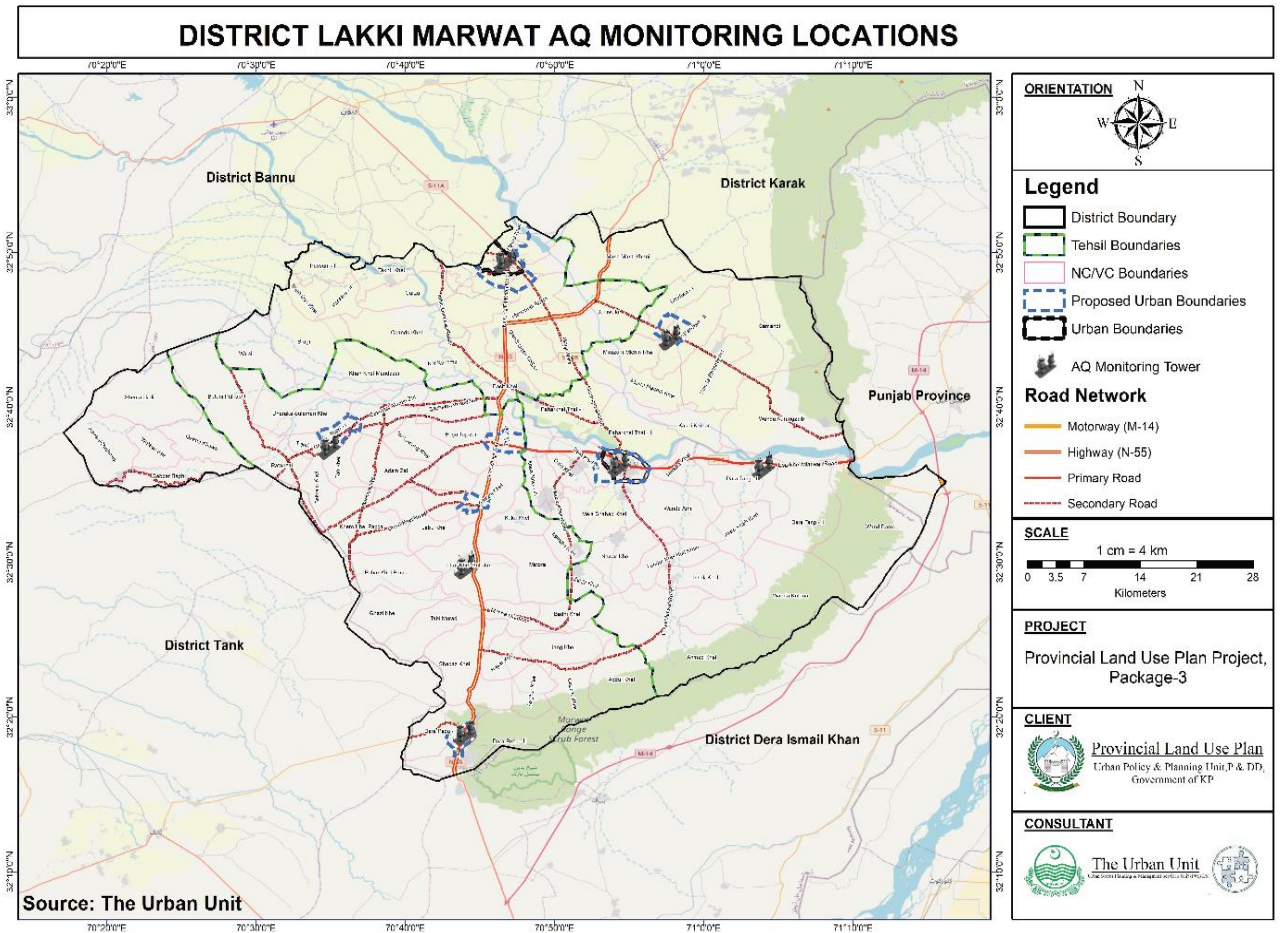
- Installation of air quality monitoring station for continuous monitoring of ambient air in Lakki Marwat district.

10.6.4 Scope

This project aims to record particulate matter concentrations (PM_{2.5} and PM₁₀) in the hotspot areas of Lakki Marwat district for continuous monitoring and informed decision making. A district level air quality monitoring dashboard for disclosure of information and issuance of health advisory is recommended.

10.6.4.1 Activities

Installation of air quality monitoring equipment /stations and a network of low-cost sensors in hotspot areas of District Lakki Marwat.



Map 10-7: AQ monitoring locations in District Lakki Marwat

11 Natural Hazards

Lakki Marwat district in Khyber Pakhtunkhwa Province is vulnerable to several natural hazards, including earthquakes, floods, and heatwaves, all of which threaten the region's socio-economic well-being. Located in Seismic Zone 2B, the District Lakki Marwat faces a moderate risk of earthquakes, as highlighted by the 2015 tremors that emphasized the necessity for earthquake-resilient infrastructure and stronger community preparedness. Devastating floods in 2010 and 2022 in Lakki Marwat caused widespread damage, primarily due to poor drainage systems, absence of early warning systems, and unchecked urban expansion.

Although large-scale landslides have not yet occurred, the threat may rise with heavy rainfall and unsustainable land use. The District Lakki Marwat also experiences extreme heatwaves, with temperatures exceeding 40°C, posing significant health hazards—particularly for at-risk groups—underscoring the urgency for climate-resilient urban planning, upgraded water systems, and greater public awareness efforts.

11.1 Earthquake Resistant Plans

Located in Seismic Zone 2B, Lakki Marwat District faces moderate earthquake risk due to the tectonic activity of the Indian and Eurasian plates. Though historically less affected, past quakes (magnitude 4–5) have caused localized damage and service disruption. Vulnerabilities arise from inadequate infrastructure and limited preparedness, highlighting the need for earthquake-resistant construction and proactive risk reduction measures.

