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REGIONAL POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVERNMENT OF SINDH

Directorate of Urban, Regional Policy & Strategic Planning,
Planning & Development Department,
Government of Sindh

"PREPARATION OF DEVELOPMENT MASTER PLANS OF MAJOR SECONDARY CITIES OF SINDH"

(PACKAGE # 3 - KOTRI, HALA, TANDO ADAM & MORO)

Draft

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STRATEGIC DEVELOPMENT PLAN REPORT

Kotri City

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STRATEGIC DEVELOPMENT PLAN REPORT – KOTRI

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LIST OF ACRONYMS AND ABBREVIATIONS

ADP	Annual Development Plan
AGR	Annual Growth Rate
BHU	Basic Health Unit
CBD	Central Business District
CC	Climate Change
DBM	Digital Base Map
DCs	Deputy Commissioners
DHQ(s)	District Headquarters
DMP	Disaster Management Plan
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSPC	Development Strategies & Prevalent Condition
DURP&SP	Directorate Of Urban Regional Policy & Strategic Planning, Government of Sindh
ECP	Emergency Contingency Plan
EDP	Economic Development Plan
EMC	Environmental Management Consultants
EPA	Environmental Protection Act
FWO	Frontier Works Organization
GBHS	Government Boys High School
GBHSS	Government Boys High Secondary School
GBLSS	Government Boys Lower Secondary School
GBPS	Government Boys Primary School
GGHS	Government Girls High School
GGHSS	Government Girls Secondary School
GGLSS	Government Girls Lower Secondary School
GGPS	Government Girls Primary School
GIS	Geographic Information System
GOS	Government of Sindh
GPS	Global Positioning System
HESCO	Hyderabad Electricity Supply Corporation
HH	Household
HQ	Head Quarters
KA(s)	Katchi Abadis
KV	Kilo Volt
LPG	Liquid Petroleum Gas
MC	Municipal Committee
MISC	Multiple Indicator Cluster Survey
MW	Mega Watt
NER	Net Enrolment Ratio
NGO	Non-Governmental Organization
NPDMP	National & Provisional Disaster Management Policy

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NRM	National Reference Manual
O&M	Operation & Maintenance
OH	Over Head
P&D	Planning & Development Department
PCU(s)	Passenger Car Units
PDAO	Planning & Development Act Ordinance
PDMA	Provincial Disaster Management Authority
PGS	Population Growth Scenarios
PH	Peak Hour
PHED	Public Health Engineering Department
PMTs	Pole Mounted Transformers
PTCL	Pakistan Telecommunication Limited
RAP	Resilience & Adaptability Plan
RCC	Reinforced Cement Concrete
SAR	Situation Analysis Report
SB&TPR	Sindh Building & Town Planning Regulation
SBI	Sindh Board of Investment
SDI	Spatial Data Information
SECP	Securities & Exchange Connection of Pakistan
SED	Socio Economic Data
SES	Socio Economic Survey
SEPA	Sindh Environmental Protection Agency
SME(s)	Small Medium Enterprises
SOP	Standard Operation Procedures
SPPRA	Sindh Public Procurement Regulatory Authority
SSGC	Sui Southern Gas Company
STP	Sewerage Treatment Plant
SWM	Solid Waste Management
SWOT	Strength Weaknesses Opportunities Threat
TOR	Terms Of References
TSS	Total Suspended Solids
TVC	Traffic Volume Count
UG	Under Ground
UG/l	Concentration of Arsenic (10 micro-gm/liter)
W&SD	Work & Services Department
WAPDA	Water and Power Development Authority
WATSAN	Water & Sanitation
WASH	Water, Sanitation & Hygiene
WB	World Bank
WHO	World Health Organization

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EXECUTIVE SUMMARY

I. Introduction

Sindh is the most urbanized province of Pakistan, with 53.7% of its population residing in urban areas as per the 2023 Census. Despite this, secondary and district headquarter (DHQ) cities have historically received limited attention in structured planning and coordinated public investment. This has led to fragmented infrastructure, unmanaged growth, and inadequate service delivery limiting their ability to function as engines of economic growth and reinforcing poverty in surrounding hinterlands.

This Strategic Development Plan (SDP) for Kotri City has been prepared under Package 3 (Kotri, Hala, Tando Adam, Moro), awarded to EA Consulting Pvt. Ltd. The plan provides a 20-year roadmap (up to 2045) for sustainable urban growth, economic regeneration, and resilient service delivery.

The SDP framework covers:

- Sectoral assessments and SWOT analysis.
- Long-term and short-term development scenarios.
- Immediate Action Plan (IAP) for the core urban area.
- Economic Development, Climate Resilience, and Disaster Management Plans.
- Integration of Sustainable Development Goals (SDGs).
- A clear Implementation Strategy for phased execution.

This report therefore serves as both a technical blueprint and a policy guide for transforming Kotri into a sustainable, resilient, and economically vibrant urban center by 2045.

II. District and City Overview

Jamshoro District is among the largest districts of Sindh and hosting a population of 1.117 million (2023 Census), with 53% rural and 47% urban. The district is agriculturally significant, producing cotton, sugarcane, wheat, Rapeseed & Mustard. while also supporting livestock-based livelihoods. Agricultural lands rely predominantly on perennial water sources for cultivation Additionally, the "katcha" areas along the Indus River are irrigated using river water. The temperature typically varies from 12°C to 41°C and is rarely below 9°C or above 44°C, Rainfall is scarce and sporadic.

Kotri City, the most urbanized settlement within Jamshoro, serves as the district headquarters and is recognized for its industrial base. With a population of 364,418 (2023 Census), projected to grow to 714,441 by 2045, it is the fastest growing urban center of the district. The city is strategically located on the N-5 corridor, M-9 and N-55, with natural water resources from the River Indus and KB Feeder.

Kotri City exhibits a ribbon development pattern, with major growth along the railway line and National Highway N-5, reflecting dependence on transport corridors. The north-east functions as a residential and mixed-use zone, while the south-east is marked for industry, though many units remain inactive. Expansion extends along the Kotri–Thatta dual carriageway, Karachi–Kotri railway, and key highways (N-55, M-9, Indus Highway), reinforcing connectivity. Housing inclusivity is represented by Khuda ki Basti, highlighting the city's evolving form and the need for industrial revitalization.

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Spatial analysis highlights that residential use dominates (34.96%), followed by agriculture (11.95%), transportation (7.81%), commercial activity (0.56%), and industry (11.19%). Recreational areas cover less than 0.42%, underscoring deficits in livability.

III. Vision for the Strategic Development Plan

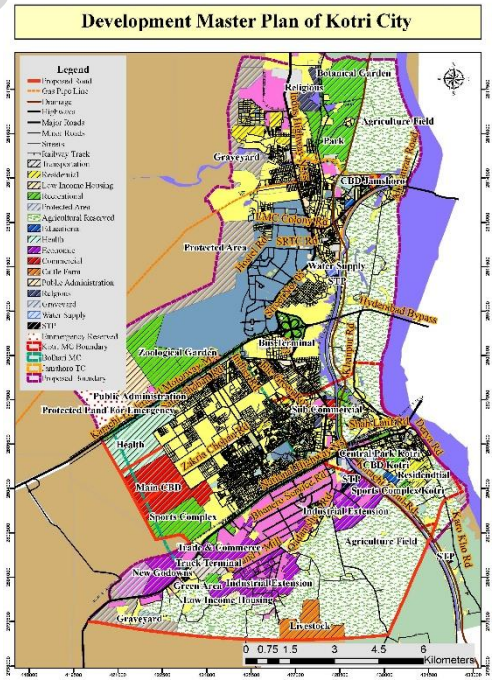
The Strategic Development Plan (SDP) for Kotri city has been formulated through a participatory and evidence-based process, combining technical assessments with citizen input gathered during the consultative workshop held on **26 July 2024**. The vision builds upon identified challenges in infrastructure, services, and economic opportunities, while reflecting community aspirations for a livable, inclusive, and economically vibrant city.

Vision Statement

The objective is to develop Kotri City into a prosperous, sustainable, and inclusive urban center, distinguished by its advanced infrastructure, dynamic economy, and superior quality of life. By employing innovative strategies and fostering community engagement, the goal is to improve public services, stimulate economic development, and establish a green, resilient, and well-integrated environment for all residents.

IV. Proposed Master Plan of Kotri City:

The Proposed Development Master Plan for Kotri City presents a comprehensive framework to guide its transformation into a sustainable, compact, and resilient urban center by 2045. Building on the city's strategic location within Jamshoro District and its established role as a hub for trade, Education and industry, the plan integrates strategic spatial growth with robust infrastructure development and environmental stewardship.



The plan is the result of extensive analysis and stakeholder consultation, which evaluated three alternative growth scenarios: Educational Hub Development Focus, Industrial Driven Growth Focus, and Mixed Development. Stakeholders unanimously endorsed the Mixed Development scenario as the preferred strategy.

This chosen path ensures a foundation for orderly growth, improved service delivery, and an enhanced quality of life for residents, solidifying kotri's role as a key regional center in Sindh.

V. Housing

Housing in Kotri City faces significant challenges, despite relatively high ownership (≈84%) and a predominance of pacca structures. The 2023 Census recorded 65,929 units yet informal growth,

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katchi abadis, and inadequate basic services remain widespread. By 2045, demand will rise to nearly 124,068 units, requiring structured interventions to avoid further informal expansion and to improve conditions in the core urban areas where sanitation, drainage, and housing quality are poor.

The Strategic Development Plan proposes a dual approach: planned expansion with affordable housing schemes, and upgrading of existing informal settlements. Key strategies include land banking and pooling, microfinance for incremental housing, public–private partnerships for low-income projects, and regularization/upgradation of katchi abadis. Immediate priorities focus on low-income housing schemes (≈400 units in Phase 1) and rehabilitation of the core urban area through façade improvements, street and pavement upgrades, and solar street lighting. These interventions aim to expand housing supply, improve livability, and ensure that growth is both affordable and sustainable.

VI. Education

The education sector in Kotri reflects a diverse yet uneven landscape, shaped by overcrowding, unsafe infrastructure, and limited resources. Government primary schools face wide disparities in class sizes, ranging from 15 to 130 students per room, with many institutions marked as “dangerous” and lacking basic facilities such as libraries, laboratories, and consistent utilities. Middle and higher secondary schools are severely overcrowded, averaging 84 students per class, with widespread shortages of furniture, drainage, and learning resources, resulting in drop-out ratios of 30–40 per school. At the college level, enrollment exceeds 4,800 across three institutions, but buildings and furniture require major repairs, and vocational education is almost absent, with the only girls’ vocational school enrolling 35 students without teaching staff. Despite these gaps, Kotri benefits from its proximity to Jamshoro, a major higher education hub hosting over 50,000 students across Mehran University of Engineering & Technology, Liaquat University of Medical & Health Sciences, and the University of Sindh, though gender disparities persist in most disciplines. Institutional weaknesses—including poorly maintained buildings, lack of planning, and underutilization of public facilities—undermine equitable learning opportunities. Strengthening infrastructure, consolidating small schools into campus models, expanding vocational training, and addressing gender gaps remain urgent priorities for improving Kotri’s education system.

The Strategic Development Plan prioritizes rehabilitation of schools, classroom expansion, and establishment of technical and vocational training facilities. Short-term measures focus on upgrading high schools in the core urban area, while long-term strategies include adding more than 1,684 classrooms by 2045, establishing new education zones, and integrating digital learning. Priority projects include the extension and rehabilitation of schools with ~52 new classrooms (PKR 2,400 million) and revitalization of the Government Monotech Institute (PKR 300 million) to support skill development and employability. These interventions, aligned with SDG 4 (Quality Education), aim to raise literacy, improve equity in access, and prepare kotri’s youth for emerging economic opportunities.

VII. Health

The health sector in kotri City faces critical shortages in both infrastructure and human resources. The Taluka Headquarters (DHQ) Hospital, with only 50 beds and significant vacancies among medical staff,

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is overstretched, serving nearly 900 outpatients daily. Current ratios fall far below national and WHO standards, with only one bed for every 3,418 residents (against a target of 2 per 1,000) and just 96 doctors for a population of 382,492 (against a need for 286). Basic facilities, including diagnostic equipment, laboratories, and emergency services, are outdated or insufficient, while the 2022 floods further exposed the fragility of the healthcare system. Private facilities add capacity, but affordability and accessibility remain major barriers for low-income communities.

The Strategic Development Plan prioritizes rehabilitation of existing facilities, expansion of bed capacity, improved diagnostic and emergency services, and workforce development. Short-term actions include upgrading DHQ Hospital and dispensaries, expanding mobile health units, and introducing digital health systems, while long-term strategies focus on sustainable workforce development, trauma response planning, and climate-resilient infrastructure. Priority projects (estimated at PKR 400 million) include Bilawal medical college Hospital, provision of mobile units, diagnostic upgrades, and training programs. Immediate interventions for the core urban area (PKR 300 million) will rehabilitate the two Dispensary and DHQ Hospital to ensure safer, more accessible, and responsive healthcare. These investments, aligned with SDG 3 (Good Health and Well-Being), aim to build a resilient health system capable of meeting the needs of Kotri's growing population.

VIII. Recreation, Culture & Tourism

Kotri and Jamshoro district host a mix of recreational, cultural, and historical assets, though infrastructure and management remain limited. Within the municipalities, recreational spaces include the Jamshoro Sports Complex, Sachal Ground, Railway Hockey and Football Grounds, Malik Asad Sikandar Sports Ground, Malik Mehrab Khan Park, Family Park, Jama Masjid Ground, and the Al-Manzar viewpoint at Kotri Barrage. Cultural and educational sites such as the Sindhology Museum and River View Resort at Petaro further enrich local opportunities. The district is also home to major historical and religious destinations that attract thousands of visitors annually, including the Shrine of Lal Shahbaz Qalandar at Sehwan, Ranikot Fort (the "Great Wall of Sindh"), Sehwan Fort, Bodlo Bahar's Mausoleum, Kai Valley's prehistoric caves, the Shrine of Laki Shah Sadar, and Manchar Lake—the largest freshwater lake in Pakistan. These sites, along with Jamshoro's universities, give the area significant tourism potential. However, poor maintenance, lack of facilities, and weak promotional efforts limit recreation and tourism-led economic growth. Improving infrastructure, heritage preservation, and visitor amenities could greatly enhance the sector's contribution to community well-being and the local economy.

The Strategic Development Plan emphasizes creating new community parks, restoring existing open spaces, and integrating eco-friendly features such as solar lighting, drought-resistant landscaping, and stormwater management systems. Long-term strategies include positioning Kotri city as a regional hub for culinary and cultural tourism through food festivals, branding of Jamshoro's Al-Manzar and Palla fish as a signature attraction and adaptive reuse of Tomb of Baba Salahuddin as a Religious and cultural landmark. Priority projects (PKR 1950 million) include a proposed theme park and Zoological Garden, beautification of canals, cultural conservation, and revitalization of parks and sports facilities in the core urban area. These initiatives, aligned with SDG 11 (Sustainable Cities and Communities),

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aim to enhance livability, preserve heritage, and stimulate local economic activity through recreation and tourism.

IX. Water Supply

Kotri's water supply depends mainly on the KB Feeder off-taking from the Indus River, though its current discharge capacity of less than 241 cusecs is insufficient and structurally deteriorated. Presently, Kotri draws 0.75 MGD from the KB Feeder and 1.20 MGD from the Indus, supported by schemes under Kotri MC, Bolhari MC, and Jamshoro TC, with a combined storage capacity of about 180 MGD. Despite extensive pumping stations and treatment through a 1.5 MGD Rapid Gravity System, residents generally receive water for only 2–3 hours daily, except in Muslim Town where supply extends to 7–8 hours. Non-functional reservoirs, weak zoning, tanker reliance, and concerns over bacterial and chemical contamination severely affect service. Health impacts such as diarrhea, typhoid, and gastrointestinal diseases are common. With demand rising and KB Feeder unable to meet future needs, urgent rehabilitation, infrastructure upgrades, and better management are critical to ensure sustainable supply.

The Strategic Development Plan builds on the Sindh Drinking Water Policy 2017 and sets clear priorities. These include upgrading intake and pumping systems, rehabilitating and expanding the distribution network with replacement of asbestos-cement pipes and installation of metering, restoring and adding overhead storage, improving treatment efficiency through rehabilitation of the Rapid Gravity System and modular additions, and extending services to unserved areas. It also emphasizes solar and back-up power systems, regular water quality monitoring, and community engagement for conservation. Priority projects amounting to approximately PKR 2.5 billion include improvements in intake works, treatment upgrades, network rehabilitation and expansion, provision of tube wells for emergency supply, and restoration of reservoirs. An Immediate Action Plan focuses on pipeline rehabilitation in the core area, modernization of pumping, installation of meters and leakage detection systems, and coverage expansion, aiming to provide safe, reliable, and equitable access to clean drinking water in line with Sustainable Development Goal 6.

X. Sewerage and Drainage

Kotri and Jamshoro's sewerage and drainage system is a mix of underground sewers, covered and open drains, with generally poor construction quality and frequent breakdowns. Much of the wastewater is discharged untreated into the KB Feeder, as the three main pumping stations and oxidation ponds provide only partial coverage. Bolhari and Jamshoro Town largely depend on open drains, while residential areas lack wastewater treatment facilities. Overall, existing services cover only about 30% of the population, leaving most residents exposed to unsanitary conditions, flooding, and health risks. Limited upgrades are underway, but financial and technical constraints continue to hinder comprehensive system improvement.

Future wastewater generation is projected to rise from 9 MGD in 2025 to nearly 17 MGD by 2045, far exceeding current capacity. The Strategic Development Plan prioritizes rehabilitation of deteriorated drains, development of a separate stormwater drainage system, establishment of modern wastewater treatment plants, and integration of climate-resilient solutions such as retention basins and recharge

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wells. Immediate action is required in the core urban areas, where overflows and blockages are most acute, with a PKR 6,294 million rehabilitation program proposed to safeguard public health, improve sanitation, and build resilience against monsoon flooding.

XI. Solid Waste Management

Kotri's solid waste management system remains underdeveloped, with only six rickshaws, one loader, tractors05 tractor trollies, and 320 sanitation workers serving a population of over 382,492. While some waste is collected through door-to-door services and manual sweeping, over 72% of households dispose of garbage informally, often in open plots or unauthorized dumping sites. The absence of a sanitary landfill, proper segregation, and hazardous waste handling has resulted in serious public health and environmental concerns.

By 2045, daily waste generation is expected to rise from 160,647 Kg to nearly 3,00,065, requiring significant upgrades in infrastructure, staffing, and systems. The Strategic Development Plan proposes the establishment of a landfill site, a central composting facility, and integration of recycling and waste-to-energy options. Immediate actions in the core urban area focus on deploying community bins, expanding municipal fleet capacity, public awareness campaigns, and user-fee based service models. Together, these measures will align Kotri City with Sindh's Solid Waste Management Policy, improve urban cleanliness, and enhance public health resilience.

XII. Firefighting

Kotri City and Jamshoro currently face critical firefighting capacity gaps that pose serious risks to life, property, and economic assets. Across Kotri MC, Jamshoro TC, and Bolhari MC, a combined population of about 382,492 is served by only two firefighting vehicles (one in Kotri and one in Jamshoro) and severely limited trained manpower, with Kotri operating below its sanctioned strength and Jamshoro lacking trained firemen altogether. In addition, the absence of dedicated fire stations in Jamshoro and the lack of a ring-fenced operational budget for fuel, maintenance, and equipment significantly undermine response readiness. As per national standards requiring one fire station per 100,000 population and one fire engine per 50,000 population, the area currently requires approximately eight fire stations and at least fifteen fire engines, highlighting a substantial service deficit that will widen further as the population is projected to reach 714,441 by 2045.

The Strategic Development Plan therefore emphasizes a phased yet decisive strengthening of firefighting services through rehabilitation of existing capacity and strategic expansion aligned with population growth. Key actions include procurement and sustained maintenance of additional fire vehicles, establishment of dedicated fire stations and sub stations in Kotri and Jamshoro, recruitment and continuous training of firefighters, and assured budget allocations for POL, spares, and operations. Complementary measures such as mandatory sprinkler systems in multi story buildings, local early warning systems, and community level training in evacuation, first aid, and fire response will further enhance preparedness. Integrated with municipal planning for road access, water supply, energy reliability, and public safety systems, these interventions will substantially improve emergency response times, reduce fire related losses, and build long term urban resilience for Kotri and Jamshoro.

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XIII. Transportation

Kotri City holds a strategically strong position in Sindh's regional transport system, anchored by Kotri Junction, one of Pakistan's oldest and busiest railway junctions, connecting Karachi with upper Sindh, Punjab, and Balochistan through multiple express and passenger services. Road connectivity is reinforced by the Indus Highway (N-55), M-9 Motorway, and Jamshoro–Hyderabad Road, positioning Kotri as a critical corridor between Karachi and the interior of Sindh. However, air connectivity remains weak, as Hyderabad Domestic Airport has been non operational since 2013 and Sehwan Sharif Airport functions only during the Ur's period, leaving Jinnah International Airport in Karachi, approximately 120 km away, as the primary air gateway. Despite strong regional linkages, the local transport system faces serious constraints: the district's vast area of over 11,500 sq km is served by only about 179 km of good quality roads, while internal roads in Kotri MC, Jamshoro TC, and Bolhari MC suffer from pavement failure, poor drainage, inconsistent right of way, encroachments, lack of street furniture, weak street lighting, and absence of organized parking. The city lacks formal bus and truck terminals, resulting in illegal roadside stands and heavy reliance on unregulated Qingqing and rickshaws, which dominate daily mobility alongside motorcycles owned by over 80 percent of households.

Traffic and OD survey findings confirm that Kotri functions largely as a short trip city, with over 80 percent of work and school trips completed within 15 minutes, yet this apparent proximity masks severe inefficiencies caused by congestion at intersections, over capacity corridors such as Kotri Station Road, unreliable hospital access times, and elevated safety and flood risks at vulnerable links. The transportation strategy therefore adopts a two track, phased approach focused on rehabilitation and management rather than expansion alone. Short term priorities include rehabilitation of secondary and tertiary roads with integrated drainage, installation of solar street lighting, formalization of para transit stands, removal of encroachments especially along core corridors such as Raswa Mori Road, improved traffic signage, crossings, and parking management, and immediate safety upgrades at major junctions like Madina Chowk, Brohi Chowk, and Jamshoro Phattak. Long term interventions aim to strengthen system capacity and resilience through completion of missing network links, development of a modern bus terminal on the city outskirts with universal accessibility and flood resilient design, organized truck and freight facilities, improved rail station capacity, smart traffic control, and enhanced pedestrian and cycling infrastructure. All interventions are aligned with the Sindh Empowerment of Persons with Disabilities Act, 2018, ensuring universal access, safety, and equitable mobility. Collectively, these measures seek to reduce congestion, improve reliability and security, support economic activity, and deliver an inclusive, resilient, and sustainable transport system for Kotri City and the wider Jamshoro District.

XIV. Energy

Kotri City's energy supply relies entirely on the HESCO–WAPDA transmission system, anchored by a single 132 KV grid station, supplying 16.4 MW and 337 transformers serving over 6729 connections. Survey results show that about 92% of households are grid-connected. However, growing demand, frequent outages, aging infrastructure, and limited adoption of renewable energy constrain reliability and resilience of supply.

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The Strategic Development Plan envisions strengthening conventional infrastructure while diversifying into cleaner, more sustainable energy. Short term actions include upgrading the existing grid station, adding substations to ease transformer loads, and promoting household energy-efficient devices. Long term strategies focus on mainstreaming solar and wind through feasibility studies and pilot projects, encouraging energy-efficient building design, and supporting women-led awareness programs on fuel-use practices. Together, these measures aim to provide kotri City with a stable, efficient, and future-ready energy system aligned with sustainable urban growth.

XV. Gas Supply

Kotri City has relatively high gas coverage, with SSGC supplying around 89% of the urban area 69.7% of respondents facing issues with insufficient gas pressure. However, gas shortages and daily load-shedding of up to 13 hours limit reliability. More than half of surveyed households also reported insufficient gas pressure, forcing many residents to rely on wood (84%), coal, or cylinders as alternate fuels. These practices raise environmental concerns and health risks while highlighting inequities in service provision.

The Strategic Development Plan calls for improving gas distribution networks to underserved neighborhoods, addressing pressure management, and exploring alternative clean energy options such as biogas, LPG expansion, and solar for cooking and heating. Policy directions include demand-side efficiency, rationalized pricing of energy resources, and measures to mitigate the impact of load-shedding. Together, these interventions aim to ensure equitable, affordable, and sustainable energy access for kotri's growing population.

XVI. Communication

Kotri's communication infrastructure is partially developed, yet only 27% of households have landline connections, while the majority rely on mobile networks. Internet and Wi-Fi access remain limited, especially in underserved areas. Key weaknesses include poor information-sharing for agriculture, health, and disaster forecasting, along with the spread of misinformation.

The Strategic Development Plan proposes short-term improvements through upgrading mobile towers for 4G/5G readiness, expanding PTCL and mobile internet services, and running awareness campaigns. Long-term priorities include extending fiber-optic networks, establishing a digital innovation hub, and introducing smart city initiatives to strengthen connectivity and support inclusive growth.

XVII. Economic Development

Economy of an area or town plays an important role for its sustainability and further growth. Economy can make a town alive from dead town. Jamshoro, being as Industrial Hub consists of one canal passing through Kotri and Jamshoro i.e. KB Feeder has economic opportunities and issues as well. The progress of economic activities in district depends upon facilitation to labors by using modern techniques now and surely in the future. The district as a whole is well-known due to its characteristic of Industrial engine which serves all over Sindh by using market of Hyderabad, the regional Hub. It is situated on a main regional corridor which connects Karachi and interior Sindh through M-9 motorway. The city's growth is held back by youth unemployment, limited diversification,

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infrastructure and logistics gaps, low participation of women in the workforce, and climate risks that threaten farm output. The Economic Development Plan focuses on modernizing agriculture and allied industries, expanding trade and ICT enterprises, promoting industrial estates and small business clusters, building skills and entrepreneurship, and improving enabling infrastructure and market linkages under a transparent, investment friendly framework aligned with SDGs.

a. Agricultural

Jamshoro's hotter summers, cool winters, and mineral-rich terrain support crops such as rice, cotton, sugarcane, bajra, maize (Kharif), and wheat, barley, pulses, gram, and oilseeds (Rabi). Unlike canal-fed districts, its higher altitude and location along the Kirthar range make irrigation dependent mainly on river water and tube wells, with katcha lands irrigated directly from the Indus. Out of 1.24 million hectares of geographical area, about 92,000 hectares are cultivated, with 67,000 hectares sown. Key challenges include limited irrigation coverage, dependence on river flows, salinity, low productivity, and weak infrastructure. Priorities include efficient river and tube well irrigation, climate-smart farming, better extension and storage, and rural connectivity to strengthen farm incomes and resilience. Within agriculture, Jamshoro's climate and canals support major crops including wheat, sugarcane, cotton, and oilseeds, alongside fruit orchards and fisheries linked to canals. Key constraints include unreliable irrigation, waterlogging and salinity, traditional practices, weak market information, pest pressures, fragmented landholdings, inadequate storage, limited extension services, and power supply issues. The strategy prioritizes higher productivity through modern technologies and quality inputs, climate resilient farming, better data and extension, post-harvest storage, and farm to market access. Immediate economic measures include expanded credit for small and medium farmers, improved water management and drainage, deployment of solar and efficient tube wells, and construction and maintenance of rural roads to cut losses and raise farm incomes.

b. Livestock

Livestock is central to Jamshoro's rural economy, with the highest population of goats (414,191), followed by sheep (171,748) and cattle (163,732). It provides dairy, meat, and daily cash income, especially for small farmers and landless households. However, the sector remains largely subsistence-based and vulnerable to disease, feed scarcity, and climate shocks. The 2022 floods caused significant 2022 in Sindh" 17,169 livestock were died in District Jamshoro and grazing areas, underscoring the sector's fragility and the need for stronger veterinary support, breed improvement, and disaster resilience.

Key challenges include landlessness, fragmented holdings, reduced natural grazing areas, lack of veterinary extension services, and climate-induced risks. While Jamshoro has one veterinary hospital and 18 centers. The Strategic Development Plan prioritizes model farms, cooperative dairy initiatives, improved veterinary coverage, and productivity gains through deworming, vaccination, feed supplementation, and value addition. With its labor force and pasture potential, livestock products can be scaled into industry-linked value chains, enhancing food security, livelihoods, and rural incomes.

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c. Fisheries

Fisheries in Jamshoro are centered on the Indus River and Manchar Lake, Pakistan's largest freshwater body. In 2021, 533 boats and 75 fishermen produced 1,537 metric tons of fish, sustaining local livelihoods and food supply. However, fluctuating water levels, ecological degradation, and the 2022 floods exposed the sector's vulnerability. Traditional practices, poor infrastructure, and limited management further constrain productivity, underscoring the need for sustainable fisheries development and lake conservation. Despite this potential, the sector remains underdeveloped, with limited policy support, poor infrastructure, and outdated practices restricting productivity and long-term sustainability.

The Strategic Development Plan emphasizes the need for a dedicated district-level fisheries policy, private sector participation, aquaculture promotion, and capacity building through training and extension services. Priority measures include fish seed stock replenishment, sustainable fishing practices, value addition (processing, packaging, and cold storage), and improved market linkages. Establishing fish farms in suitable areas, supported by government and private investment, will modernize the sector, enhance resilience, and expand employment opportunities, aligning fisheries with the broader vision of inclusive economic growth for Kotri and Jamshoro District.

d. Industries

Jamshoro District hosts two major industrial estates. **SITE Kotri** spans 1,875 acres with 160 factories, leveraging its strategic location near Hyderabad and Karachi to support textiles, food processing, chemicals, plastics, and pharmaceuticals. **SITE Nooriabad**, spread over 5,741 acres along the Super Highway, has over 70 units (42 active) and offers tax incentives, attracting both national and multinational industries. Mining also supports livelihoods in Thano Bula Khan. Together, these estates drive industrial growth, job creation, and diversification, though challenges include inactive units and uneven infrastructure.

The Strategic Development Plan emphasizes revitalizing the Small Industrial Estate, expanding agro-based and cottage industries, promoting value addition in local products, and strengthening workforce skills through vocational training. Public–private partnerships, investment incentives, and improved market and supply chain linkages are proposed to attract investment and generate employment. A short-term priority project is the Revitalization of the SITE (PKR 200 million), which will modernize facilities, create jobs, and enhance industrial competitiveness while integrating green buffers to mitigate environmental impacts.

e. Trade & Commerce

There is existence of lots of banks in Jamshoro district namely, Agricultural bank Kotri, Sindh bank, National bank of Pakistan, Allied Bank,HBL Kotri city branch. Small Businesses such as A.J Autos, Sakhi Cement Depot. There is also the presence of few general stores. Kotri MC has main commercial hub along the Raswa Mori Road. Bolari MC has main commercial hub along the Hajji Ali Nawaz Chohan Road. Jamshoro TC has main commercial hub near Hyderabad-Jamshoro Road. This area includes super stores, traders, book shops, sports shop, cosmetic shop, restaurants, petrol pumps, cloth centres, chicken shops, However, unplanned business activities, the decline of traditional agricultural

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markets, weak PPP performance, and inadequate infrastructure undermine trade efficiency and growth.

The Strategic Development Plan proposes modernizing bazaars, developing a wholesale market with cold storage and logistics, and promoting artisan-based industries through organized trade clusters and digital platforms. The Immediate Action Plan focuses on the core commercial zones (Raswa Mori and Shahi Bazar) by upgrading infrastructure, improving pedestrian access, relocating hawkers to organized vending zones, and vegetable and fruit market. Priority rehabilitation works (PKR 950 million) aim to reduce congestion, strengthen market accessibility, and enhance the shopping environment, thereby improving business activity and aligning with SDGs 8 and 11.

XVIII. Environment

Jamshoro District, with Kotri as its HQ, lies between the Indus River and Kirthar Range, featuring flat croplands in the east and arid rangelands and hills in the west. The ecology includes limited flora and fauna, with major habitats in **Kirthar National Park** and **Mahal Kohistan Wildlife Sanctuary**. Wildlife ranges from leopards, hyenas, and gazelles to diverse bird and reptile species, while livestock and riverine forests support rural livelihoods. **Air and noise monitoring** show overall compliance with SEQS, though **$PM_{2.5}$ and CO exceedances** were noted in traffic-heavy zones, alongside localized noise stress. Key challenges include waterlogging, salinity, poor water quality, seismic risks, aging drainage canals, and rising urban air pollution.

The strategic plan calls for sustainable land and water management, biodiversity conservation, pollution control, and climate adaptation. Long-term measures emphasize rehabilitating drainage systems, promoting salt-tolerant crops, wetland and forest management, industrial effluent control, and climate risk mapping. Short-term priorities include emergency drainage, wetland monitoring, reed-based livelihood support, stricter pollution bylaws, urban flood preparedness, and community training. Together, these interventions aim to balance ecological conservation with urban growth, strengthening resilience to climate change while safeguarding natural resources for future generations.

XIX. Disaster Risk Management

Kotri City and Jamshoro District face recurring disasters that pose severe risks to lives, livelihoods, and urban systems. Floods in 2010–2012 and 2022 devastated agriculture, housing, and basic infrastructure, while the absence of a stormwater drainage network left low-lying urban areas like Khanpur and area along Indus River in Kotri city i.e, Muhajir Colony and inhabitants living along Derya Band are highly vulnerable to flash flooding. Alongside floods, rising heatwaves, seismic risks, and growing urban challenges including air and noise pollution, unmanaged solid waste, and unsafe drinking water. These overlapping hazards underscore the city's fragile resilience, particularly for semi-pucca housing, food security, and public health systems.

Disaster risk management in Kotri City is guided by the Sindh DRM Policy and coordinated through the Provincial and District Disaster Management Authorities, supported by municipal committees, taluka administrations, and community organizations. However, weak infrastructure, insufficient municipal capacity, and poor enforcement of building and environmental standards undermine

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preparedness and response. The Strategic Development Plan sets out short-term measures such as flood forecasting, drainage clearance, medical readiness, and public safety systems while laying the groundwork for long-term resilience through climate-resilient infrastructure, integration of risk mapping into land-use planning, and community-based disaster preparedness. A flagship priority is the establishment of a dedicated Emergency Shelter and Disaster Resilience Hub, designed to provide safe, well-equipped refuge for over 57,016 people in times of crisis. Together, these initiatives aim to safeguard lives, strengthen institutions, and build a more resilient urban future for Kotri City.

XX. Climate Change Emergency Contingency Plan

Sindh and Kotri city within Jamshoro faces accelerating climate risks: hotter maximum temperatures. Historical data (2010–2023) shows stable seasonal temperature cycles with a warming tilt and highly variable rainfall punctuated by extremes (notably 2022). Maximum temperatures typically peak around 42°C during the summer months (May to July), while minimum temperatures drop to about 8–10°C in winter (December to January). The district's topography 3 kilometers of Kotri is essentially flat, waterlogging/salinity, and weak storm-drainage magnify hazard exposure. Recent disasters confirm the trend: the 2022 floods surpassed 2010 in human, housing, and crop losses, with Jamshoro among the worst hit (3.8 M people affected; 260 k displaced; 43 k houses destroyed; major crop and livestock losses). Heatwaves, chronic water quality issues, and epidemic risks compound vulnerability.

The plan aligns local action with federal and Sindh frameworks (MoCC/NCCP, SEPA/DoCC, Sindh Climate Policy 2022) and ongoing resilience programs (RRU, SFERP, SPHF). It prioritizes near-term readiness forecasting and early warning, pre-monsoon drain clearing, medical surge capacity, and community evacuation planning while driving long-term adaptation: risk-based land use and climate zoning; climate-resilient building codes and transport/utilities; LBOD and urban drainage rehabilitation; safe water systems (treatment, rainwater harvesting, quality monitoring); climate-smart agriculture and livestock support; and heat-mitigation green corridors and solarized public services. Cross-cutting actions strengthen institutions, finance (including PPPs and climate funds), and inclusive community engagement, with clear roles for DDMA, municipal committees, and union councils to embed resilience across development decisions.