11.1.1 Seismic Risk Profile of Lakki Marwat

11.1.1.1 Seismic Zone

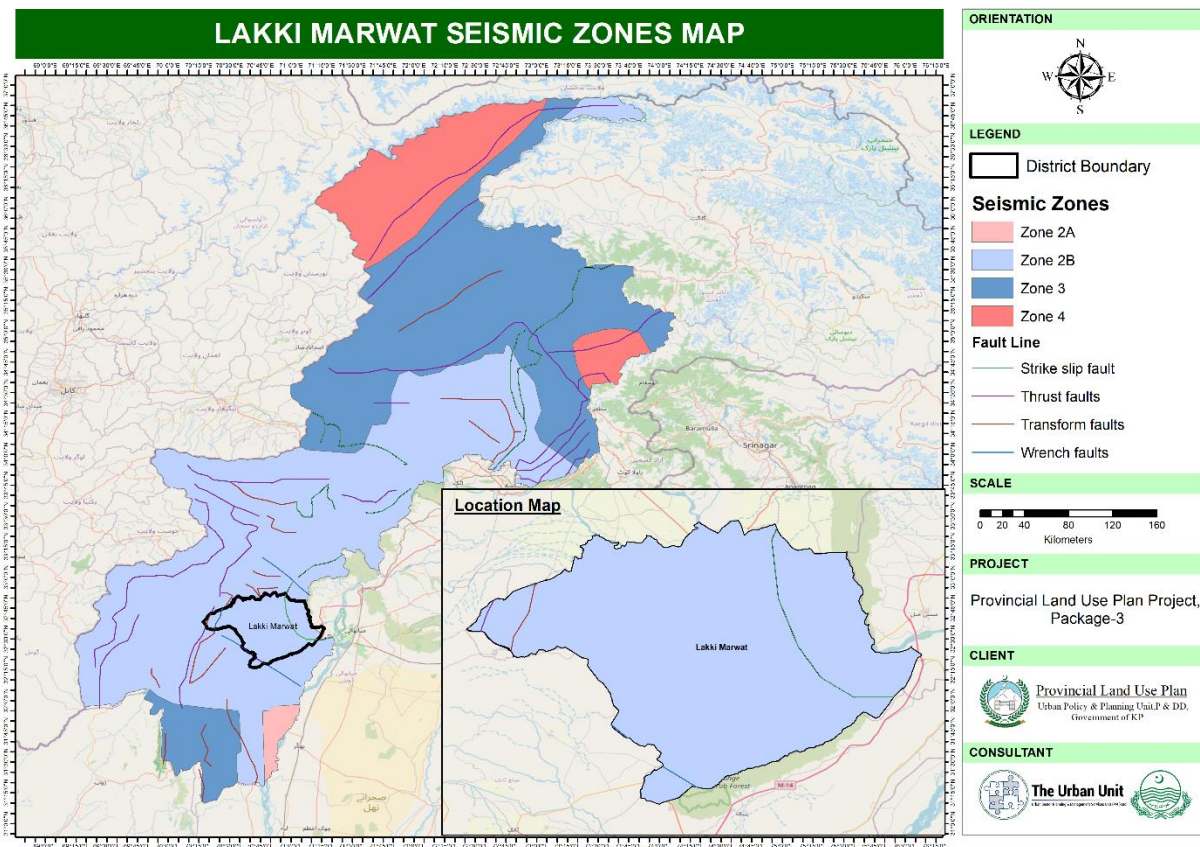
According to Pakistan Building Code 2007, Pakistan is divided into 5 zones which are mentioned in the **Table**.

Table 11-1: Seismic Zone distribution indicating hazard level and PGA

| Zone | Seismic Hazard Level | Peak Ground Acceleration (PGA) |
|---------|----------------------|--------------------------------|
| Zone 1 | Low | 0.05 to 0.08g |
| Zone 2A | Moderate-Low | 0.08 to 0.16g |
| Zone 2B | Moderate-High | 0.16 to 0.24g |
| Zone 3 | High | 0.24 to 0.32g |
| Zone 4 | Very High | >0.32g |

*Where 'g' is the acceleration due to gravity

Lakki Marwat District falls under Seismic Zone 2B, indicating moderate to high seismic risk, similar to other southern Khyber Pakhtunkhwa Districts. The region lies near the Main Frontal Thrust (MFT) zone, making it vulnerable to tectonic movements caused by the collision of the Indian and Eurasian plates. Past tremors of magnitude 4–5 have been felt in the region, but the infrastructure remains largely unprepared for a major seismic event.



Map 11-1: Lakki Marwat Seismic Zones

11.1.1.2 Zone 2B (Moderate-High Risk)

- **Structure:** Reinforced concrete (RC) frame structures with shear walls or braced frames mandatory.
- **Foundation:** Deepened or pile foundations may be recommended based on soil conditions.
- **Design Requirements:**
 - Seismic design must follow Zone 2B requirements in BCP-2007 (use seismic coefficient $Z = 0.24$).
 - Importance Factor (I): 1.0 for residential, 1.25–1.5 for critical facilities (schools, hospitals).
- **Retrofit Need:** Retrofitting of all unreinforced masonry or adobe structures in urban areas.

The summarized requirements regarding infrastructure development and land use planning are mentioned in the **Table**.

Table 11-2: Summary of development strategies by Seismic Zones

| Seismic Zone | Land Use Planning | Infrastructure Development |
|--------------|---|--|
| Zone 2A | Permit moderate density; avoid soft soils. | Require basic seismic detailing. |
| Zone 2B | Controlled densification; restrict hillside or slope cuts. | Use RC frames, tie beams, and confined masonry. Mandatory code checks. |
| Zone 3 | Limit high-rise development. Focus on horizontal expansion. | Reinforced shear walls; ductile detailing; critical facility retrofitting. |
| Zone 4 | Avoid construction on slopes and soft deposits. | Only permit development with isolation techniques or deep foundations. |

11.1.2 Earthquake Resistant Structural Design and Construction Practices in Lakki Marwat

11.1.2.1 Confined Masonry Construction:

- Widely used in residential buildings and schools, especially in Lakki Marwat's rural and semi-urban areas.
- Brick or stone walls are confined with reinforced concrete (RC) bands at plinth, lintel, and roof levels.
- Promoted by ERRA and PDMA following post-2005 awareness campaigns.

11.1.2.2 RC Frame Structures with Brick Infill:

- Used in health facilities, schools, and government buildings built after 2010.
- Reinforced concrete columns and beams provide seismic resistance, while brick acts as infill material.

11.1.2.3 Low-Rise Construction:

- Lakki Marwat's built environment consists mainly of single- and double-storey buildings, which is favorable for seismic safety if properly reinforced.

11.1.2.4 Compliance with Pakistan Building Code 2007 (Seismic Provisions)

Pakistan's seismic design requirements are laid out in the Building Code of Pakistan – Seismic Provisions 2007, which is enforced for new constructions, especially for public buildings. In KP, and specifically in Lakki Marwat District the code classifies Lakki Marwat as Seismic Zone 2B (moderate risk). It mandates minimum structural safety features such as:

- Use of reinforced concrete frames.
- Provision of shear walls.
- Anchored and tied-down roofs.
- Foundation reinforcements suitable for regional soil types.

Note: In Lakki Marwat, actual enforcement is often weak in private constructions due to lack of regulatory oversight, but public sector projects (schools, hospitals) increasingly follow the code.

11.1.2.5 Retrofitting Practices in Existing Buildings

- **Steel Bracing and Jacketing:**
 - Retrofit older school buildings and health units by adding steel braces or jackets to beams and columns.
 - Common in ERRA-funded post-2005 earthquake programs, extended into KP districts.
- **Shear Wall Addition:**
 - Existing structures in KP cities (including Lakki Marwat District) are sometimes retrofitted with external or internal shear walls, especially in public schools.
- **FRP Wrapping:**
 - Fiber Reinforced Polymer (FRP) sheets are used to strengthen columns and beams in critical public buildings.
 - Though relatively expensive, this method has been piloted in urban KP (e.g., Peshawar) and may be extended to district centers like Lakki Marwat District through donor projects.