XXI. Sustainable Development Goals for Kotri City

Pakistan adopted the Sustainable Development Goals (SDGs) in 2016 as part of Vision 2025, creating federal and provincial coordination mechanisms to localize global commitments. The national framework prioritizes goals in three categories. Category I covers areas where quick progress can be made, including food security, health, education, clean water, clean energy, and responsive institutions. Category II requires sustained interventions for poverty reduction, women's empowerment, and resilient infrastructure. Category III involves long-gestation goals such as climate change mitigation and marine conservation.

In Kotri City, socioeconomic surveys reveal pressing challenges across food security, healthcare, education, water and sanitation, energy, livelihoods, and urban growth. To address these, seven SDGs have been selected for integration into the Strategic Development Plan: Zero Hunger, Good Health and Well-Being, Quality Education, Clean Water and Sanitation, Affordable and Clean Energy, Decent

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Work and Economic Growth, and Sustainable Cities and Communities. Each is mapped to relevant sectors such as agriculture, health, WASH, education, energy, industry, and land use planning. Sector strategies specify outputs, indicators, and timelines that feed into the city's SDG monitoring system and connect to provincial reporting.

The Strategic Development Plan provides the overarching framework for aligning local development with the 2030 Agenda. A separate SDG Implementation Plan complements this framework with detailed baseline analysis, target-to-indicator mapping, and implementation matrices. Together, they ensure that urban growth in Kotri City is directed toward sustainability, inclusivity, and resilience while contributing to national and global SDG commitments.

XXII. Urban Land Management

Urban land management in Kotri City reflects broader challenges faced across Sindh, where the supply of serviced and affordable land has not kept pace with rapid population growth. The absence of a provincial policy framework, weak enforcement of zoning, and limited financial capacity of municipal bodies have led to unplanned expansion, conversion of fertile agricultural land, and rising informal settlements. Issues such as outdated land use plans, corruption in land governance, and infrastructure stress from poorly regulated housing and commercial schemes further aggravate the situation.

The Strategic Development Plan emphasizes introducing modern land management tools such as Land Pooling and Reconstitution (LPR), Guided Urban Development (GUD), and Transferable Development Rights (TDRs) to ensure a steady supply of serviced land while safeguarding agricultural zones. Immediate priorities include cadastral surveys, digitized land records, and pilot LPR projects in peri-urban areas, along with enforcement of zoning bylaws to curb haphazard development. In the long term, strategies focus on establishing land banks, PPP-based industrial and commercial zones, peri-urban agriculture protection, and redevelopment of katchi abadis through inclusive models. These measures, aligned with existing legal frameworks, provide a pathway for sustainable, equitable, and resilient urban expansion in kotri.

XXIII. Implementation Strategy

The successful execution of the Strategic Development Plan hinges on a clear institutional framework, phased implementation, and diversified funding. The Kotri Urban Development Authority (k-UDA) will be established as the central coordinating body, operating initially within the Municipal Committee and town Committee before evolving into an autonomous entity. Implementation will be phased: short-term (1-3 years) focuses on establishing the K-UDA, digitizing land records, and launching pilot projects; medium-term (4-10 years) scales up land pooling and priority infrastructure; and long-term (10-20 years) advances regional integration and climate-resilient development.

Funding will be mobilized through provincial development programs (ADP/PSDP), municipal budgets, donor partnerships, and private sector investment via PPP models. Oversight will be provided by a District Coordination Committee chaired by the Deputy Commissioner, ensuring alignment with provincial goals and active stakeholder engagement. This structured approach ensures the plan's transition from vision to actionable, accountable outcomes.

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STRATEGIC DEVELOPMENT PLAN FOR KOTRI CITY

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1. THE PROJECT OVERVIEW

Sindh is the most urbanized province of Pakistan, with 53.7% of its population residing in urban areas as per the 2023 Census. Despite this high rate of urbanization, the province's secondary and district headquarter (DHQ) cities have historically received inadequate attention in terms of structured planning and coordinated public investment. Infrastructure development has often been fragmented and ad hoc, resulting in inefficient service delivery, unmanaged growth, and limited opportunities for balanced regional development.

As a consequence, many secondary cities have not been able to function as true "engines of economic growth." Their inability to attract investment and provide adequate infrastructure and social facilities has reinforced rural poverty in surrounding hinterlands, where the poverty headcount ratio remains nearly double that of declared urban areas.

Recognizing these challenges, the Government of Sindh established the Directorate of Urban, Regional Policy & Strategic Planning (DURP&SP) under the Planning & Development Department. The Directorate provides technical support in policy formulation, master planning, and project implementation aimed at revitalizing Sindh's urban sector and enhancing the role of secondary cities in regional development.

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1.1 Objective and mandate of DURP&SP

The core objective of the Directorate is to provide technical support to the Planning & Development Department, Government of Sindh on urban policies, plans, programs, and schemes related to sustainable urban development. The Directorate's focus spans a wide range of urban sectors, including:[1]

- Strategic and Spatial Urban Planning
- Development Regulation and Control
- Economic Regeneration and Investment
- Data and Information Management
- Urban Transport and Mass Transit
- Water Supply and Sanitation
- Municipal Finance and Urban Governance
- Housing and Katchi Abadis

The mandate and scope of the Directorate are twofold:

1. Establishing a province-wide urban development planning process through the preparation of policies, plans, and studies across short-, medium-, and long-term horizons.

[1] Urban Policy & Planning – urbandirectorate.gos.pk

2. Supporting the implementation of development projects in line with approved policies and plans, addressing the needs of the urban population, managing migration pressures, and decentralizing economic activities to reduce the burden on already congested metropolitan areas.

Specific functions of the Directorate include:

- Providing guidance and technical support on urban policy and planning.
- Facilitating economic regeneration, investment planning, and municipal governance reforms.
- Establishing urban information systems (GIS, cadastral surveys, and databases).
- Compiling and managing urban data to support evidence-based policymaking.
- Preparing development/master plans, surveys, and sectoral studies.
- Coordinating with provincial departments, local administrations, and development partners on planning issues.
- Developing and updating the policy framework targeting sustainable urban growth in Sindh.

To date, the Directorate has completed 17 Development Master Plans for DHQ cities, including Sukkur, Larkana, Sanghar, Mirpurkhas, Umerkot, Thatta, Badin, Dadu, Jamshoro, and others.

1.2 Goals and Objectives of the Development Master Plan Project

Building on this institutional foundation, the Government of Sindh initiated the preparation of Development Master Plans for 12 additional secondary cities. These have been grouped into three geographic packages to facilitate integrated regional planning:

- **Package 1:** Khairpur, Ghotki, Mirpur Mathelo, Rohri
- **Package 2:** Shikarpur, Kandkot, Jacobabad, Kambar
- **Package 3:** Kotri, Hala, Tando Adam, Moro

Package 3 has been awarded to EA Consulting Pvt. Ltd. The primary goal is to create comprehensive, 20-year master plans that will transform these cities into sustainable and economically vibrant urban centers.

The proposed Development Master Plans of selected major secondary cities of Sindh would focus on the following activities:

- Review of Past Trends, Development Strategies and Prevalent Conditions
- Preparation of Digital Base Maps
- SWOT Analysis
- Carving out a Vision for Future
- Preparation of the Development Plan focusing on:

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- Long Term Development Plan
- Growth Scenarios
- Short Term Action Plan for Priority Infrastructure Development
- Development of an Immediate Action Plan for the Core Urban Area
- Economic Development Plan
- Climate Change, Resilience & Adaptability Plans
- Disaster Management Plan
- Sustainable Development Goals SDGs Implementation Plan
- Implementation Strategy
- Dissemination – Development Master Plan

This report presents the Strategic Development Plan for Kotri City, outlining sector-wise assessments, growth strategies, and implementation mechanisms designed to guide the city's transformation into a sustainable and resilient urban center by 2045.

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2. AN OVERVIEW OF JAMSHORO AND ITS ENVIRONMENT

2.1 Jamshoro District at Glance

District Jamshoro, located in the western part of the Sindh province, was established as a district in 2004, separated from district Dadu. The 1998 census reported a population of 582,094 in taluka Kotri (now District Jamshoro), comprising 23% urban and 77% rural population. The average annual growth rate was 2.57, with a household size of 5.7. In the 2017 census, the population of District Jamshoro reached 993,908, with 44% urban and 56% rural population.

The district shares borders with Dadu to the north, River Indus to the east (separating it from Shaheed Benazirabad, Matiari, and Hyderabad districts), Thatta to the south, Karachi to the southwest, and Khirthar Range to the west, marking the boundary between Sindh and Lasbela district of Baluchistan.

Due to its location at the base of the Khirthar mountain range, the district lacks a canal system, relying on perennial water for cultivation. Irrigation along the Indus River's katcha area is common. Although the district's lands are arid, wheat, cotton, maize, and vegetables are cultivated. The majority of the population is rural, engaged in agriculture, while industrial areas, power plants, and towns provide employment opportunities.

Nooriabad Industrial Area and Kotri Industrial Area house over 500 different industries. Key power units include Jamshoro Power Station, Lakhra Power Project, and Kotri Thermal Power Station[2].

Transportation in Jamshoro relies on roads and railways, with the National Highway connecting Karachi and Peshawar passing through the district. The Karachi railway line via Kotri connects Jamshoro to the national railway network. The district's population, according to the 2023 census, is 1,117,308 with an average annual growth rate of 1.98%. The average household size is 5.23, totalling 213,639 households.

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[2] SITE Nooriabad | (archive.org)

2.1.1 Geographical Location

District Jamshoro is strategically positioned between 67° 16" 20' to 68° 27" 37' east longitudes and 24° 58" 14' to 26° 36" 33' north latitudes. The geographical boundaries of the district are defined by its neighboring regions:

North: Dadu district

East: Separated by the River Indus from Shaheed Benazirabad, Matiari, and Hyderabad districts

South: Thatta district

Southwest: Karachi district

West: Khirthar Range, forming the boundary between Sindh and Lasbela district of Baluchistan

This strategic location places District Jamshoro at the crossroads of key neighboring areas, contributing to its significance within the Sindh province.

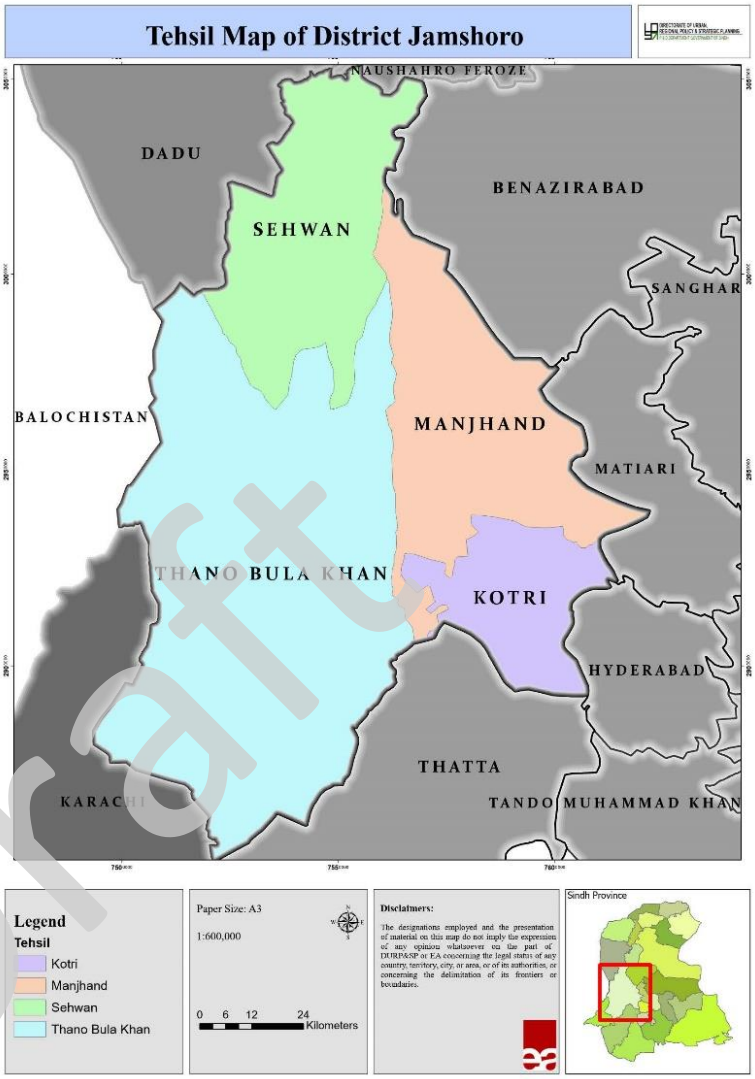

Figure 2-1: District Map of Jamshoro

2.1.2 Topography, Geology and Soils (Jamshoro)

The lands of this district are mostly arid with some vegetation. Due to the hilly nature of the land, cultivation is scarce in this district. Irrigated croplands are on the border alongside the Indus River. Geologically Jamshoro contains the exposed Cenozoic rocks from Paleocene to Recent Deposits. The Paleocene is exposed in the Ranikot area in the form of Khadro, Bara and Lakhra Formations with clastic and carbonate Lithology. The exposed formation of Eocene age is Laki Formation. Nari Formation of Oligocene age, Gaj Formation of Miocene and Manchhar Formation of Miocene-Pliocene ages are exposed at various localities in the district. The surface is covered by a recent cover of unconsolidated surficial deposits of silt, sand, and gravel.[3]

[3] https://www.scribd.com/document/172676460/Geology-of-Sindh-District

Tehsil Map of District Jamshoro

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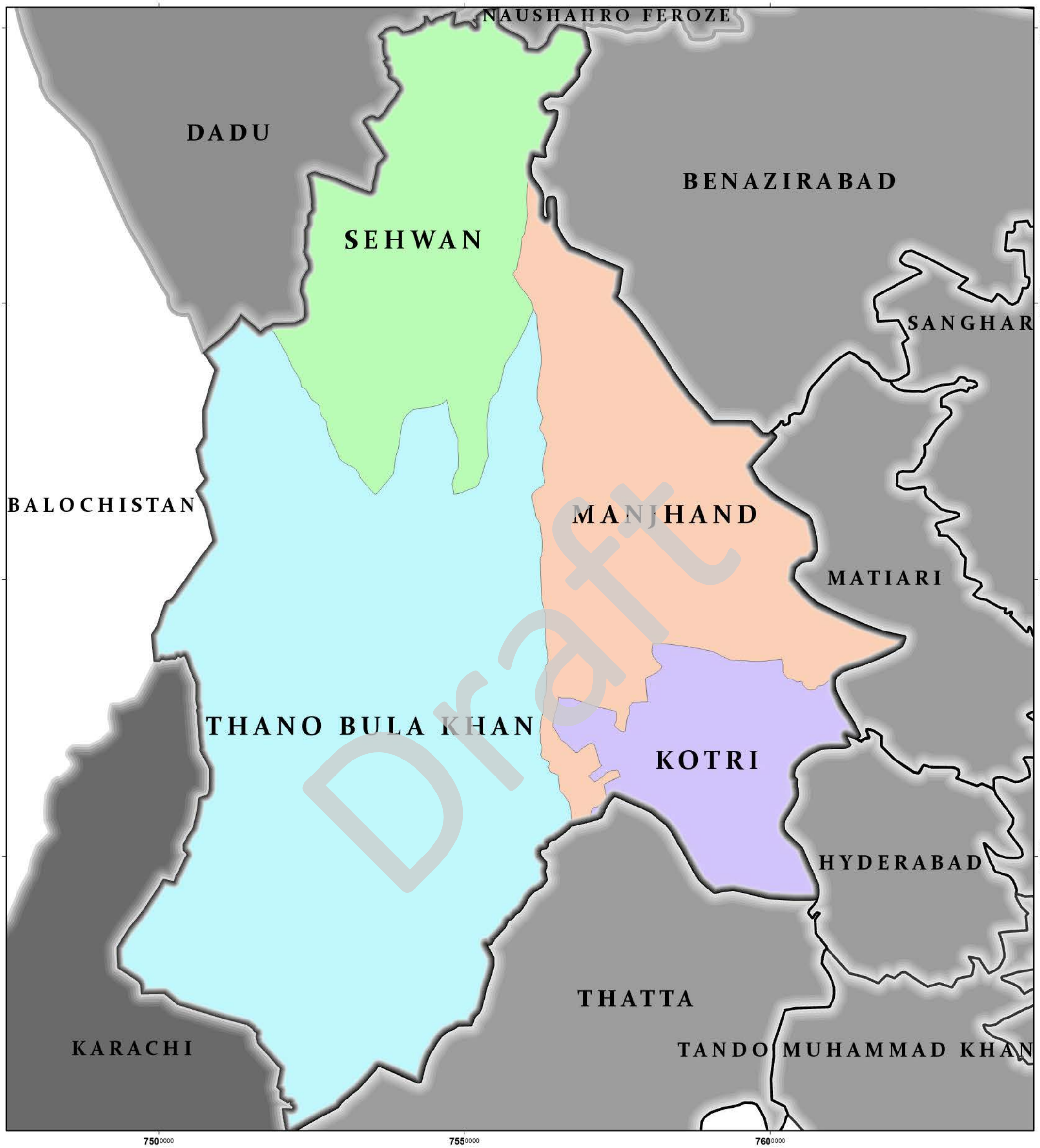
P & D DEPARTMENT GOVERNMENT OF SINDH



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Tehsil

- Kotri
- Manjhand
- Sehwan
- Thano Bula Khan

Paper Size: A3

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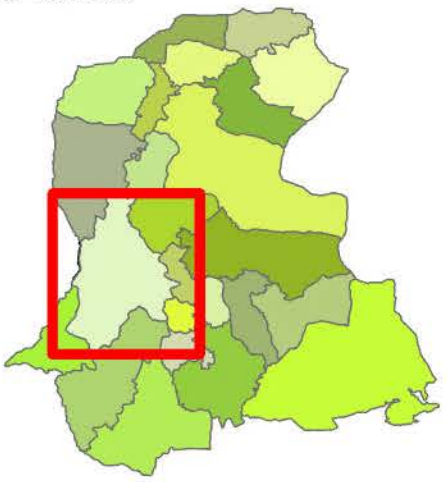
Disclaimers:

The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of DURP&SP or EA concerning the legal status of any country, territory, city, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Sindh Province



It starts from Petaro near Jamshoro (start point of M-9 motorway) and terminates near Sehwan. Most of the area is flat while some reaches are rolling. No major agriculture activity was found in this section.[4]

*2.1.3 **Climate***

Jamshoro District in Sindh province experiences a distinctive climate characterized by scorching summers, humid monsoons, and pleasant winters. The summer months, from April to June, bring extreme heat, with temperatures surpassing 40°C. Monsoons, spanning July to September, provide relief but intensify humidity. Winters, from October to March, offer pleasant, dry conditions.

Jamshoro exhibits distinct seasonal variation in monthly rainfall, with a notable rainy period and an extended rainless period. The rainy season spans approximately 2.8 months, commencing from June 29 and concluding on September 21. During this period, there is a consistent 31-day sliding window with a minimum accumulation of 0.5 inches of rainfall. August stands out as the wettest month, boasting an average rainfall of 1.5 inches.

Conversely, the rainless period dominates the majority of the year, lasting for 9.2 months from September 21 to June 29. November marks the driest month, with an average rainfall as low as 0.1 inches. Understanding these rainfall patterns is essential for agricultural planning, water resource management, and overall climate resilience in Jamshoro[5]. Abundant sunshine, over 3000 hours annually[6], positions Jamshoro as a favorable location for solar energy. Winds shift with the seasons, and moderate speeds prevail, occasionally escalating during dust storms.

Extreme events, including droughts, floods, and heatwaves, impact the district. Vulnerability to droughts stems from the arid climate, while floods coincide with heavy monsoon rainfall. The increasing frequency of intense heatwaves reflects climate change's influence.

Projections indicate rising temperatures, more severe heatwaves, and erratic rainfall patterns. Adapting to these changes is crucial for sustainable development, especially in agriculture, water management, and public health. Understanding Jamshoro's climate nuances enables strategic planning to address climate challenges effectively

*2.1.4 **Ethnicity, Culture and Politics***

Jamshoro has a rich traditional Sindhi culture. Women usually wear Shalwar Qameez but quite often dress in the traditional attire, Ghaghra or Parro, as well. Traditionally, women wear bangles. Men usually wear a Shalwar Qameez distinguished by broader bottoms, and a traditional Sindhi style cap. People of this district are pre-dominantly Sindhi speaking but Urdu, Balochi, and Brohi are also spoken in the district. Bhutto, Rind, Syed, Talpur, Chandio, Magsi, Soomro, Memon and Kalhoro are the major clans of this district. Islam is the religion of the majority in this district followed by a minority of Hindu community.

[4] https://www.adb.org/sites/default/files/project-documents/48404/48404-003-iee-en.pdf
[5] Jāmshoro Climate, Weather By Month, Average Temperature (Pakistan) - Weather Spark
[6] sunshine-hours.png (2753×1400) (vividmaps.com)

*2.1.5 **Historical/Famous Places***

The Town Sehwan is famous for the shrine of Hazrat Makhdoom Usman Marvindi, popularly known as Hazrat Lal Shahbaz Qalandar. Thousands of people from all over the country come to visit (ziarat) and pay tribute to this great Saint during the annual URS on the 18th of Shaban, every year. Manchhur Lake is also one of the well-known places of Sehwan because it is the largest sweet water lake in the Asian continent.[7]

Shrine of Lal-Shahbaz-Qalandar

- Dargah of Hyder Shah Sanni
- Shrine of Hazrat Makhdoom Usman Marvindi, popularly known as Hazrat Lal Shahbaz Qalandar.[8]
- Ranikot Fort.
- The site was selected to be a university township away from the humdrum of Hyderabad city which lacked room to meet the ambitious expansion programs of the University.
  - University of Sindh
  - Liaquat University of Medical and Health Sciences
  - Mehran University of Engineering and Technology.
- Lakhmir-ji-Mari.
- Sehwan Fort.
- The Kotri Barrage, also known as the Ghulam Muhammad Barrage.

Rani Kot

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Sehwan Fort

Kotri Barrage

[7] Report on Tranche Condition (2006), Taluka Administration, Social Services Program (SDSSP), Government of Sindh
[8] Report on Tranche Condition (2006), Taluka Administration, District Government Jamshoro, Sindh Devolved Social Services Program (SDSSP), Government of Sindh

*2.1.6 **Administrative Set-up***

District Jamshoro exhibits a well-defined administrative structure, comprising multiple talukas, each further categorized into dehs, reflecting the nuanced distribution of population and land use. Sehwan Taluka, with a total of 71 dehs, stands out with a predominantly rural landscape, accounting for 67 rural dehs, while Kotri Taluka showcases a balanced mix of rural and urban areas, emphasizing its diverse administrative composition.

Thano Bula Khan Taluka, with 28 dehs, emerges as an area predominantly characterized by its rural nature, offering valuable insights into the district's agrarian facets. Conversely, Manjhand Taluka, housing 50 dehs, presents a dynamic blend of urban and rural components, illustrating the intricate balance between urbanization and rural development.

The cumulative administrative setup of Jamshoro District, encompassing 175 dehs, signifies the district's complexity. The dominance of rural dehs, totaling 164, underscores the district's reliance on agricultural activities, while the presence of urban and partly urban areas highlights the evolving urbanization trends. The existence of forest and un-populated dehs further adds layers to the district's administrative fabric.

This detailed administrative breakdown serves as a foundational framework for understanding the distribution of dehs, offering crucial insights for policymaking, resource allocation, and targeted developmental initiatives within District Jamshoro.

Table 2-1: Administrative Division of District Jamshoro[9]

Jamshoro	Number of Dehs						
	Total	Rural	Urban	Partly Urban	Forest	Un-Populated	Rural populated
Sehwan Taluka	71	67	1	2	0	1	69
Kotri Taluka	26	23	2	0	0	1	23
Thano Bula Khan Taluka	28	0	0	0	0	0	28
Manjhand Taluka	50	74	2	1	0	0	48
Jamshoro District	**175**	**164**	**5**	**3**	**0**	**2**	**168**

[9] Mouza Census Dashboard (pbos.gov.pk)

2.1.7 Major Linkages

Road network is considered as a vehicle for economic development and social change. Efficient road network not only develops a quick and efficient transportation system but also opens up new areas hitherto remained closed. It brings about social integration among rural and urban Sectors and greatly assists in providing access to basic amenities such as education and health facilities etc. It brings rural areas in constant touch with the urban segment of society and creates a better understanding necessary for social change and political awareness.

Jamshoro district covers a vast area of 11,204 sq. km, yet only has 672[10] kilometers of good quality roads. While this network connects major towns and cities, it is inadequate for the district's size and population. A crucial element in economic development and social change, a robust road network facilitates efficient transportation, opens up new areas, and fosters social integration. Unfortunately, Jamshoro's limited road network restricts these benefits.

National Highway N-55 (Indus Highway): This highway connects Jamshoro to other major cities within Sindh province, playing a vital role in inter-city transportation and trade.

Express Way M-9: This expressway further enhances connectivity, providing a faster and more efficient route between Jamshoro and other major cities.

Metal Roads: These connect the district headquarters of Jamshoro with its taluka headquarters of Thano Bula Khan, Manjhand, and Sehwan, facilitating transportation within the district.

Railways: Jamshoro is connected to the rest of Pakistan through the Karachi–Kotri or Kotri–Attock Railway Line. This major line, operated by Pakistan Railways, spans 1,519 kilometers and has 73 stations. It serves as a vital link for passengers and cargo, offering an alternative to road transportation.

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2.1.8 Demography

The demographic trends in Jamshoro District, drawn from the data between 1998 and 2045, reveal a significant pattern of population growth and an escalating demand for housing. In 1998, the district's population was recorded at 582,094, a figure that rose markedly to 993,908 by the 2017 census, however, in Census 2023, the district population was 1,117,308 reflecting a robust average growth rate of 1.98%. This growth translated into a notable increase in housing units, which stood at 213,639, highlighting the district's expanding infrastructure needs.

The trajectory of growth is expected to continue, as evidenced by the population projections. By 2025, the population is estimated to reach 1,161,991, necessitating 223,460 housing units to accommodate the residents adequately. This trend of expansion is set to persist, with the population projected to climb to 1,281,675 by 2030, further increasing the demand for housing to 246,476 units.

[10] Sindh Statistics 2022

The subsequent years will see a continuation of this pattern, with population figures expected to rise to 1,413,686 by 2035 and 1,559,294 by 2040, driving the need for housing units up to 271,863 and 299,864 respectively.

The year 2045 marks a significant milestone, with the population projected to reach an impressive 1,719,900, accompanied by a demand for 330,750 housing units. This substantial growth underscores the critical need for comprehensive urban planning and sustainable development strategies in Jamshoro District. The authorities are thus faced with the challenge of not only expanding the housing and infrastructure to meet the rising demand but also ensuring that this expansion is managed sustainably, with adequate provision of essential services and preservation of the environment. The data clearly indicates that proactive measures are essential to address the burgeoning population growth and its associated demands in the district.

Table 2-2: Demographic Statistics: District Jamshoro

AREA		JAMSHORO DISTRICT
Census 1998	Population	582,094
	Aver. Growth Rate	-
	Aver. HH Size	-
	Housing Units	-
Census 2017	Population	993,908
	Aver. Growth Rate	2.85
	Aver. HH Size	5.37
	Housing Units	178,651
Census 2023	Population	1,117,308
	Aver. Growth Rate	1.98
	Aver. HH Size	5.2
	Housing Units	213,493
Population Projection in 2025	Population Projection	1,719,900
	Housing Units Projection	330,750

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2.2 Kotri (Kotri MC + Bolhari MC + Jamshoro TC) – The District Headquarter Town

2.7.1 History

Kotri, the district headquarters of Jamshoro, is more than just an administrative center. It boasts a rich history, vibrant culture, and a strategic location that has shaped its development through centuries.

Kotri's land has witnessed the rise and fall of several dynasties, each leaving their mark on the region. From the Soomras (1024-1351) to the Talpurs (1783-1843), each era added a layer of cultural and architectural influence. The Kalhoras, in particular, played a significant role in shaping Kotri's identity. Their reign saw the construction of the iconic Ranikot Fort, a UNESCO World Heritage Site, and the development of Kotri as a vital trade center.

The British conquest of Sindh in 1843 marked another chapter in Kotri's history. General Charles Napier, the first Governor-General of Sindh, recognized the region's potential and initiated infrastructural development projects. Roads, schools, and dispensaries were built, laying the foundation for Kotri's modern transformation.[11]

After Pakistan's independence in 1947, Kotri remained a part of Dadu district until 2004. However, the town continued to grow, attracting people from other districts and provinces. This influx of population spurred further development, leading to the creation of Kotri MC, Bolhari MC, and Jamshoro TC, which together form the current district headquarters.

Today, Kotri is a bustling town with a thriving economy. Its strategic location on the Indus Highway and proximity to Karachi make it a key player in trade and commerce. The town is also home to several educational institutions, healthcare facilities, and cultural attractions.

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2.7.2 Geography

Kotri, a pivotal component of District Jamshoro, is geographically anchored at coordinates 25° 22’ 26.27” N latitude and 68° 18’ 4.73” E longitude. Situated at this precise junction, Kotri not only contributes to the district's geographical expanse but also serves as a nexus for various administrative functions.

I. Topography

Kotri City has a varied topography with areas of flat land as well as mountainous regions. The flat areas are near the Indus River and are about 9 meters above sea level, indicating low-lying terrain that may be prone to flooding if the river levels rise. The western parts of the city are mountainous and rise from 9 meters to as high as 79 meters above sea level. This elevation change could affect weather patterns, water flow, and infrastructure development within the city.

[11] Hyderabad- An Economic Overview, (2005), Small and Medium Enterprise Development Authority (SMEDA), Hyderabad

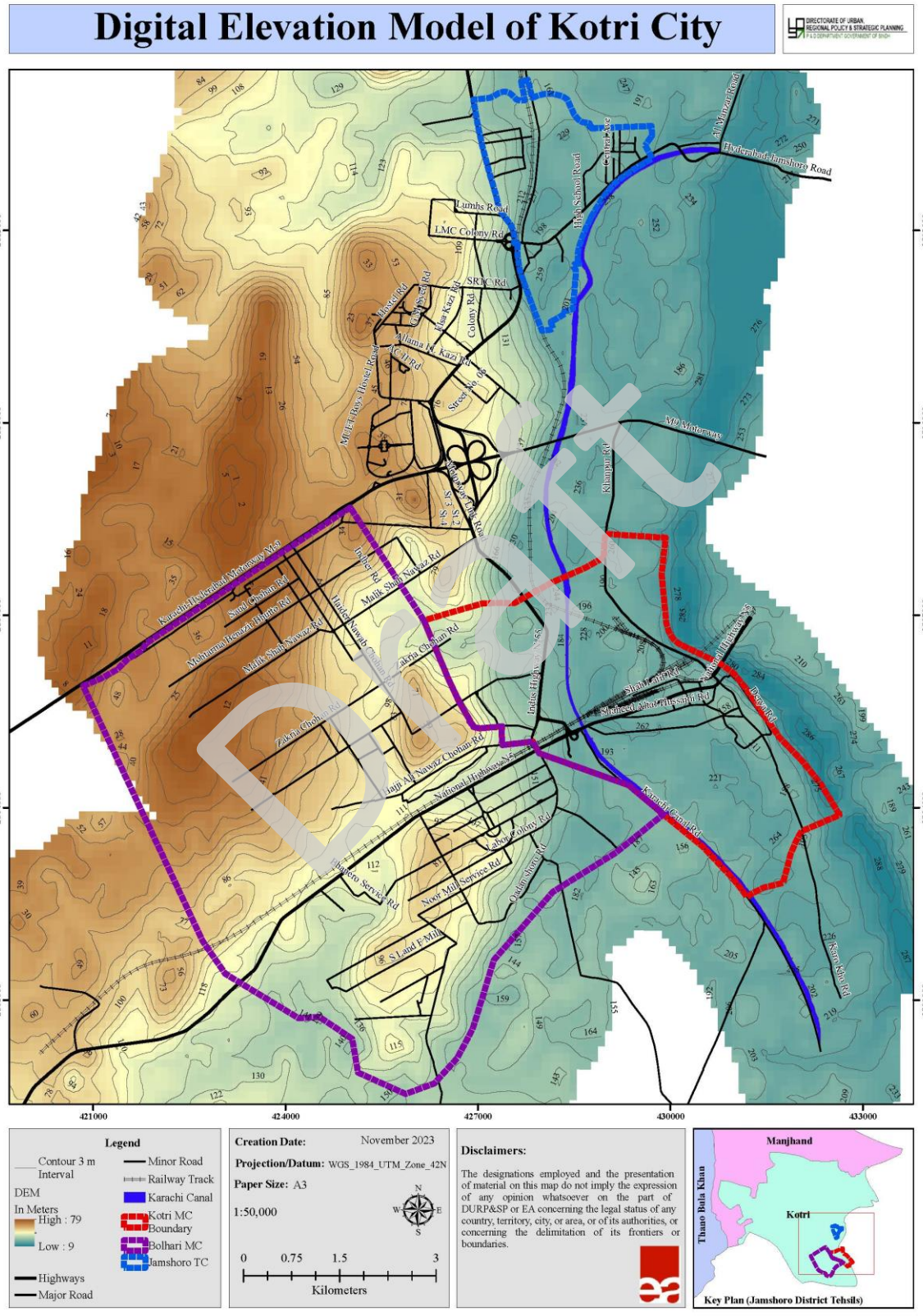

Figure 2-2: Digital Elevation Model of Kotri City

Digital Elevation Model of Kotri City

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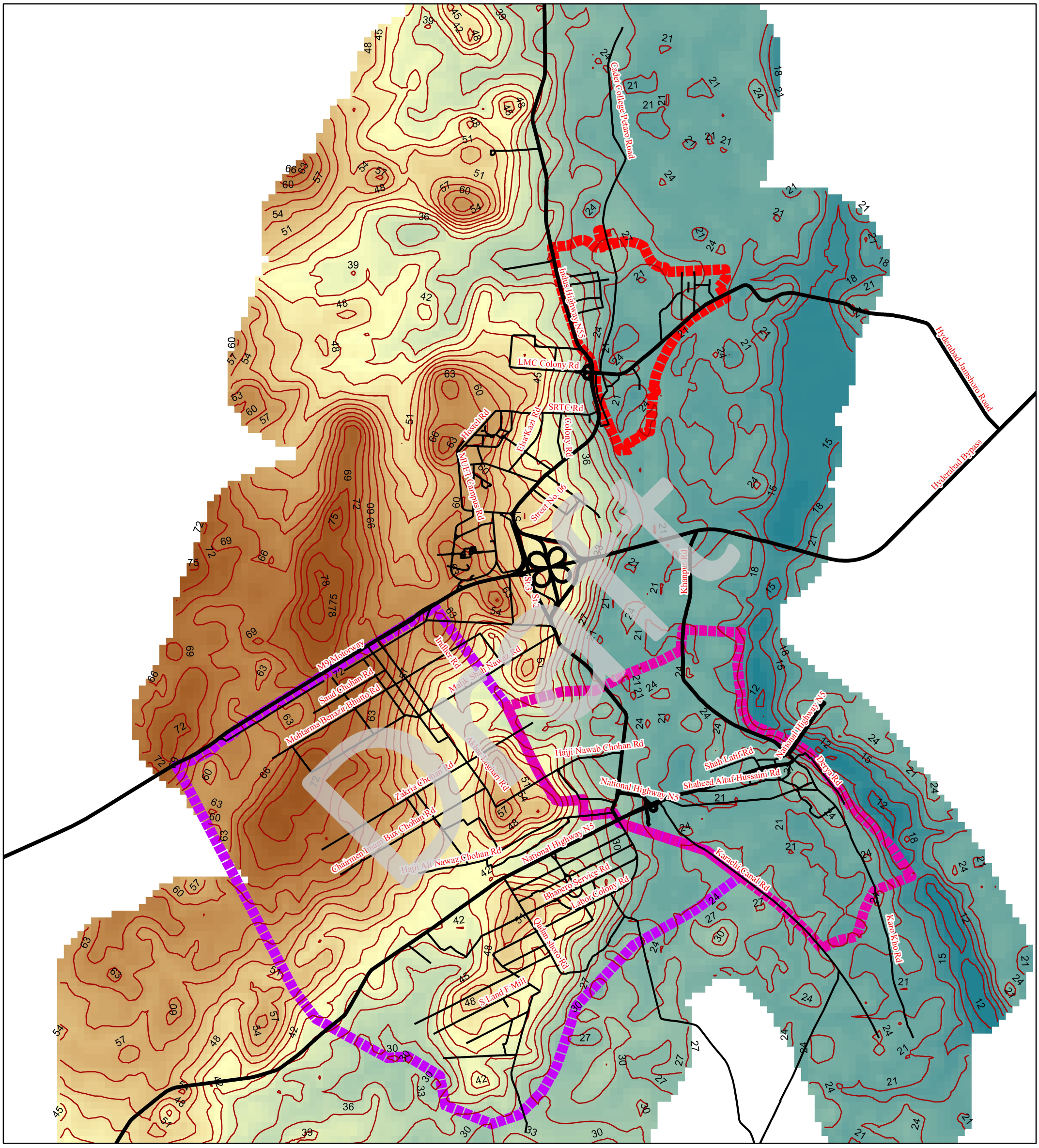
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Contour 3 m Interval

DEM

In Meters

- High : 79
- Low : 9
- Major Road
- Minor Road
- Mc_Kotri_Boundary
- MC_Bolhari Boundary
- TC_Jamshoro_Boundary

Paper Size: A3

1:65,000

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Kilometers

Disclaimers:

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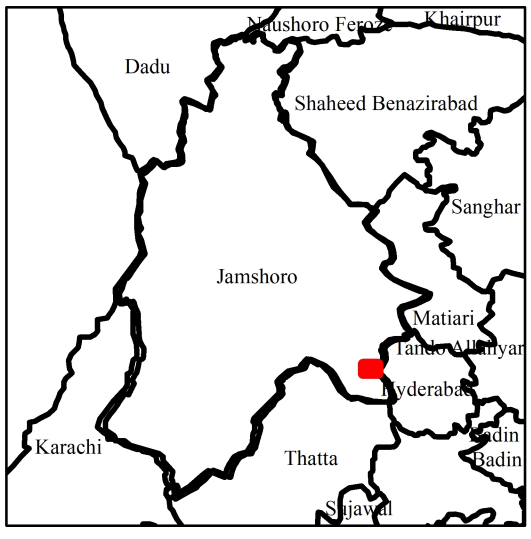

II. Climate:

The average maximum temperature in Kotri is around 38.5°C (101°F), exhibiting a nuanced pattern with a subtle zenith in May and June, tapering gradually as winter approaches. In contrast, the average minimum temperature maintains a relatively steady demeanor, ranging from 18°C to 22°C (64°F to 72°F) across the seasons.