11.1.2.6 Common Materials and Techniques in Lakki Marwat Region

- **Locally available Brick and Stone:** Combined with cement mortar and reinforced with rebar cages.
- **Use of Tori (Ring Beams):** A traditional method of placing horizontal RCC bands at plinth, lintel, and roof levels in rural homes.
- **Steel Reinforcement from Local Markets:** Mild steel bars and mesh are widely used in both confined masonry and RC frame structures.
- **Plinth-Level Reinforcement:** Local masons often raise the plinth and include horizontal ties to prevent differential settlement and improve seismic performance.

11.1.3 Land-use Planning of Lakki Marwat District

Most of Lakki Marwat's agriculture is rain-fed, with limited irrigated farming supported by small-scale water storage projects. The district Lakki Marwat has a small dam constructed to support irrigation and domestic water use:

- Pezu Dam

Urban planning within the main urban area—Lakki Marwat Township—is overseen by the Lakki Marwat Development Authority (LMDA). Its functions include:

- Infrastructure development (roads, drainage, water supply)
- Solid waste management
- Provision of parks and green spaces
- Street lighting and sanitation improvement

The LMDA works under the directives of the Local Government and Rural Development Department of KP.

11.1.3.1 KP Urban Policy 2022–2030:

The Urban Policy Unit under the Planning & Development Department KP has set a framework that applies to all Khyber Pakhtunkhwa Districts, including Lakki Marwat. The policy mandates:

- Preparation of spatial plans and land use zoning for tehsils
- Regulating markets, housing, roads, and infrastructure development
- Preventing unplanned urban sprawl
- Promoting integrated land use tied to hazard mitigation (e.g., in floodplains or seismic zones)

11.1.3.2 Khyber Pakhtunkhwa Rivers Protection Ordinance, 2002:

This ordinance guides land use in river catchment areas, including:

- Restricting construction near rivers to prevent pollution and ecological damage
- Protecting aquatic ecosystems and ensuring buffer zones

11.1.4 Early Warning Systems

In Pakistan, earthquake early warning systems (EWS) are at a foundational stage. While there is no fully operational public EWS, several institutional measures exist:

- The Pakistan Meteorological Department (PMD) operates the National Seismic Monitoring Centre (NSMC), with over 30 seismic stations across Pakistan, including in KP.
- These stations collect real-time seismic data, which is analyzed at PMD. Alerts are relayed to the Provincial Disaster Management Authorities (PDMA).
- In KP, PDMA KP collaborates with district administrations (including Lakki Marwat) to issue warnings via SMS, media, and administrative channels.
- While automated citizen alerts (e.g., apps, sirens) are not fully implemented, Pakistan is engaged in partnerships (e.g., with Japan and UNDP) to develop such systems.

11.1.5 Community Awareness and Training

- The Earthquake Reconstruction and Rehabilitation Authority (ERRA) and NDMA have created earthquake safety training materials distributed through schools and local government structures.
- In Khyber Pakhtunkhwa, school safety drills are periodically conducted in collaboration with PDMA Khyber Pakhtunkhwa and the Education Department.
- Awareness campaigns have been conducted in districts like Lakki Marwat to train community volunteers, teachers, and health staff on safe evacuation and emergency protocols.

11.1.6 Risk Assessment

- NDMA and UNDP have carried out Multi-Hazard Vulnerability Risk Assessments (MHVRA) across KP, identifying seismic risks at district and tehsil levels.
- PDMA KP has developed a Hazard Risk Profile Atlas that includes earthquake risk zones. Lakki Marwat is classified as a Zone 2B (moderate risk).
- These assessments guide decisions on zoning, building approvals, and public infrastructure planning.

11.1.7 Policy and Regulation

- Building Code of Pakistan – Seismic Provisions 2007 (BCP-2007) is enforced in public and institutional buildings, requiring compliance with earthquake-resistant design.
- Khyber Pakhtunkhwa Land Use and Building Control Act 2021 empowers authorities to regulate construction based on seismic hazard zoning.

11.1.8 Preparedness Planning

- District Disaster Management Plans (DDMPs) have been prepared by PDMA Khyber Pakhtunkhwa in collaboration with local governments, covering emergency evacuation, shelter management, and communications during earthquakes.
- Regular mock drills and simulations are conducted in public institutions in coordination with the Health and Education departments.
- Lakki Marwat District has participated in such planning efforts through its local disaster management committees.

11.1.9 Insurance and Financial Planning

- Earthquake insurance coverage is still limited, but promoted under State Bank of Pakistan's micro-insurance frameworks.
- Some donor-funded initiatives (e.g., through NDRMF) have supported pilot disaster risk financing for vulnerable communities in Khyber Pakhtunkhwa.

11.1.10 Stakeholder Collaboration

- After the 2005 earthquake, ERRA, NDMA, and various NGOs collaborated to develop earthquake-resistant designs now used in Khyber Pakhtunkhwa.
- PDMA Khyber Pakhtunkhwa works with organizations such as UNICEF, UNDP, and GIZ to improve infrastructure safety and institutional capacity.
- Universities in Khyber Pakhtunkhwa, including UET Peshawar, contribute through research, seismic vulnerability studies, and training of engineers and planners.

11.1.11 Recommendations

- All buildings must follow PBC 2007 – Seismic Provisions, particularly Chapters 3–6.
- Residential and public buildings must:
 - Use Reinforced Concrete (RC) frames with proper seismic detailing.
 - Include horizontal reinforcement bands at plinth, sill, lintel, and roof levels.
 - Maintain minimum ductility and strength requirements (as per PBC Table 5.1 & 5.2).
- Confined masonry is allowed for low-rise homes but must include:
 - RC tie-columns and ring beams (minimum 150 mm width).
 - Proper anchorage of roof slab with ring beams.
- Max height for residential buildings in Lakki Marwat city: Ground + 2 floors, unless engineered with special structural support.
- Maintain minimum side setbacks of 3 ft and rear setbacks of 5 ft for ventilation, fire safety, and light.
- Buildings in seismic zones must avoid torsional irregularities and asymmetrical layouts (PBC 2007, Clause 6.4.4).

11.2 Flood Resistant Plans

Floods are one of the most frequent and destructive hazards in Khyber Pakhtunkhwa (KP), with districts like Lakki Marwat being particularly vulnerable to riverine and flash floods. A comprehensive flood resistance plan tailored to the region's needs can significantly reduce the impacts of future flood events.