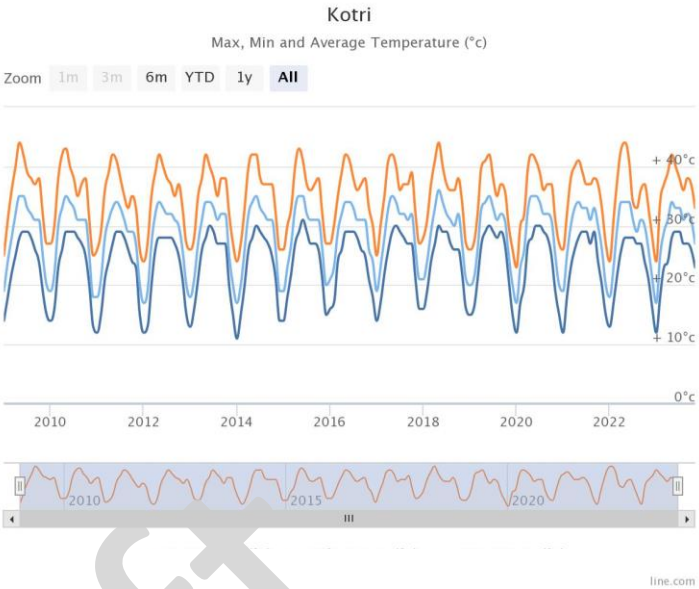

Figure 2-3: Max, Min Average Temperature kotri

Delving into the realm of precipitation, Kotri experiences a distinctive distribution of rainfall. The graphical representation underscores that the monsoon season, particularly in July and August, takes center stage, witnessing the highest influx of rainfall. The remainder of the months experiences sparse precipitation, aligning with the region's characteristically arid climate.

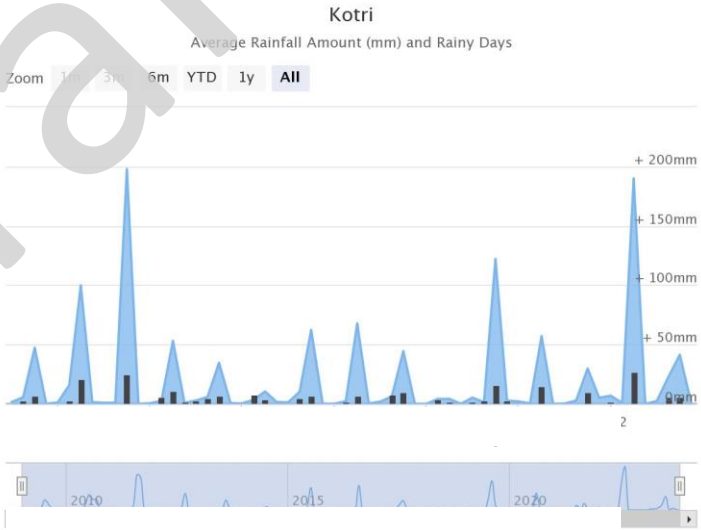

Figure 2-4: Annual Average Rainfall

In summation, Kotri's climate can be encapsulated as one marked by scorching summers, mild winters, limited rainfall primarily concentrated in the monsoon months, and elevated humidity levels. This climatic canvas not only sets the tone for the local weather but also holds paramount importance for sectors like agriculture, water resource management, and planning outdoor activities. Understanding these climatic nuances is instrumental in fostering resilience and sustainable development in the Kotri region**.**

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III. Natural Features

The mighty Indus River, a lifeline for agriculture and aquatic life, graces its eastern edges, offering scenic retreats for locals and visitors alike. The enchanting Kirthar Range to the west beckon's adventurers with its rugged allure, while fertile alluvial plains nurture bountiful crops and diverse bird species. Seasonal wetlands during the monsoon season attract migratory birds and contribute to the local ecosystem. Rocky outcrops and hillocks scattered across the landscape add a touch of rugged charm, and to the west, arid desert patches showcase unique flora and fauna adapted to harsh conditions. Kotri's natural wonders, encompassing the river, mountains, plains, wetlands, rocky formations, and deserts, collectively create a dynamic and surprisingly diverse landscape that enriches the ecological tapestry of the region**.**

IV. Surrounding Landscape

Kotri, the district headquarters of Jamshoro in Sindh, unfolds a mesmerizing story through its diverse landscape. The dominant features include the life-giving Indus River and the majestic Kirthar Range, offering a harmonious blend of fertile plains, rugged terrains, and seasonal wetlands. Vast agricultural fields and rocky outcrops contribute to the region's ecological richness. The landscape transitions into arid desert patches towards the west, showcasing specialized flora and fauna. Noteworthy features like the Kotri Barrage and mangrove forests add both engineering marvels and environmental significance. Beyond the physical allure, the cultural significance of the landscape is profound, with the Indus River influencing local traditions and the Kirthar Range holding spiritual value. Kotri's surroundings present a captivating tapestry, where nature's wonders, history, and cultural heritage converge seamlessly. Remarkably, the landscape has witnessed transformative changes, especially post the 2010 flood. Rapid expansion, notably along the M-9 motorway toll and the Sehwan road crossing the Jamshoro Power House, reflects the dynamic evolution of this region.

2.7.3 Demography

The demographic landscape of Kotri City, encompassing Kotri Municipal Committee (MC), Bolhari MC, and Jamshoro Town Committee (TC), highlights a pattern of significant growth and demographic evolution. This section presents an analysis of past population trends and future projections, providing valuable insights into the developmental trajectory of the region.

Population Trends and Projections:

In 2017, the combined population of Kotri MC, Bolhari MC, and Jamshoro TC was 292,131. This number increased significantly by the 2023 census, reflecting broader trends of urbanization and population expansion in the region. Specifically, Kotri MC's population grew from 101,124 to 106,615, Bolhari MC from 158,239 to 169,613, and Jamshoro TC saw a notable increase from 32,768 to 88,190. These trends indicate an overall demographic expansion, driven by both natural population growth and migration patterns.

Looking ahead to 2025, the projections indicate continued growth, with Kotri MC expected to reach 108,521 inhabitants, Bolhari MC 173,605, and Jamshoro TC 100,366, resulting in a total combined

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population of 382,492. This upward trend will necessitate strategic planning in housing, infrastructure, and essential services to accommodate the growing population.

The reported average annual growth rate of 17.99% for Jamshoro TC appears unusually high, especially when considering that the overall population of Kotri Taluka (which includes Jamshoro TC) increased by only 33,940 during the same period. This discrepancy suggests potential anomalies in the data. To provide a more realistic estimate, averaging the growth rates of all three municipalities yields an approximate annual growth rate of 6.68%, which offers a more balanced perspective on the demographic trends in the region.

The average household size remains relatively high in the region, indicating a tendency towards larger family units. This trend has direct implications for housing, social services, and community facilities. Additionally, the increase in the number of housing units, from 65,929 to a projected 68,987, underscores the growing demand for residential space and the need for sustainable urban development strategies.

Future Projections

The future population projections for Kotri MC, Bolhari MC, and Jamshoro TC provide a detailed view of anticipated growth in population and housing needs up to 2045. These projections are essential for strategic planning, infrastructure development, and resource allocation to address the demands of the growing population.

Starting from the 2023 census data, Jamshoro District, which encompasses the Kotri MC, Bolhari MC, and Jamshoro TC areas, had a total population of 1,117,308. By 2025, the district's population is projected to reach 1,161,991 and is expected to grow further to 1,719,900 by 2045. Correspondingly, housing units will need to increase from 213,493 in 2023 to an estimated 324,328 by 2045 to accommodate this growth.

Within Kotri Taluka specifically, the population is projected to rise from 472,003 in 2023 to 483,877 in 2025 and is expected to reach 620,348 by 2045. This growth will require an increase in housing units from 86,413 in 2023 to an estimated 114,879 by 2045.

Focusing on individual municipal committees, **Kotri MC** is anticipated to experience moderate growth, with its population increasing from 106,615 in 2023 to 108,521 in 2025, and reaching 129,562 by 2045. Housing units in Kotri MC will need to rise from 20,742 in 2023 to approximately 25,207 by 2045.

Bolhari MC is expected to experience a slightly higher growth rate, with the population increasing from 169,613 in 2023 to 173,605 in 2025 and reaching 219,077 by 2045. This population expansion necessitates a rise in housing units from 31,008 in 2023 to about 40,051 by 2045.

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Jamshoro TC stands out with the most substantial growth projection. The population in Jamshoro TC is anticipated to increase from 88,190 in 2023 to 100,366 in 2025, reaching a projected 365,802 by 2045. This rapid increase requires a significant rise in housing units, from 14,178 in 2023 to an estimated 58,811 by 2045.

When aggregated, the total population across Kotri MC, Bolhari MC, and Jamshoro TC is expected to grow from 364,418 in 2023 to approximately 382,492 in 2025, eventually reaching 714,441 by 2045. Likewise, the total housing units across these areas are projected to increase from 65,929 in 2023 to 124,068 by 2045.

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Table 2-3: Future Projections for the Project Area

Area	Census 2023				Population Projection in 2025		2030		2035		2040		2045	
	Population	Aver. Growth Rate	Aver. HH Size	Housing Units	Population Projection	Housing Units Projection	Est: Pop.	HUs EST:	Est: Pop.	HUs EST	Est: Pop.	HUs EST:	Est: Pop.	HUs EST
Jamshoro District	1,117,308	1.98	5.2	213,493	1,161,991	223,460	1,281,675	246,476	1,413,686	271,863	1,559,294	299,864	1,719,900	330,750
Kotri Taluka	472,003	1.25	5.4	86,413	483,877	89,607	514,885	95,349	547,880	101,459	582,989	107,961	620,348	114,879
Kotri MC	106,615	0.89	5.14	20,742	108,521	21,113	113,437	22,069	118,576	23,069	123,947	24,114	129,562	25,207
Bolhari MC	169,613	1.17	5.47	31,008	173,605	31,738	184,002	33,638	195,020	35,653	206,699	37,788	219,077	40,051
Jamshoro TC	88,190	6.68	6.22	14,178	100,366	16,136	138,676	22,295	191,609	30,805	264,747	42,564	365,802	58,811
Total Population MC And TC	364,418			65,929	382,492	68,987	436,114	78,003	**505,205**	**89,527**	**595,393**	**104,466**	**714,441**	**124,068**

Source: Census 2023 and Consultant's Estimates

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2.3 Urban Morphology

Kotri City's urban form reflects a ribbon development pattern, with growth concentrated in the north-west along the railway line and National Highway N-5, emphasizing the city's reliance on transportation corridors. The north-eastern sector has developed as a residential zone with integrated mixed-use areas, ensuring accessibility to both housing and commerce. Meanwhile, the south-eastern quadrant is designated for industrial activities, though many units remain inactive, highlighting the need for revitalization or repurposing to meet evolving urban needs.

The city's road network follows a systematic gridiron pattern, supporting effective mobility and urban navigation. Administrative offices and civic complexes are strategically located along National Highway N-55 and N-5, ensuring accessibility and reinforcing these routes as central axes of governance and activity. Urban expansion also stretches along the Kotri–Thatta dual carriageway and the Karachi–Kotri railway track, further underscoring the role of major transit corridors in shaping the city's growth.

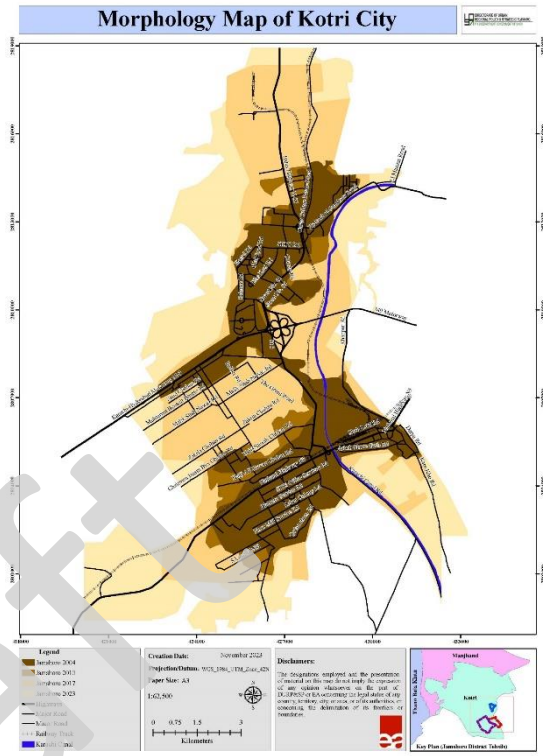

Figure 2-7: Historical Growth of Project Area

Public infrastructure projects are concentrated along key routes such as the Karachi–Hyderabad Motorway M-9 and the Indus Highway, strengthening longitudinal connectivity. Housing inclusivity is represented by Khuda ki Basti in the north-west, a renowned low-income housing project. Together, these developments highlight Kotri's dynamic evolution shaped by transport linkages, infrastructure, and strategic planning, while also underscoring the need for adaptive approaches to industrial and residential growth.

2.4 Land Use and Spatial Analysis

Agriculture covers 11.95% of Kotri's total area, reflecting its continued economic role alongside urban growth, while residential use dominates at 34.96%, spread across low- (6.68%), medium- (11.20%), and high-density (6.12%) zones, with additional reserved land (10.85%) and housing schemes (0.11%) indicating proactive planning for population growth. Commercial activity remains limited at 0.56%, primarily in ribbon form without major business hubs, whereas industrial areas occupy 11.19%, consisting of large, medium, and small-scale units with warehouses, though many remain underutilized and in need of revitalization. Transportation infrastructure accounts for 7.81%, shaped by highways, railways, and road networks that ensure strong regional connectivity, while amenities cover 2.16%, including institutional (1.49%) and utility (0.67%) functions, with religious land use at 1.23%. Recreational spaces are critically low at 0.42%, undermining livability and public health benefits, while water bodies span 1.70%, offering ecological and potential recreational value. Special-use areas such as industrial buffers cover 0.14%, and vacant land, strikingly high at 27.88%, presents both a challenge and an opportunity for structured future development.