11.2.1 Drainage System Upgrades

11.2.1.1 Expansion and Maintenance of Urban Drainage:

In response to urban flooding, particularly in Lakki Marwat city, the Tehsil Municipal Administration (TMA) Lakki Marwat has undertaken projects to expand and maintain drainage channels. These efforts aim to manage increased stormwater runoff during heavy rainfall events.

11.2.2 Road Infrastructure Enhancements

11.2.2.1 Elevation of Flood-Prone Road Sections:

Khyber Pakhtunkhwa Highways Authority (KPHA) has identified and elevated sections of roads in low-lying areas susceptible to flooding. This measure ensures uninterrupted connectivity during heavy rains.

11.2.2.2 Improved Culvert and Bridge Designs:

New culverts and small bridges are being constructed with enhanced capacity to allow for better water flow, reducing the risk of water accumulation and roadway damage.

11.2.3 Community-Level Water Management

11.2.3.1 Construction of Check Dams and Retention Basins:

In collaboration with local communities, small-scale check dams and water retention basins have been constructed in upstream areas to capture and slowly release rainwater, mitigating sudden downstream flooding.

11.2.4 Reforestation and Soil Conservation

11.2.4.1 Afforestation initiatives on Hill Slopes:

Forest Department (KP), along with local NGOs, has initiated tree plantation drives on vulnerable hill slopes to reduce surface runoff and enhance soil absorption capacity, thereby decreasing flood risks.

11.2.4.2 Terracing and Contour Plowing:

Farmers are encouraged to adopt terracing and contour plowing techniques to prevent soil erosion and promote water infiltration, reducing the speed and volume of surface runoff.

11.2.5 Early Warning Systems and Community Preparedness

11.2.5.1 Installation of Rain Gauges and Alert Systems:

Provincial Disaster Management Authority (PDMA) Khyber Pakhtunkhwa has installed rain gauges in strategic locations to monitor precipitation levels. Data from these instruments feed into an early warning system, enabling timely alerts to communities via SMS and local media.

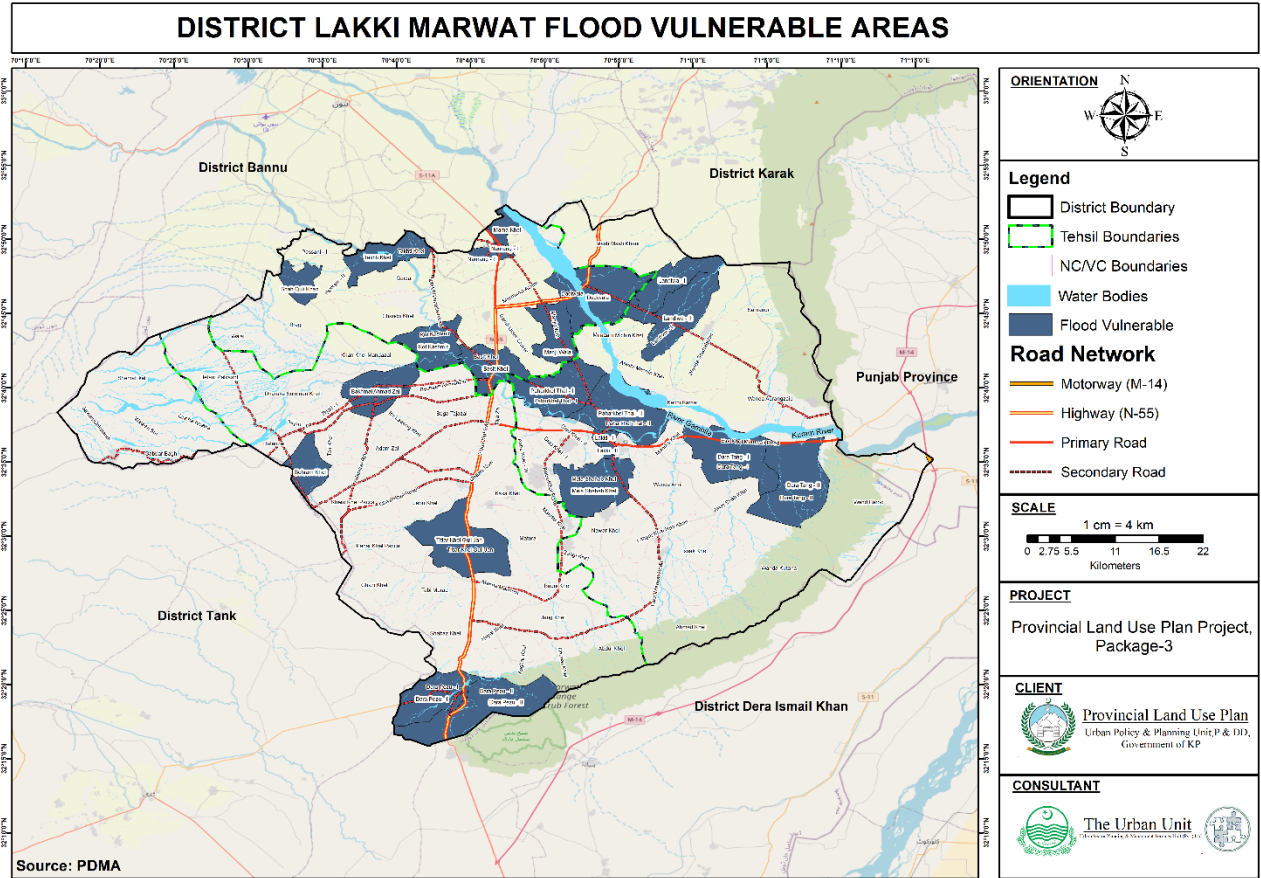
11.2.5.2 Community-Based Disaster Risk Management (CBDRM) Programs:

Local authorities, in partnership with NGOs, have conducted CBDRM training sessions, equipping community members with the knowledge and skills to respond effectively to flood warnings and emergencies.

11.2.6 Land Use and Zoning Practices

11.2.6.1 Floodplain Mapping and Construction Control:

Khyber Pakhtunkhwa Urban Policy Unit and PDMA integrate floodplain maps into district land use planning to restrict development in hazard zones.



Map 11-2: District Lakki Marwat Flood Vulnerable Areas

11.2.6.2 Relocation of At-Risk Settlements:

After major flood events (e.g., 2010), some informal settlements near riverbanks were relocated under provincial programs.

11.2.6.3 Use of Green Buffer Zones:

Areas adjacent to rivers are reserved for parks, agriculture, or natural drainage, not housing.

11.2.7 Nature-Based Mitigation

11.2.7.1 Reforestation and Riverbank Vegetation:

Tree plantation and bioengineering using vetiver grass are promoted to stabilize banks and reduce erosion.

11.2.7.2 Restoration of Natural Drainage Paths:

Blocked nullahs and seasonal streams are being cleared and desilted by local governments before monsoon season.

11.2.8 Community Preparedness

11.2.8.1 Evacuation Plans and Route Mapping:

District Disaster Management Units (DDMUs) prepare community-level evacuation routes and safe shelters in flood-prone Union Councils.

11.2.8.2 Household-Level Training:

NGOs run training on how to prepare emergency kits and valuables from flood damage.

11.2.9 Recommendations

1. Avoid development in:
 - Flood-prone areas, dry riverbeds, and steep slopes.
 - Areas with known history of subsidence or soil erosion.
2. Conduct site-specific soil investigations for all public or multistory buildings (as per PBC 2007, Chapter 4).
3. Use reinforced strip or raft foundations in low-rise structures and pile foundations for soft or weak soils.
4. Foundations in low-lying zones must be raised at least 2.5–3.0 ft above the highest known flood level.
5. Drainage outlets must be integrated with covered drains or culverts, particularly in Lakki Marwat town.
6. Sump pits and soakage wells should be built in large buildings to manage stormwater.
7. Roofs must be designed with proper slope and water disposal spouts.

11.3 Landslide Resistant Plans

No major or significant landslide event has been reported in Lakki Marwat; however, according to the Building Codes of Pakistan 2007, the following recommendations still apply.

11.3.1 Recommendations

According to Pakistan Building Code 2007, following are the recommendations regarding land use mapping of Lakki Marwat District:

1. Before deciding about placing a building on or adjacent to sloping ground in mountainous terrain, an examination of the hill slope stability conditions shall be made. The stability of sloping ground shall be evaluated and improvements if required shall be designed through an established analytical method.
2. The site selection for an important engineered building on potentially liquefiable soils shall be preceded by evaluation of liquefaction potential of the sub-surface through

detailed geotechnical investigations and established analytical techniques. Necessary mitigation measures shall be taken to minimize the potential risk.

3. The selection of site for a building on such soils shall be made on the basis of the detailed geotechnical investigations and adopting necessary mitigating measures in the structure and/or bearing ground.

11.4 Heat Wave Resistant Plans

11.4.1 Public Awareness and Health Preparedness

11.4.1.1 Heatwave Warnings and SMS Alerts:

During peak summer months (May–July), PDMA KP disseminates heatwave alerts via SMS in southern KP districts, including Lakki Marwat, through coordination with District Administration and Health Departments.

11.4.1.2 Community Health Awareness Campaigns:

The District Health Office (DHO) Lakki Marwat, in collaboration with Lady Health Workers (LHWs), conducts heatstroke awareness drives, especially in schools and rural communities. Posters, community meetings, and mosque announcements are used to spread preventive information.

11.4.2 Infrastructure and Facility Readiness

11.4.2.1 Heat-Ready Public Health Facilities:

Lakki Marwat's public hospitals and Basic Health Units (BHUs) have been directed by Health Department KP to ensure:

- Availability of ORS (oral rehydration salts),
- Emergency beds for heatstroke patients, and
- Backup electricity supply (generators or solar) to run fans and coolers during outages.

11.4.2.2 Shaded Rest Areas for Workers:

During recent summers, temporary shade structures have been installed at bus terminals, bazaar entry points, and traffic police checkpoints to protect field workers and the public.

11.4.3 Water Access Measures

11.4.3.1 Public Water Points in Urban Lakki Marwat:

During heatwaves, Tehsil Municipal Administration (TMA) Lakki Marwat establishes temporary water distribution points, especially in crowded commercial areas.

11.4.3.2 Water Tanker Services to Peri-Urban Areas:

Tankers are dispatched to underserved neighborhoods experiencing water shortages, particularly in peri-urban union councils like Ghoriwala and Domel.

Heatwaves have become increasingly severe in Khyber Pakhtunkhwa, particularly in southern districts like Lakki Marwat, Karak and Dera Ismail Khan. Rising temperatures, often exceeding 40 °C, pose serious risks to health, infrastructure, and agriculture. A targeted heatwave resistance plan can help mitigate these impacts effectively.

11.5 Recommendations

1. Use reflective roof coatings, light-colored paint, and ventilated roofing systems to minimize indoor heat gain.
2. Encourage courtyard and passive ventilation designs in residential buildings.
3. Green buffers, tree-lined streets, and rooftop gardens should be included in urban master planning.

11.6 General Recommendations

1. Restrict construction in seismic and flood hazard zones.
2. Establish a District Land Use Committee for plan approval and monitoring.
3. Mandatory registration of architects and engineers involved in any structural design with PEC.
4. Create a Building Control Cell within Lakki Marwat's TMA to review plans, inspect sites, and issue compliance certificates.

12 District Economy

Lakki Marwat, one of the southern districts of Khyber Pakhtunkhwa, is a strategically positioned and economically diverse region. The district's economy is primarily driven by agriculture, which forms the backbone of local livelihoods. Major crops include wheat, maize, barley, rice, sugarcane, and bajra, cultivated mainly through irrigation from the Gambila River and the 267 km Marwat Canal System that covers 170,500 acres. The district also produces vegetables and fruits, though water scarcity and outdated irrigation methods remain key constraints. Dams such as Baran and Kurram Tangi support irrigation, and improvements in irrigation efficiency could further boost agricultural productivity. Agriculture employs about 38.8% of the workforce, making it the largest employment sector.

Livestock farming is another vital contributor to the district's economy, providing dairy, meat, hides, and poultry. Vast grazing lands support large populations of cattle, goats, sheep, and poultry, which supply meat and dairy products to surrounding regions and enhance household incomes.

According to the Population Census 2017, Lakki Marwat has a population of 902,541. The largest age group is 5–9 years, with 148,810 individuals, followed by children aged 4 and below, totaling 157,876. The overall literacy rate is 57.19%. Literacy is relatively higher among younger groups, reaching 69.69% among those aged 11–20, but it declines sharply in older age groups. This trend indicates that many individuals discontinue education after matric or higher secondary school.

The district is also rich in mineral resources, including limestone, shale clay, silica sand, laterite, iron ore, and sandstone. Mining and minerals play a significant role in the local economy, with the Lucky Cement Factory in Pezu serving as the largest industrial enterprise. The factory, which relies heavily on locally sourced limestone, employs around 3,000 workers and has made a significant contribution to industrial development in the region. In 2020–21, the revenue from major minerals, particularly limestone, reached PKR 216.2 million, a sharp increase from the previous year. The mining sector continues to expand, with promising opportunities in areas such as the Wali Block, known for its oil and gas potential.

The industrial landscape of Lakki Marwat is gradually evolving. As of 2021–22, the district had 215 small, 7 medium, and 1 large industrial unit, which include brick kilns, ice factories, aluminum and steel product

manufacturers, and crush plants. Despite this growth, industrialization remains modest compared to other districts, with most enterprises falling into the small to medium-sized category.