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Morphology Map of Kotri City

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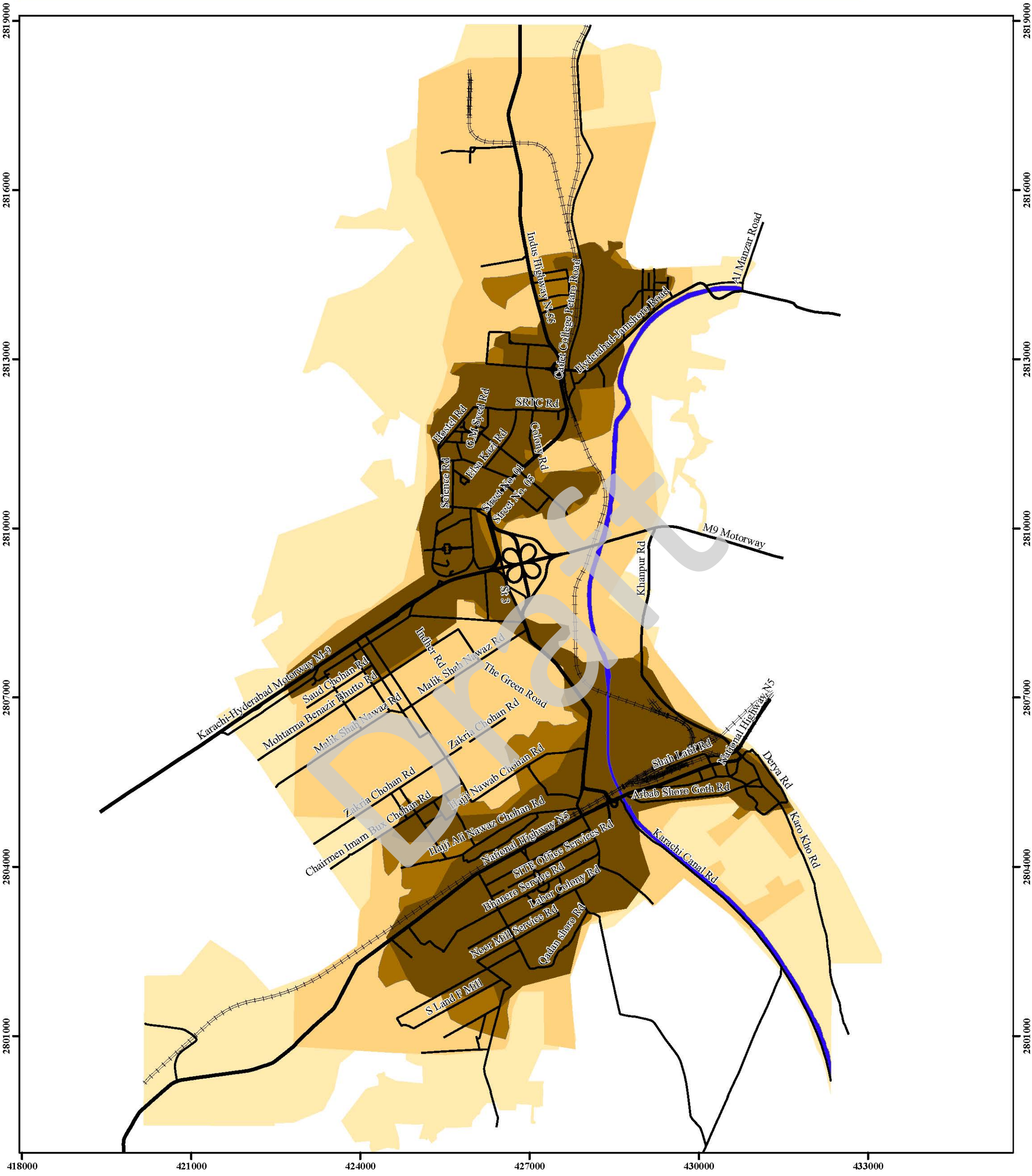
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Jamshoro 2004
- Jamshoro 2010
- Jamshoro 2017
- Jamshoro 2023
- Highways
- Major Road
- Minor Road
- Railway Track
- Karachi Canal

Creation Date: November 2023

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:62,500

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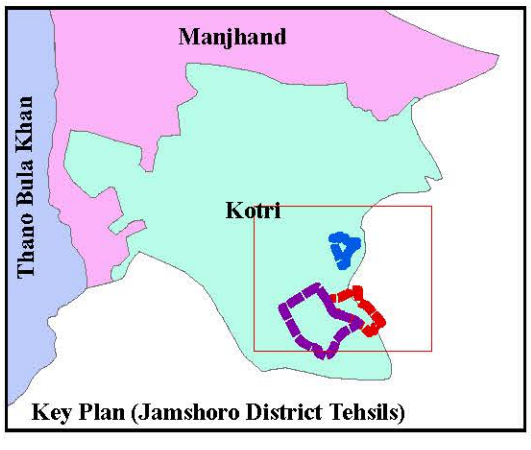
Kilometers

Disclaimers:

The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of DURP&SP or EA concerning the legal status of any country, territory, city, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.



Overall, Kotri's land use reflects strong residential and industrial bases but critical deficits in recreation, utilities, and commercial zones, underscoring the urgent need for balanced zoning and sustainable urban planning.

The detailed land use classification for kotri city, covering 15248.2 acres, is presented in **Table 2-5**, showing nine broad categories: Residential, Commercial, Amenities, Recreational, Industrial, Transportation, Agriculture, Water Bodies, and Special Use (Vacant Land).

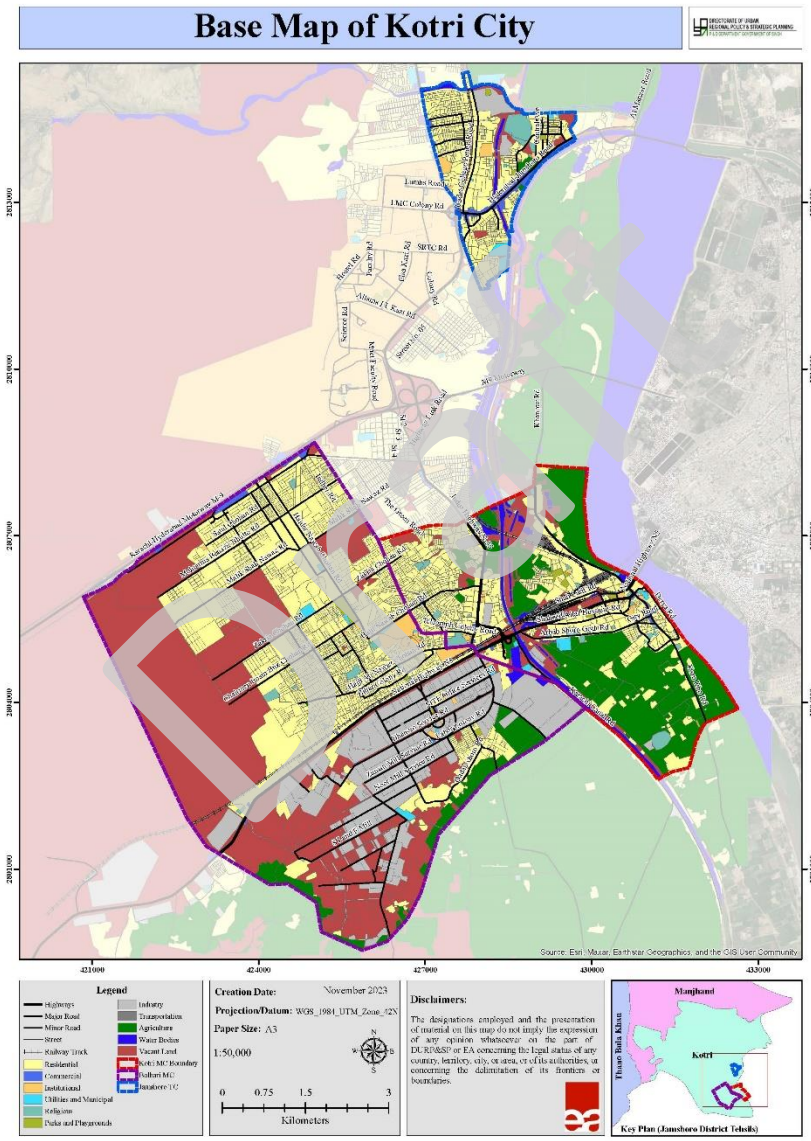


Figure 2-8: Landuse Map of Kotri City

Base Map of Kotri City

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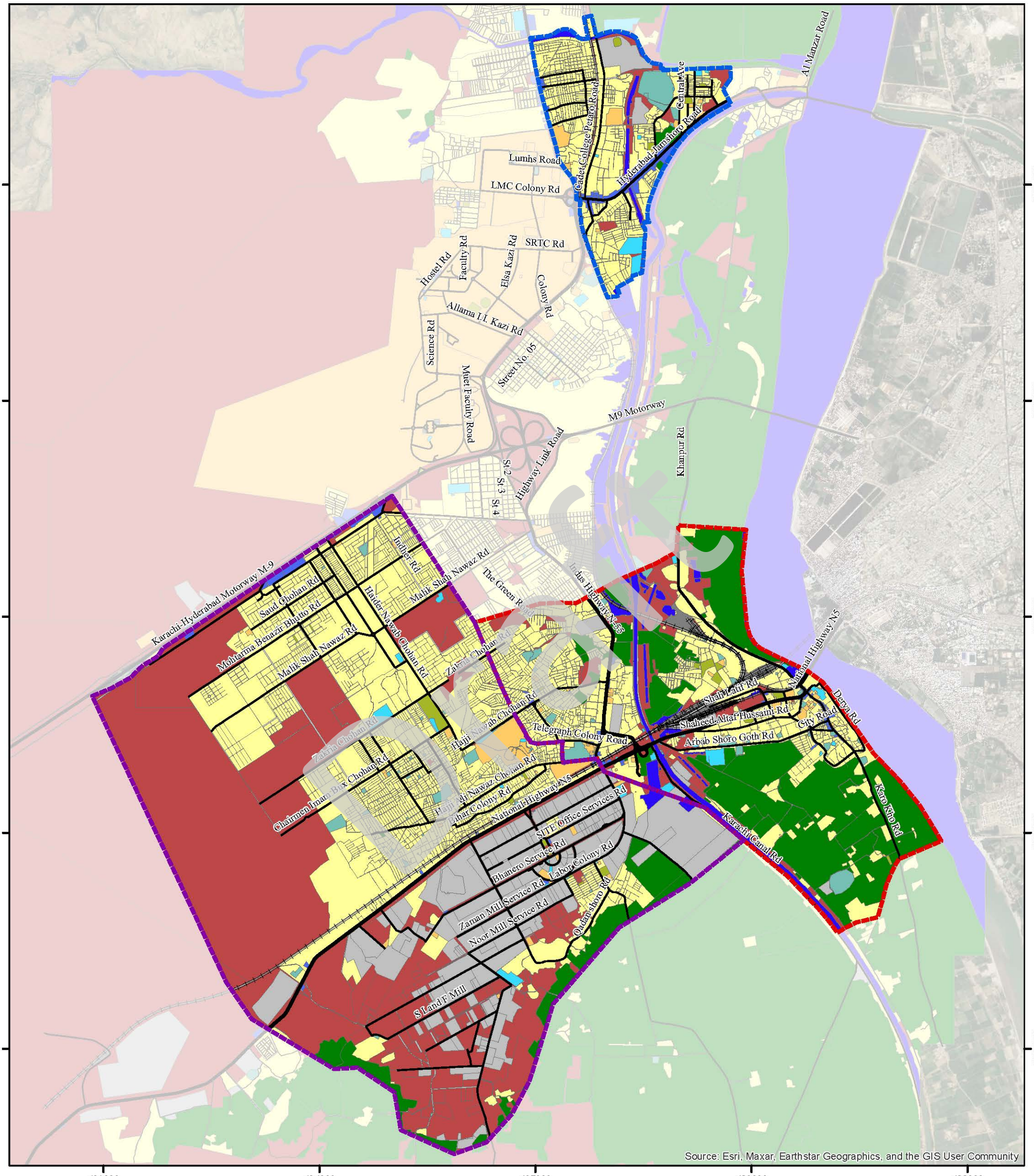

Legend

- Highways
- Major Road
- Minor Road
- Street
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Kotri MC Boundary
- Bolhari MC
- Jamshoro TC

Creation Date: November 2023

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:50,000

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Kilometers

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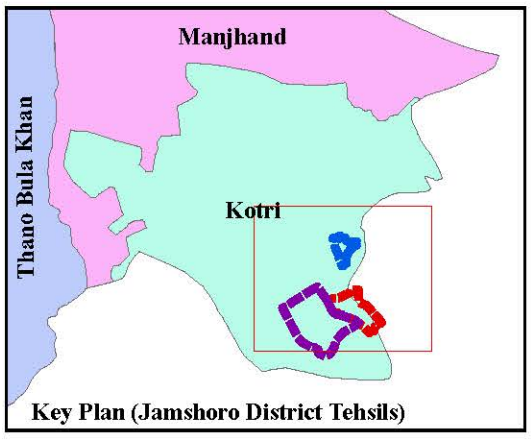

Table 2-4: Land Use Classification and Percentages[12]

Landuse Classification and Percentages					
Kotri MC, Bolhari MC and Jamshoro TC					
S No	**Landuse Classification**			**Area (Acres)**	**%**
1	**Residential**	Residential	Low Density Residential	1018.8	6.68
			Medium Density Residential	1707.5	11.20
			High Density Residential	933.1	6.12
			Reserved for Residential Purpose	1654.7	10.85
			Existing Housing Schemes	16.1	0.11
		Sub Total		**5330.2**	**34.96**
2	**Commercial**	Commercial	Low Density Commercial	55.9	0.37
			Medium Density Commercial	13.9	0.09
			High Density Commercial	0.7	0.00
			Central Business District	15.4	0.10
		Sub Total		**85.9**	**0.56**
3	**Amenities**	Institutional	Government/Public Administration	48.1	0.32
			Health And Welfare	92.8	0.61
			Education	84.1	0.55
			Private Office/Institution	1.4	0.01
		Sub Total - A		**226.4**	**1.49**
		Utilities And Municipal Service Facilities	Water Supply	58.9	0.39
			Sewerage	9.5	0.06
			Solid Waste Disposal	6.2	0.04
			Electricity	24.2	0.16
			Communication	3.7	0.02
			Fire Station	0.1	0.00
		Sub Total -B		**102.5**	**0.67**
		Religious	Mosque	39.4	0.26
			Imam Bargah	0.5	0.00
			Temple/Mandir	0.4	0.00
			Church	2.9	0.02
			Burial Ground	141.7	0.93
			Meditation Center	3.3	0.02
		Sub Total - C		**188.3**	**1.23**
		Total of A+B+C		**517.2**	**3.39**
4	**Recreational**	Parks and Playground	Parks and Playgrounds	64.7	0.42
		Sub Total		**64.7**	**0.42**

[12] *Source: Spatial Analysis done by Consultants*

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Landuse Classification and Percentages					
Kotri MC, Bolhari MC and Jamshoro TC					
S No	**Landuse Classification**			**Area (Acres)**	**%**
5	**Industrial**	Industry	Large-Scale Manufacturing/ Heavy Industry	749.0	4.91
			Small-Scale Manufacturing/ Light Industry	244.1	1.60
			Medium-Scale Manufacturing/ Medium Industry	599.8	3.93
			Warehouse	113.8	0.75
		Sub Total		**1706.8**	**11.19**
6	**Transportation**	Transportation	Taxi Stand	0.1	0.00
			Railway	51.1	0.34
			Roads	1139.0	7.47
		Sub Total		**1190.2**	**7.81**
7	**Agriculture**	Agriculture And Forestry	Agricultural	1820.6	11.94
			Livestock	0.8	0.01
		Sub Total		**1821.4**	**11.95**
8	**Water Bodies**	Water Bodies	Pond	130.4	0.85
			River	11.7	0.08
			Canal	95.9	0.63
			Water Ways	20.6	0.13
		Sub Total		**258.5**	**1.70**
9	**Special Use**	Special Areas	Buffer around Industrial Facilities	21.7	0.14
			Vacant Land	4251.6	27.88
		Sub Total		**4273.3**	**28.03**
	Total Area of Kotri MC, Bolhari MC and Jamshoro TC			**15248.2**	**100.00**

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2.5 Town Scape

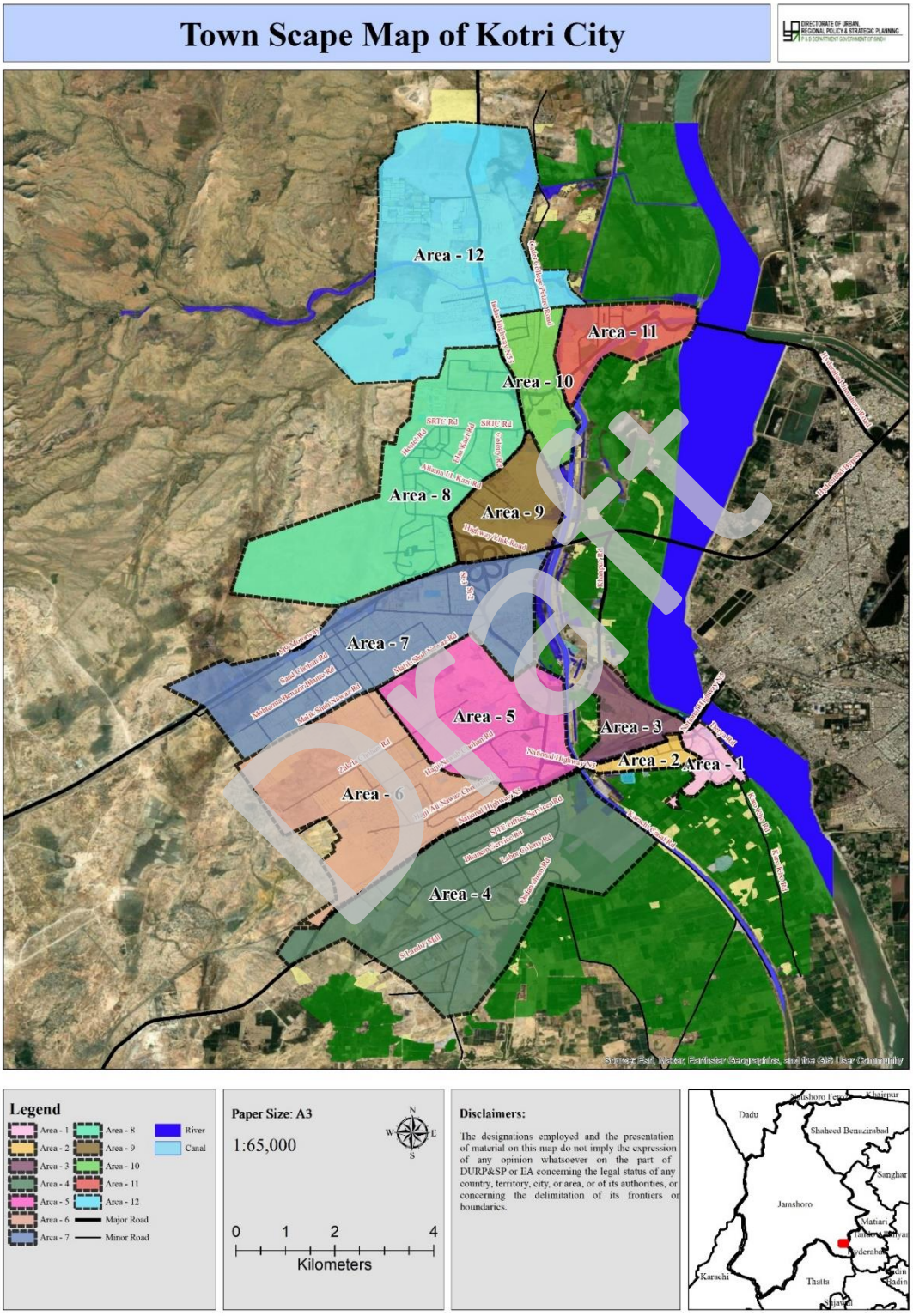

Figure 2-9: Town Scape Map of Kotri city

2.5.1 Town Scape of Kotri City

The townscape map of Kotri City provides a detailed overview of the city's layout divided into eight distinct areas, each with its unique character and blend of residential, commercial, and industrial developments. It's important to note that these divisions are not administrative but serve to understand the existing cityscape.