The labor force of Lakki Marwat totals 219,400 workers, with sectoral employment distributed across agriculture (38.8%), industry (26.4%), and services (34.8%). The workforce is largely unskilled, and industrial development is limited, keeping agriculture labor-intensive, especially in rural areas. Modern irrigation and mechanization could improve productivity and generate additional jobs in the agricultural sector. The services sector, which includes retail, education, healthcare, and hospitality, employs 34.8% of workers, mostly in urban areas.

Despite these strengths, the district faces several economic challenges, including weak infrastructure, water shortages, and reliance on outdated technologies in both agriculture and mining. Nevertheless, Lakki Marwat's strategic location along the Indus Highway (N-55), its mineral wealth, and its potential for industrial expansion provide significant opportunities for growth. Future economic development will also be guided by the District Land Use Plan, which emphasizes sustainable land allocation for agriculture, industry, and residential expansion, aligning job creation with long-term development goals.

Investment in modern mining practices, irrigation improvements, infrastructure, and vocational training will be critical to enhancing productivity, supporting small-scale industries, diversifying the economy, and creating sustainable employment opportunities for the people of Lakki Marwat.

The details of key growth sectors of the districts given below:

12.1 Agriculture

Agriculture is the principal occupation in District Lakki Marwat, where major of the population lives in rural areas. The district covers a total reported area of approximately 314,973 hectares, with around 116,900 hectares under cultivation as of 2021-22. The net sown area of the district is 37,215 hectares in 2021-22, while "current fallow" land recorded as 79,685 hectares. Uncultivated areas, including barren land, forests, and mountainous terrain, cover about 112,358 hectares.

District Lakki Marwat produces both Kharif and Rabi crops. From 2017-18 to 2021-22, Rabi crops, sown in winter, include wheat, gram (chickpea), barley, and rapeseed & mustard, which dominate the district's farmland. Among these, wheat consistently occupied the largest area, ranging from 17,060 ha in 2017-18 to 18,755 ha in 2018-19, slightly declining to 17,810 ha in 2021-22, while gram decreased from 11,780 ha to 7,865 ha. Barley fluctuated between 340 and 731 ha. Kharif crops, sown in summer, include maize, rice, bajra, jowar, and sugarcane, which are cultivated on smaller areas. Among these, maize was grown on 588 ha in 2017-18 which increased to 1,385 ha in 2018-19 but it further declined to 1297 ha in 2021-22, rice declined from 617 ha in 2018-19 to 203 ha in 2021-22, bajra and jowar occupied 12-27 ha and 236-480 ha respectively.

From 2017-18 to 2021-22, the area under vegetables and fruits in District Lakki Marwat showed a fluctuating trend. For vegetables, the total cultivated area (rabi and kharif) ranged from 253 ha in 2017-18 to a peak of 263 ha in 2018-19, before dropping sharply to just 11 ha in 2021-22.

12.1.1 Constraints

District Lakki Marwat faces multiple agricultural challenges that require targeted interventions to improve productivity and sustainability. Most farmers are uneducated, which restricts the adoption of modern practices, while poverty and debt further limit investment in improved inputs and technologies. Water scarcity, inefficient irrigation, poor canal maintenance, and silting in the Baran Dam and Marwat Canal reduce water availability, with additional losses from flood irrigation and unlined canals. Soil erosion, salinity, waterlogging, and land degradation continue to damage soil fertility, and land fragmentation creates uneconomical holdings that are difficult to manage. Crop yields remain below potential due to limited pest control knowledge, shortage of certified seeds, and poor access to quality fertilizers. Weak extension services and lack of training restrict farmer exposure to innovations, while the absence of proper storage and processing facilities causes high post-harvest losses. Recommendations

To improve agriculture in District Lakki Marwat, it is essential to establish agricultural training centers, strengthen extension services, and run adult literacy programs to educate farmers on modern farming, irrigation, and pest control. Irrigation should be enhanced through drip, sprinkler, and smart systems, along with rainwater harvesting, and the construction of small dams and reservoirs to ensure year-round water availability. Soil issues such as erosion, salinity, and land degradation can be addressed through reforestation, proper drainage, soil treatment, and conservation practices. Small farmers need support through subsidies, easy credit, and microfinance to adopt high-yield varieties, modern equipment, quality seeds, and fertilizers based on soil testing. Better transport infrastructure, affordable services, market information systems, and farmer cooperatives can improve market access and profitability. Crop diversification, climate-resilient varieties, and value addition through food processing should be promoted to increase income and resilience. Integrated Pest Management (IPM), resistant varieties, and farmer training can strengthen pest and disease control, while solar-powered irrigation and water-efficient technologies can ensure sustainability and reduce farming costs.

12.2 Livestock

District Lakki Marwat has great potential in the livestock sector, which directly supports farmer livelihoods by providing food, wool, fuel, and farm resources. It ensures daily income, employment, and a stable food supply, while also serving as a safeguard against crop failure and other risks.

The livestock population in District Lakki Marwat declined significantly between 2006 and 2021, dropping from 1,510,919 to 951,867 heads. Cattle increased slightly from 163,471 to 170,893, and buffaloes also rose modestly from 3,827 to 4,715. In contrast, sharp declines were recorded in sheep (88,118 to 53,811), goats (397,290 to 227,374), and camels (7,215 to 2,747). The number of donkeys and horses also decreased from 19,174 to 14,461 and 1,245 to 1,089 respectively, while mules showed an unusual increase from 131 to 906. Poultry experienced the steepest fall, from 830,448 in 2006 to 453,852 in 2021.

In district, the reduction in growth may be due to inadequate veterinary services, disease outbreaks and economic constraints.

12.2.1 Constraints

The livestock sector in District Lakki Marwat faces several constraints that hinder its growth and productivity. From 2006 to 2021, livestock populations, particularly sheep, goats, and camels, declined sharply, reflecting weaknesses in management and breeding practices. Water shortages, especially in dry seasons, coupled with the absence of efficient water utilization strategies, further reduce productivity. Grazing lands are neither properly identified nor managed, and the irregular supply of quality fodder limits livestock performance. Disease prevalence remains high due to weak vaccination programs, poor veterinary services, and inadequate disease surveillance and control. Women, despite playing a crucial role in livestock rearing, receive little recognition or support, which restricts improvements in management practices. The regulatory framework is also weak, lacking comprehensive measures for nutrition, breeding, disease control, and marketing. Although the district has strong potential, particularly with the rising demand in the international halal food market, poor management, weak infrastructure, and low investment prevent livestock from realizing its full economic potential.

12.2.2 Recommendations

To strengthen the livestock sector in District Lakki Marwat, several measures are recommended. Increasing the number of veterinary hospitals, dispensaries, and centers, along with improving veterinary institutes, is vital to enhance animal health services and treatment coverage. Efficient water utilization strategies should be developed through new water sources, watering points, and conservation methods to ensure year-round availability. Comprehensive assessments of grazing lands and pastures are needed to promote sustainable use and secure fodder supply, supported by continuous fodder crop cultivation and forage preservation techniques. Strengthening vaccination programs, veterinary services, and disease

surveillance will help reduce disease prevalence and prevent outbreaks. Recognizing and supporting women’s role in livestock through training, resources, and gender-sensitive policies can further enhance productivity. Existing policies should be reviewed to address nutrition, breeding, disease control, and marketing challenges, while encouraging private sector investment with public sector support. Community engagement through training and adoption of best livestock practices is crucial for sustainable growth. Moreover, promoting fodder cultivation, feed storage, and research on native breeds can address challenges of nutrition and resilience. Backyard poultry should also be encouraged in rural areas by providing training, affordable inputs, market access, and research support in nutrition and disease management, ensuring diversified income sources and sector stability.

12.3 Fuels, Minerals, and Energy

District Lakki Marwat plays a vital role in Khyber Pakhtunkhwa’s resource-based economy, with rich deposits of limestone, shale clay, silica sand, iron ore, coal, and laterite that fuel key industries such as cement, construction, and steel. According to the development statistics 2023, the Lucky Cement Plant in Pezu, one of Pakistan’s largest producers, relies heavily on local limestone and shale clay—producing 918,970 tons and 762,515 tons respectively in 2018–19. However, the absence of updated data beyond this period underscores the need for improved monitoring, sustainable extraction, and better infrastructure to support long-term industrial growth.

Beyond minerals, Lakki Marwat is emerging as an energy hub, contributing around 850 barrels of crude oil and 12.5 million cubic feet of gas daily through the Wali Block. The establishment of the Early Production Facility (EPF) at Wali-1 in 2023 has further boosted output, with recoverable reserves estimated at 13 million barrels of oil and 219 billion cubic feet of gas. Ongoing drilling at Bettani Deep-1 and Bettani-2 aims to expand production to 50 million cubic feet per day, reinforcing the district’s role in national energy sustainability. Strengthening environmental safeguards, promoting efficient technologies, and enhancing infrastructure will be essential for maximizing these economic gains responsibly.

12.3.1 Constraints

The fuels, minerals, and energy sectors of District Lakki Marwat face several interrelated challenges that hinder sustainable growth and development. Environmental degradation remains a major concern, with extensive limestone extraction and other mining activities contributing to soil erosion, habitat loss, and air and water pollution. Inadequate waste management practices further exacerbate ecological damage, while the lack of effective mitigation measures and rehabilitation plans undermines long-term environmental sustainability. The sector also suffers from fluctuating mineral production and inconsistent revenue streams, primarily driven by market demand, operational limitations, and regulatory inconsistencies. Health and safety risks among mine workers remain high due to insufficient compliance with occupational standards, limited access to protective equipment, and the absence of routine safety training and health monitoring systems. Moreover, insufficient community consultation often leads to conflicts and social grievances, as local populations experience the adverse effects of noise, dust, and water disruption caused by unregulated mining operations.

Beyond environmental and social challenges, the mining and energy sectors are constrained by systemic and structural barriers. Weak regulatory enforcement, outdated legal frameworks, and unclear governance structures following the devolution of authority after the 18th Amendment have slowed sectoral progress. Limited access to modern mining technologies and poor infrastructure—including unreliable electricity, inadequate road networks, and scarce utility services—further impede productivity and operational efficiency. Additionally, the local economy’s overdependence on mineral revenues, combined with a lack of diversification, increases vulnerability to market fluctuations. The absence of vocational and technical training institutes exacerbates the shortage of skilled labor, restricting innovation and modernization within the industry. Addressing these constraints through institutional strengthening, infrastructural investment, technological advancement, and human capital development will be vital for ensuring the sustainable and inclusive growth of Lakki Marwat’s fuel and mineral economy.

12.3.2 Recommendations

Sustainable development of the mining sector in District Lakki Marwat demands a balanced approach that integrates economic growth with environmental and social responsibility. Adopting modern, eco-friendly mining practices—such as pollution control technologies, effective waste management, and land rehabilitation—can significantly reduce soil erosion, water contamination, and ecosystem degradation. Strengthening health and safety protocols through worker training, protective gear, and regular check-ups will further enhance productivity and workforce welfare. These measures ensure that mining contributes to long-term sustainability while preserving natural resources.

To ensure resilience and equitable growth, Lakki Marwat must stabilize mining revenues, diversify its economy, and adopt advanced technologies that enhance efficiency and reduce environmental impact. Strengthening legal frameworks, enforcing compliance, and improving infrastructure—such as roads, electricity, and water supply—are critical to attracting investment. Equally, fostering community engagement and vocational training will build local capacity and promote inclusive growth. Through transparent governance, data-driven planning, and continuous environmental monitoring, Lakki Marwat can transform its mining sector into a model of sustainable resource management and regional economic strength.

12.4 Industry

The industrial sector of District Lakki Marwat, though still in its developmental phase, plays a crucial role in diversifying the district's economy and generating employment. The Lucky Cement Factory in Pezu serves as the backbone of this growth, driving demand for raw materials, transport services, and supporting industries such as crush plants, brick kilns, and aluminum units. These small- and medium-scale enterprises contribute significantly to local livelihoods and economic resilience. However, the lack of a designated industrial zone has resulted in scattered development, causing inefficiencies in infrastructure use, coordination, and environmental management.

To address this challenge and promote organized industrial expansion, seven new industrial zones have been proposed across key locations in the district, including Lakki Marwat City, Landiwah, Serai Naurang, Ghazni Khel, Pezu, Tajori, and Tajazai. These zones are strategically distributed to ensure balanced regional development, improve employment access, and encourage investment in agro-processing, manufacturing, and logistics. Once developed, these zones will provide the necessary infrastructure and regulatory environment to attract both public and private investment, transforming Lakki Marwat into a more structured and competitive industrial district.

According to the Development statistics – 2023, In the recent years, Lakki Marwat has witnessed a steady rise in industrial activity, with the number of operational units growing from 15 in 2017–18 to 37 currently. Despite this positive trajectory, issues such as unreliable electricity, poor road connectivity, and inadequate utilities continue to hinder progress. To fully harness its industrial potential, the district must focus on developing a dedicated industrial estate, improving infrastructure, and promoting skill development and sustainable practices. These strategic interventions would enhance productivity, attract investment, and enable Lakki Marwat to evolve into a key regional industrial hub, contributing to both provincial and national economic growth.

12.4.1 Rural-Urban Linkages

Rural–urban linkages in District Lakki Marwat are primarily driven by industrial and agricultural interactions. The presence of industries such as Lucky Cement in Pezu and related small-scale enterprises creates employment opportunities for residents from nearby rural areas, fostering labor mobility and income diversification. Rural producers supply raw materials such as limestone, sand, and agricultural goods to urban-based processing units, while towns provide essential services, markets, and access to goods for surrounding villages.