Area- 1:

The historic core of Kotri, Area-1 houses the old town with a distribution of commercial activities. This part of the city is marked by its heritage and long-established businesses, which are gradually shifting towards Area 5, signifying a potential change in the urban dynamic and economic focus of the town.

Area 2:

Acting as the extension of the old town Kotri, Area 2 continues to exhibit characteristics similar to the original town center. It is marked by a haphazard pattern of housing that contributes to a high level of urban density and congestion. The expansion in this direction suggests a continuation of established urban patterns and possibly a need for urban planning initiatives to manage growth and improve living condition.

Area 3:

Area 3 is distinguished by the pivotal Kotri Junction Railway Station, which serves as a vital regional connector linking various towns. It is a significant transportation node where the railway lines from the eastern and western banks of the river Indus converge. This includes the main line running from Karachi to Peshawar via the Rohri line, and the branch line extending from Karachi to Quetta via the Habib Kot-Dadu route. The presence of this junction underscores the area's importance in facilitating regional commerce and mobility, highlighting its role in the broader transport network of Pakistan).

Area 4:

Area 4 is a key industrial zone within Kotri City, predominantly occupied by the textile sector. It hosts several prominent textile mills such as AMZ Textile Mills, Surriya Textile Kotri, Bhanero Textile Mills, Island Textile Mills, Zaman Textile Mills, and Sapphires Textile Mills. The area is also home to other significant industrial players like Pakistan Oil Mills (Pvt) Ltd and Farmers Agro Industry. Due to the substantial industrial presence, the population density here is relatively low, with the workforce being accommodated in two main residential colonies: New Labor Colony and WAPDA Colony. These residential areas are strategically placed to serve the industrial sector, providing housing for employees and their families close to their workplaces.

Area 5:

Area 5 is the administrative hub of Kotri City, housing important government offices such as the District Coordination Officer (DCO) office, the Sub-Divisional Magistrate (SDM) office, and the PEHF Head Office, which fall under the administrative land use category. It is also a key healthcare center with major medical facilities like the T&T Hospital and the T.B. Sanatorium Hospital, which provide essential health services to the population. In addition to its administrative and healthcare roles, Area 5 contributes to the educational

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development of the city through the Government Vocational Training Institute, which offers vocational training and skill development programs to the community. This multifaceted area plays a critical role in the governance, health, and education sectors of Kotri City.

Area 6:

Area 6 is characterized by its high-density living conditions, predominantly accommodating low-income housing settlements such as "Khuda ki Basti." The area is known for its compact layout, where a significant portion of the city's lower-income population resides. Alongside "Khuda ki Basti," there are additional low-income settlements, including Katchi Abadis and slums, which are typically underserved in urban infrastructure and services. This area represents the more challenging aspects of urban development, highlighting the need for improved housing, sanitation, and social services to enhance the living conditions for its residents.

Area 7:

Area 7 is designated as a zone for future residential development and expansion within Kotri City. It is reserved for housing settlements, with a particular site already earmarked for the Mehran University Employees Cooperative Housing Society. This society is likely intended to provide housing for the employees of the nearby Mehran University, and its location along the M-9 indicates strategic planning for ease of access and connectivity. The area's designation for residential use suggests that it will be a focal point for new development, potentially featuring planned communities with accompanying amenities and infrastructure to support a growing population.

Area 8:

Area 8 stands out as an educational epicenter within Kotri City, aptly described as 'Education City' due to the concentration of higher education institutions and their associated facilities. It is the location of prominent universities, such as Mehran University of Engineering and Technology, Mehran University Institute of Science and Technology Development, Sindh University along with its medical subsidiary, Sindh University Hospital, and Liaquat University of Medical and Health Sciences. This academic zone is not only a center for learning and research but also includes comprehensive accommodations for the university community. It has a range of employee housing options and residential colonies that provide hostel facilities for the convenience of students and staff. The presence of these educational institutions plays a significant role in the regional development, offering opportunities for advanced education and contributing to the socio-economic growth of the city.

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Zone 1:

Consist of old town Kotri with a distribution of commercial activities in this zone, which are now moving to Zone 5.

Zone 2:

This zone is the extension of Kotri, as the old town with its characteristic haphazard housing pattern, high urban density and congestion is getting expanded in the direction of Zone 2.

Zone 3:

The most important and prominent feature of the zone and landscape is Kotri Junction Railway Station that is acting as a regional connection between various town. The Kotri Junction connects the railway lines laid on the eastern and western banks of the River Indus,. i.e. the main line (Karachi- Peshawar via Rohri line), and branch line (Karachi-Quetta via Habib Kot-Dadu).

Zone 4:

This zone is characterized by industries mainly textile industries named AMZ textile mills, Surriya Textile Kotri, Bhanero Textile Mills, Island Textile Mills, Zaman Textile Mills and Sapphires Textile mills. Other mills in this area include Pakistan Oil Mills (Pvt) Ltd and Farmers Agro Industry.

Population density in this area is low as there is large dominant industrial fabric to this zone. Two residential colonies named New Labor Colony and WAPDA Colony are present here.

Zone 5:

DCO office, SDM office, PEHF Head Office exist here coming under administrative category of land use. This zone also got major hospitals named T&T Hospital and T.B Sanatorium Hospital. Furthermore, it is home to Government Vocational Training Institute providing skills to the population.

Zone 6:

It is high density compact zone having low-income housing settlement “Khuda ki Basti”. In addition to Khuda ki Basti, more low-income settlement in form of Katchi Abadis and slums are present here.

Zone 7:

Reserved Housing settlements where new development is directed. Moreover, in this zone the site is already designated for Mehran University Employees Cooperative Housing Society along M9.

Zone 8:

This zone can be termed as Education City as major universities and its allied facilities exist here. These universities include Mehran University of Engineering and Technology, Mehran University Institute of Science and Technology Development, Sindh University and its subsidiary Sindh University Hospital and Liaquat University of Medical and Health Sciences.

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This zone also contains lot of employees housing and colonies with hostels facilities for students and staff.

Zone 9:

Enclosed between two very important roads i.e. Indus Highway and Hyderabad Bypass there is Sindh University Employee Housing (Phase I, II and IV).

Zone 10:

Along Indus highway lies the old town with haphazard planning while the development is being done in grid pattern in some areas. A lot of commercial activities are happening in this zone.

Zone 11:

Towards Jamshoro road lies the Jamshoro colony and Manzar colony. Development is sparse and planned.

Zone 12:

Thermal Power Plant and its allied facilities is the obvious element of this zone. In addition, this zone is characterized by industries as well like Archroma Pakistan Ltd. Jamshoro RCC colony is also settled here.

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3. VISION FOR STRATEGIC DEVELOPMENT PLAN OF KOTRI CITY

Having gone through a detailed process of data collection and evaluation in the previous stages of the study and obtaining citizens input through the Consultative workshops with the stakeholders, the Consultants have identified development issues in the various sectors and provided sector wise strategies to resolve issues in an integrated manner. The issues are running of the development programmes. As funds are never unlimited, it would be utmost necessary to concentrate on projects that being meaningful and quick relief in the life of common man and significantly the quality of life. In the sections of the Report to follow, sector wise development strategies are listed. The focus should be to select projects which have a strong sequential links is the form of a "package" rather than stand-alone project.

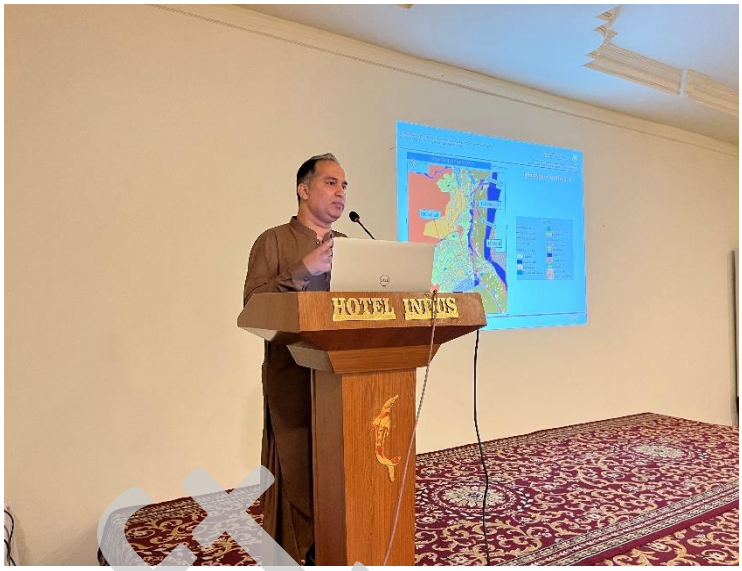

Figure 3-1: Consultant, Explaining Base Map of Kotri City

3.1 Summation of Vision Formulation

The basic aim of vision formulation exercise is to have pluralistic approach to establish a shared and common vision for the development of Kotri city in the future, define its role as a leading regional centre in the Sindh province and the socio-economic uplift of the population.

The summations and conclusions are described hereunder:

1) The current road infrastructure in Kotri City received predominantly average ratings, with a clear consensus on the necessity for new road construction projects. Participants emphasized the urgent need to improve local and public transportation facilities, rating this as very important or important. The water supply systems were found to be largely inadequate, with a significant majority indicating the need for substantial improvements.

2) The sewerage system's condition was another major concern, with most participants rating it as average or poor. There was a strong emphasis on the importance of developing new commercial zones to boost the city's economic activities. Additionally, there was substantial support for the creation of more industrial areas, which is seen as vital for economic growth.

3) Job opportunities in Kotri City were rated mostly as neutral or dissatisfied, highlighting the need for economic development initiatives. The availability of healthcare facilities was predominantly rated as average or poor, underscoring the necessity for enhancing medical services in the city. There was unanimous agreement on the need for more educational institutions, emphasizing the development of dedicated zones for schools and colleges.

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4) Recreational facilities, such as parks and sports complexes, were considered very important or important by all respondents, reflecting the need for enhanced public amenities. Solid waste management efforts were rated as average or poor, indicating a need for more effective solutions. The necessity for more green spaces was unanimously supported, highlighting the community's desire for a greener urban environment. Renewable energy projects were considered very important or important by the majority, pointing to a strong interest in sustainable energy solutions.

5) Overall, the quality of life in Kotri City was rated mostly as average, with some participants expressing dissatisfaction. There was unanimous support for the development of a comprehensive master plan, underscoring the community's commitment to structured urban planning. Community involvement in the master plan's development was also deemed very important or important, reflecting the community's desire for active participation in the city's future.

6) In conclusion, the workshop identified several key areas for improvement, including infrastructure, public services, economic development, and environmental sustainability. These insights will be instrumental in shaping a comprehensive master plan aimed at enhancing the quality of life for Kotri City's residents.

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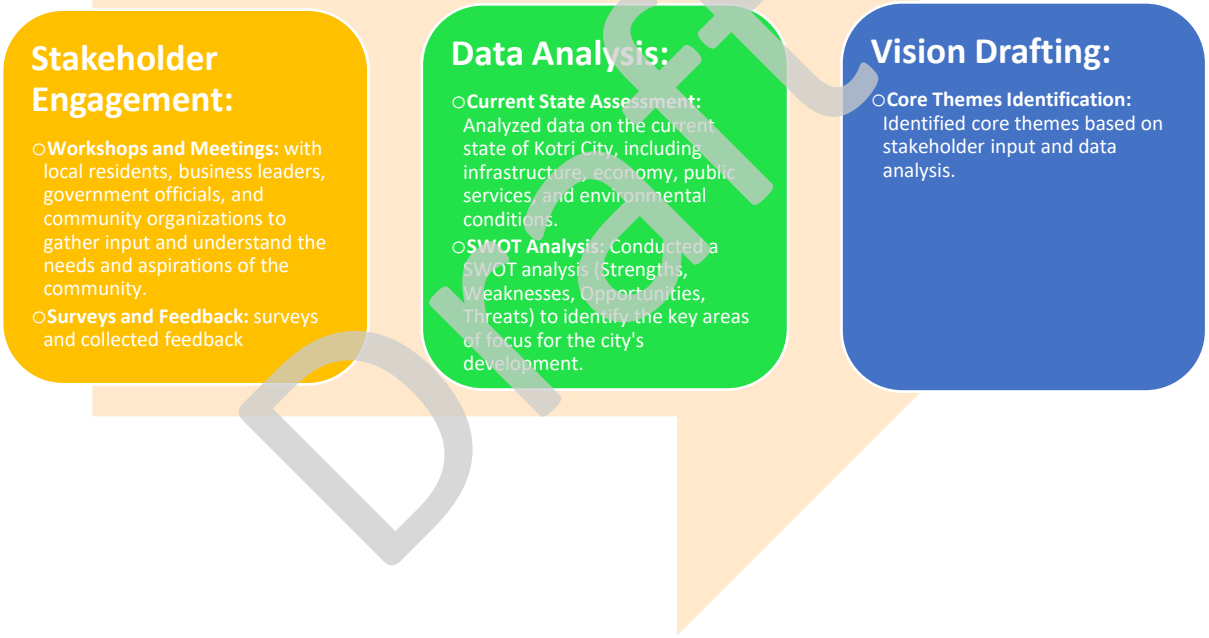
4.1 Kotri City Vision Statement

The vision statement is derived from stakeholder inputs and is translated into strategic themes and measurable targets to guide sector strategies, project prioritization, and implementation sequencing under the SDP.

Process of Developing the Vision Statement:



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KOTRI VISION 2045

"The objective is to develop Kotri City into a prosperous, sustainable, and inclusive urban center, distinguished by its advanced infrastructure, dynamic economy, and superior quality of life. By employing innovative strategies and fostering community engagement, the goal is to improve public services, stimulate economic development, and establish a green, resilient, and well-integrated environment for all residents".

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PROPOSED MASTER PLAN OF KOTRI CITY

4. PROPOSED MASTER PLAN OF KOTRI

4.1 Spatial Pattern

In 2004, Kotri was designated as part of Jamshoro District after being carved out from District Dadu, and it lies in the western part of Sindh Province. Jamshoro District is bounded by Dadu District to the north, with the River Indus separating it from Shaheed Benazirabad, Matiari, and Hyderabad Districts to the east. To the south lies Thatta District, while the southwest is bordered by Karachi Division, and the Kirthar Range forms the boundary in the west, separating Sindh from Las Bela District of Baluchistan.

The lands of Kotri are mostly located at the bottom of the Kirthar mountain range, with a varied topography that includes both flat and hilly areas. The district area is largely arid and barren, with sparse vegetation and limited cultivation potential due to the hilly terrain. However, Kotri benefits from mineral resources such as limestone, gravel, and marble.

With no significant canal system in place, agriculture in Kotri depends largely on perennial water sources, particularly along the Indus River. Although the agricultural productivity is less compared to other districts of Sindh, wheat, cotton, maize, and vegetables are cultivated within the district, especially in the irrigated areas along the river.

Kotri City is known for its strategic location on the National Highway N5, making it a major hub of trade and connectivity. The Kotri Barrage, a significant infrastructure feature, plays a crucial role in the local economy, supporting agriculture and water management.

The main means of transport and communication in Kotri are roads and railways. The Kotri Junction railway station is one of the oldest in Pakistan, linking the district with the national railway network via the Karachi-Kotri Railway Line and Kotri-Dadu Railway Line. The National Highway N5 connects Karachi to Peshawar and passes through Kotri, while the Indus Highway N55 and Karachi-Hyderabad Motorway M9 provide additional connectivity, making Kotri a crucial transport hub.

Kotri, Bolhari, and Jamshoro are collectively referred to as Jamshoro Town, which serves as the District Headquarters. Each area plays a distinct role: Kotri is primarily a transport and economic hub, Bolhari is an industrial hub, and Jamshoro is an educational hub.

- **Kotri**: An old area in the southeast, Kotri is a prime example of ribbon development along transport corridors. Expansion in Kotri is concentrated along the railway line and National Highway N5, with residential areas expanding alongside mixed-use developments.
- **Bolhari**: Positioned as an industrial zone, Bolhari houses the Sindh Industrial Trading Estate (SITE) and follows a gridiron road pattern. The low-income housing project "Khuda ki Basti" is also located here, providing affordable housing solutions.
- **Jamshoro**: Known for its educational institutions, including the University of Sindh, Liaquat University of Medical and Health Sciences, and Mehran University of Engineering and Technology, Jamshoro serves as the educational hub, away from the bustling urban environment of Hyderabad.

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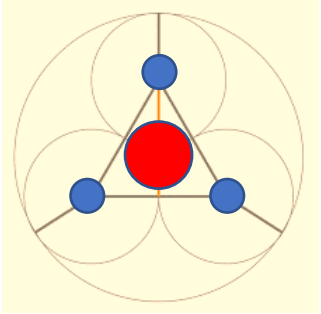
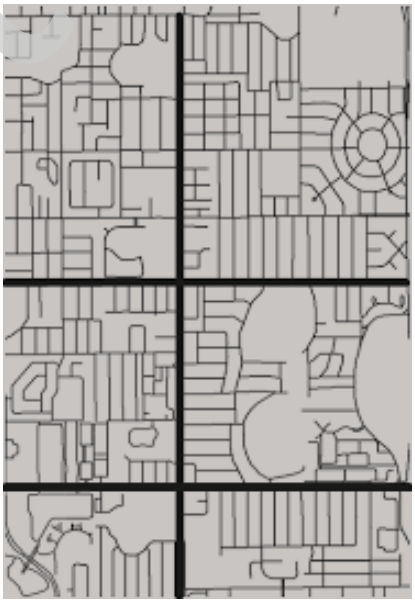
4.2 Basic Urban Form

The three towns—Kotri, Bolhari, and Jamshoro—together form a vibrant and dynamic urban center that fulfills the socio-economic, educational, and industrial needs of the region and surrounding towns. Kotri City, in particular, plays a critical role as a transport and trade hub, with its well-developed connectivity infrastructure.