However, weak infrastructure—particularly poor road connectivity and limited transport services—restricts efficient movement of goods and workers between rural and urban centers. Strengthening these linkages through improved transportation networks, rural market access, and logistics support can enhance economic integration. Promoting agro-based industries, establishing rural service centers, and facilitating small enterprise development in peri-urban areas would further balance regional growth and reduce rural poverty.

12.4.2 Constraints

The industrial sector of District Lakki Marwat faces multiple challenges that limit its sustainable growth and competitiveness. Infrastructural deficiencies remain the most pressing issue—poor road connectivity, inconsistent electricity supply, and water scarcity significantly hinder industrial productivity. These gaps not only disrupt production and increase operational costs but also discourage potential investors from establishing new enterprises. For industries such as cement and agro-processing, the shortage of water and power reliability further constrains their ability to operate efficiently and expand sustainably.

Environmental, organizational, and human resource challenges also impede progress. Scattered industrial development without a designated zone has led to uncoordinated growth, inefficient infrastructure use, and weak environmental monitoring. Pollution from brick kilns and crush plants continues to affect air and water quality, while a shortage of skilled labor limits the adoption of advanced technologies. Additionally, weak regulatory enforcement, lack of consistent policy incentives, and minimal financial support further restrict industrial development. To overcome these challenges, Lakki Marwat must prioritize the establishment of dedicated industrial zones, invest in infrastructure and workforce training, and strengthen environmental and policy frameworks to ensure inclusive, sustainable, and competitive industrial growth.

12.4.3 Recommendations

To strengthen District Lakki Marwat’s industrial base, focused improvements in infrastructure, environmental management, and workforce development are crucial. Upgrading road connectivity, ensuring a stable power supply, and improving water management systems will enhance production efficiency and attract new investments. Developing water conservation infrastructure is especially important for water-intensive industries such as cement and agro-based manufacturing. These infrastructural enhancements will not only boost industrial performance but also promote sustainable and balanced economic growth across the district.

Equally important is the promotion of sustainable and well-organized industrial development. Establishing designated industrial zones or clusters will centralize activities, improve infrastructure utilization, and streamline environmental monitoring. Strict enforcement of emission controls, adoption of cleaner technologies, and implementation of recycling and waste management systems can minimize environmental damage. Furthermore, investing in technical education and vocational training will bridge the district’s skills gap, while policy incentives such as tax relief and low-interest financing can encourage investment and diversification. By fostering innovation, sustainability, and inclusivity, Lakki Marwat can transition toward a resilient and competitive industrial economy.

12.5 Trade and Commerce

Trade and commerce form the backbone of District Lakki Marwat’s local economy, playing a crucial role in connecting rural producers with urban markets and facilitating the flow of goods and services. The district’s primary commercial centers such as Lakki City, Serai Naurang, Tajori, and Pezu serve as trade hubs catering to both urban populations and surrounding rural communities. These markets support agriculture-based trade, livestock sales, and small-scale retail activity, forming the core of economic interaction across the district.

To strengthen the commercial base and promote organized market development, new commercial zones (CBDs) have been proposed in Ghaznikhel, Landiwah, Pezu, and Lakki City. These zones are strategically

located along major highways and primary roads, ensuring high accessibility, efficient logistics, and integration with nearby industrial areas. Once operationalized, these planned CBDs will enhance trade efficiency, attract private investment, and provide modern retail and business spaces transforming Lakki Marwat into a more connected and economically dynamic district.

Within the broader provincial context, the trade and commerce sector contributes significantly to Khyber Pakhtunkhwa's services-based economy, which accounts for over half of the province's total output. Wholesale and retail trade, alongside hospitality and transport, serve as key drivers of growth and employment. While the COVID-19 pandemic temporarily slowed this progress, the sector shows strong potential for recovery and diversification. For Lakki Marwat, strengthening local trade infrastructure, developing organized markets, and enhancing connectivity with regional trade routes will be pivotal in transforming its commercial landscape and fostering sustainable economic growth.

12.5.1 Constraints

The trade and commerce sector in District Lakki Marwat faces multiple structural and operational challenges that hinder its full economic potential. One of the most significant constraints is the district's limited industrial base, with the Pezu Cement Factory serving as the only major industrial establishment. This lack of industrial diversity restricts job creation and limits opportunities for value addition and local production. Moreover, the district's heavy dependence on external markets such as Bannu and Mianwali for essential goods undermines its economic self-reliance and exposes it to supply chain disruptions. In addition, issues like encroachment in key commercial hubs — particularly in Lakki City and Serai Naurang contribute to congestion, reduced pedestrian space, and inefficient market operations.

Infrastructure and management deficiencies further exacerbate these challenges. Poorly maintained roads, inadequate drainage, and insufficient lighting in commercial areas hamper trade activities and discourage investment. Limited parking facilities add to the congestion, especially in high-traffic zones, while inconsistent waste collection services by the Town Municipal Administration (TMA) create unhygienic conditions detrimental to commerce. The shortage of skilled labor and absence of vocational training opportunities further constrain productivity and service quality in both small-scale industries and agricultural trade. Lastly, the lack of effective urban planning and zoning regulations has led to unorganized commercial expansion and unauthorized construction, highlighting the need for structured development to support sustainable trade and economic growth.

12.5.2 Recommendations

To enhance the trade and commerce sector in District Lakki Marwat, a strategic approach focusing on infrastructure improvement, policy support, and business facilitation is essential. Establishing small-scale industrial units in sectors such as agricultural processing, dairy production, and local handicrafts will diversify the economic base and create employment opportunities. Government-backed financial incentives, such as subsidies, tax reliefs, and low-interest loans can further encourage entrepreneurship and investment. Developing vocational training centers in Lakki City and Serai Naurang will equip the local workforce with essential skills in agriculture technology, livestock management, and industrial operations, addressing the district's labor skill gap. Improving internet connectivity and telecommunications infrastructure will also open new avenues for digital trade, online business platforms, and e-commerce expansion.

Urban management and infrastructure upgrades are equally crucial for sustaining commercial growth. Key interventions should include improving road networks, drainage systems, and street lighting in major markets to ensure safe and efficient trade environments. Establishing organized parking facilities in high-traffic zones will help alleviate congestion, while strengthening waste management and introducing recycling initiatives will improve urban hygiene and sustainability. Designating Essa Khel–Mianwali Road in Lakki City and Naurang–DI Khan Road in Serai Naurang as official commercial corridors with appropriate taxation and enhanced municipal services will streamline governance and promote structured commercial development. Additionally, upgrading Sabzi Mandis and Mawaishi Mandis with better facilities will benefit

local farmers and traders, while the creation of artisan centers will promote cultural crafts and local tourism. Collectively, these measures will enhance Lakki Marwat's trade capacity, stimulate investment, and foster a more sustainable, inclusive, and resilient commercial ecosystem.