The population of Kotri City has consistently demanded that the unique identity of these towns be maintained and enhanced in future plans. During stakeholder engagements, community representatives emphasized that future urban development must complement rather than replace the existing urban centers. As a result, the future development plan aims to maintain the prominence of the existing urban cores while facilitating growth outward from these centers in various sectors.

Currently, three major highways pass through Kotri City: the Indus Highway N55, the National Highway N5, and the Karachi-Hyderabad Motorway M9. The N5 and M9 run parallel through Kotri, Bolhari, and Jamshoro, while the N55 provides a perpendicular link between the N5 and M9, extending towards Peshawar and crossing Punjab along the left bank of the Indus River.



To support the anticipated growth of Kotri City, enhanced outer connectivity is proposed. The eastern side of Kotri is bordered by the Indus River, while Hyderabad District lies across the river. To the west and south, additional connectivity is proposed towards the north of Jamshoro District to accommodate future expansion. Instead of a ring road, a bypass connecting Mill Area Road, the Motorway M9, and the Indus Highway N55 is proposed to improve connectivity and streamline traffic flow.

A series of roads parallel to the Indus Highway N55 (including Cadet College Petaro, Karachi Canal, Karo Kho, and Kotri Station Roads) will form vertical connections, while roads parallel to the National Highway N5 and Motorway M9 (such as Hyderabad-Jamshoro, LUMHS, and SRTC Roads) will form horizontal connections. This network of vertical and horizontal roads will keep development compact and interconnected, promoting efficient movement throughout Kotri.

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4.3 Proposed Master Plan

The Proposed Master Plan is structured into three implementation horizons to link spatial proposals with investment sequencing and institutional capacity:

i. Immediate Phase - Immediate Action Plan
ii. Short Term Phase - Priority Projects
iii. Long Term Phase – Strategic Development Plan

The total extent of the area included in the proposed Kotri Master Plan is approximately 41,000 acres, with a projected population of 714,441 by 2045. The plan aims to achieve a balanced population density while providing adequate housing, infrastructure, and services to meet the needs of a growing urban population.

The hallmark of the plan is compact development that avoids congestion while ensuring the efficient use of land. The Proposed Master Plan is designed to accommodate future urban growth in a structured manner, ensuring that all necessary land uses are balanced to create a sustainable urban environment.

The spatial structure reinforces the historic core and introduces a radial–ring framework, where existing primary corridors operate as radial connectors and a proposed bypass connection functions as both a mobility improvement and a growth boundary.

The Development Master Plan is based on the following components:

a) Determination of Growth Scenarios The potential growth scenarios for the city and district have been identified based on population growth projections, economic development potential, and recommendations for the most viable spatial growth option for the city. These scenarios consider land requirements for spatial growth, environmental concerns, and economic opportunities. This forms the basis for delimiting development zones for the city and its hinterland, ensuring that the delineated area meets the anticipated spatial needs for the coming 20 years.

b) Long Term Plan the Long-Term Framework focuses on the development of the city and the larger region over the next 20 years on an ecologically sustainable basis. It addresses urban planning and development, including programs and strategies across infrastructure, economic, and social sectors such as housing, land supply and management, education, health, recreation, water supply, sewerage, stormwater drainage, solid waste management, transportation networks, electric power supply, gas supply, firefighting systems, environmental and ecological concerns, and economic development. Specific projects identified in the long-term plan are intended for implementation in the short term.

c) Short Term Action Plan for Priority Infrastructure Investment Based on the long-term physical and economic development plans, a Short-Term Action Plan has been prepared to identify priority projects in each sector. These include rehabilitation, improvement, and extension of water supply, sewerage, stormwater drainage, solid waste management, road infrastructure, housing (including Katchi abadis and slums), education, health, recreation, the central business district, and firefighting systems. The priority projects are aligned with the Sustainable Development Goals (SDGs 2, 3, 4, 6, 7, 8, and 11). Scope, size, and preliminary cost estimates for public sector projects have been worked out for Annual Development Program (ADP) allocations.

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d) Preparation of an Immediate Action Plan for the Core Urban Area An Immediate Action Plan (IAP) has been developed for the core urban area, including detailed design proposals for development and revitalization of key elements such as housing, footpaths, street lighting, street furniture, water supply, wastewater networks, essential garbage collection, horticulture, plantation, and the creation of urban open spaces. Scope, size, and preliminary cost estimates for public sector projects have been drafted for ADP allocations, and sector-wise PC-Is have been prepared.

e) Economic Development Plan Within the Long-Term Development Plan framework, both long- and short-term economic development plans have been formulated. The focus is on strategies, interventions, and projects that will lead to the economic revitalization of Kotri City and the district. The plan emphasizes identifying new avenues for job creation, revenue generation, and the development of Small and Medium Enterprises (SMEs), Special Economic Zones (SEZs), agro-based industries, tourism, recreational activities, and the services sector. Investment plans have been proposed to attract investors, with an emphasis on syncing with the core competencies of the city and district.

f) The Economic Development Plan also considers ongoing and proposed projects and the potential for industrial, agricultural, livestock, tourism, and other developments. A detailed framework for the development of primary, secondary, and tertiary industries is included, with strategic actions aimed at boosting the economy and creating employment opportunities.

g) Disaster Management Plan A Comprehensive Disaster Management Plan has been developed based on a detailed study of the environmental setting and natural disaster risks for Kotri City and the larger region. This plan includes threat perception, emergency preparedness, coordination between various government agencies, and emergency response, relief, and rehabilitation strategies.

h) Climate Change, Resilience & Adaptability Plan A Climate Change Resilience and Emergency Contingency Plan has been formulated based on secondary data and consultations with relevant institutions. The plan includes recommendations for the conservation and enhancement of local agriculture, flora, and fauna, focusing on climate change adaptation and resilience.

i) Sustainable Development Goals (SDGs) Implementation Plan An SDGs Implementation Plan has been prepared to achieve national commitments to the SDGs. The plan analyzes the existing situation of Kotri City concerning SDGs such as Zero Hunger (Goal 2), Good Health and Well-Being (Goal 3), Quality Education (Goal 4), Clean Water and Sanitation (Goal 6), Affordable and Clean Energy (Goal 7), Decent Work and Economic Growth (Goal 8), and Sustainable Cities and Communities (Goal 11).

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Alternative Land Use Planning Options in Master Plan Design

To apply the three alternative land use planning options for Kotri City, the following steps have been taken to effectively integrate each scenario into the master plan:

1. **Integration of Key Objectives into Zoning Plans**
   I. **Mixed Development Focus**
   - Specific zones have been allocated for strategic open spaces and agricultural purposes to preserve critical aspects of Kotri's economy and environment. "Conservation Zones" have been established to restrict urban expansion into these areas and maintain ecological balance.
   - Green buffer zones have been defined to separate agricultural and open areas from urban zones, ensuring a controlled transition between urban and rural land uses.

   II. **Industrial-Driven Growth Focus**
   - Specific zones for industrial activities have been identified, particularly around existing industrial areas, with an emphasis on proximity to major transport networks like N5 and M9 to facilitate logistics and connectivity for economic growth.
   - "Industrial Zones" have been designated to support the growth of medium and small-scale industries. Infrastructure provision (utilities, roads) has been ensured to support further industrial growth and employment generation.

   III. **Educational Hub Development Focus**
   - A mixed-use zoning approach has been used to integrate residential, commercial, and educational facilities, fostering balanced growth across different sectors.
   - Urban green spaces, parks, and buffer areas have been incorporated throughout Kotri to enhance quality of urban life and support educational environments.
   - Zones supporting transit-oriented development (TOD) have been established to link residential areas with educational institutions and employment hubs.

2. **Mapping the Proposed Land Use Plan Alternatives in GIS**

- GIS-based digital maps have been developed to represent the three land use planning alternatives, marking different areas according to the objectives of each plan.
  - **Scenario 1**: Areas designated for strategic open space conservation are highlighted, showing boundaries for controlled growth and green belt zones.
  - **Scenario 2**: Industrial expansion areas are marked, focusing on locations near transport corridors to enhance economic efficiency.
  - **Scenario 3**: A mixed-use map has been created to include residential, commercial, educational, and recreational areas for a balanced urban environment.

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3. **Infrastructure and Utilities Planning**

I. **Mixed Development**

- New infrastructure in conservation zones has been minimized, focusing mainly on rural access roads to support local agricultural activities and prevent unnecessary urban encroachment.

II. **Industrial-Driven Growth**

- Infrastructure improvements in industrial zones include upgrades to water supply, power, roads, and communication systems. Utility corridors have been planned to connect industrial zones efficiently to the rest of the city.

III. **Educational Hub Development**

- Public services such as schools, healthcare, and community centers have been mapped to ensure comprehensive infrastructure coverage across the city.
- TOD nodes have been integrated to improve access to public transit, enhancing connectivity between residential, commercial, and educational zones.

4. **Development of Growth Scenarios**

- Detailed growth scenarios for each option have been prepared, outlining the expected expansion in residential, commercial, and industrial areas.

I. **Mixed Development Focus**

- Growth projections emphasize preserving ecological balance and managing urban sprawl to maintain the sustainability of open spaces.

II. **Industrial-Driven Growth Focus**

- Industrial growth scenarios have been developed, focusing on leveraging existing industries, planning for expansion, and enhancing economic output.

III. **Educational Hub Development Focus**

- Residential, economic, and educational growth projections have been integrated to create a balanced scenario that enhances quality of life and addresses current shortages in amenities.

5. Selection of the Optimal Scenario and Refinement

I. A stakeholder consultation meeting was held on June 27, 2025 at the Assistant Commissioner Office, Kotri, chaired by the Assistant Commissioner, with participation from DURP&SP officials, line departments, EA Consulting, and community representatives. Three alternative land use scenarios were presented Educational Hub Development Focus, Industrial Driven Growth Focus, and Mixed Development. After discussion, stakeholders unanimously endorsed the Mixed Development Option as the preferred strategy, with emphasis on incorporating green buffer zones, improved drainage, a new ring road, and rehabilitation of transport and civic facilities. The selected option now forms the basis of the Proposed Development Master Plan of Kotri City.

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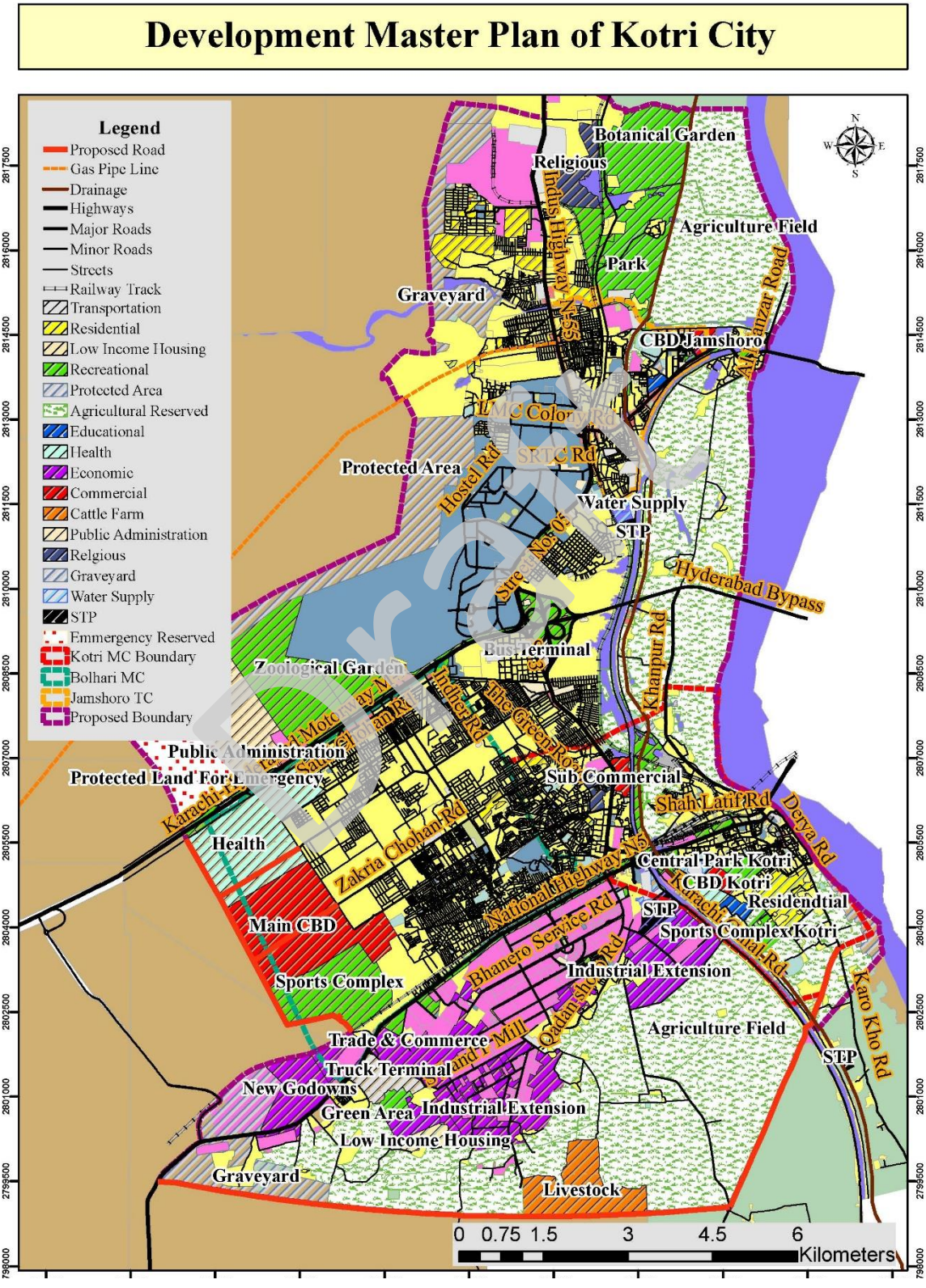

Figure 4-1 : Development Master Plan of Kotri City

Development Master Plan of Kotri City

Legend

- Proposed Road
- Gas Pipe Line
- Drainage
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Transportation
- Residential
- Low Income Housing
- Recreational
- Protected Area
- Agricultural Reserved
- Educational
- Health
- Economic
- Commercial
- Cattle Farm
- Public Administration
- Relgious
- Graveyard
- Water Supply
- STP
- Emmergency Reserved
- Kotri MC Boundary
- Bolhari MC
- Jamshoro TC
- Proposed Boundary

Botanical Garden
Religious
Indus Highway N55
Agriculture Field
Park
Graveyard
CBD Jamshoro
Allanzar Road
LMC Colony Rd
SRTC Rd
Protected Area
Hostel Rd
Vater Supply
STP
Street No 05
Hyderabad Bypass
Bus Terminal
Zoological Garden
Motorway M9
Indher Rd
The Green Rd
Khanpur Rd
Public Administration
Protected Land For Emergency
Karachi-Hyderabad Super Highway
Sub Commercial
Shah Latif Rd
Deya Rd
Zakria Chohan Rd
Health
National Highway N5
Central Park Kotri
CBD Kotri
Residendtial
STP
Sports Complex Kotri
Main CBD
Bhanero Service Rd
Qadan shah Rd
Industrial Extension
Karachi Canal Rd
Karo Kho Rd
Sports Complex
Agriculture Field
Trade & Commerce
Flour and Rice Mill
STP
Truck Terminal
New Godowns
Green Area
Industrial Extension
Low Income Housing
Graveyard
Livestock

0 0.75 1.5 3 4.5 6 Kilometers

2817500 2816000 2814500 2813000 2811500 2810000 2808500 2807000 2805500 2804000 2802500 2801000 2799500 2798000

418000 419500 421000 422500 424000 425500 427000 428500 430000 431500 433000

*4.3.1 **Salient Features of Planning***

- The New Main CBD (Central Business Districts) is placed as a focal point, in between Motorway M9 and National Highway N5, as the new development is focused more towards western side of the city. In addition, two CBDs are also identified in Kotri, Jamshoro and a sub-commercial in Bholari; to reduce the burden over the Main CBD.
- Considering existing economic activities; Trade and Commerce and New Warehouses are placed along main connectivity corridor of National Highway N5. While Industrial Extension is proposed behind the existing Industrial Area of Bolhari.
- As the economic activities are proposed in south direction, thus Truck Terminal is also placed there, which is accessible directly from National Highway N5 and a Public Transport Terminal is suggested in the center, parallel to the Karachi-Hyderabad Motorway M-9, adjacent to the proposed green space.
- There are two large religious areas and two huge sites for graveyards have been reserved in the areas of Bolhari and Jamshoro.
- The Cattle Park is proposed in the south, parallel to new proposed bypass Road, to limit the town development further. It will also benefit the population of nearby villages and other settlements.
- New large-scale area for Health, is placed adjacent to Main CBD and in between Motorway M9.
- Next to Main CBD; Sports Complex is placed towards National Highway N5, while a Central Parks is proposed in Kotri and sport complex in kotri. Further large recreational areas are located for Amusement Park, Botanical and Zoological Gardens.
- The New Public Administration area is proposed along Motorway M9; to serve and manage this beautiful city of kotri.
- In eastern side the areas have been reserved for agricultural use, while in western side protected reserved hilly areas are suggested. These will be helpful in restricting housing development, preserving hilly areas and promoting the agricultural activities from the onslaught of the housing projects by private sectors.

*4.3.2 **Highways, Motorways and Bypass – Triangular Setting***

Considering the increasing development on both sides of Indus Highway N55, National Highway N5 and Motorway M9, Bypass is proposed. Secondly, from southwest to north is an important transport corridor, which connects Karachi with important towns on the left bank of River Indus. Thus, a Bypass is proposed as a diagonal link to reduce the burden of direct traffic without entering in the town areas. This will start from Motorway M9 Interchange at Mill Area Road, going in northeast.

In this way, National Highway N5 is forming baseline with River Indus on right side, while Bypass is making left side of the triangle. On the other hand, Motorway M9 is creating horizontal central spine and Indus Highway N55 is developing vertical middle spine.

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The recommendations are to increase the right of way i.e. 200 feet with urban forestation of 200 feet wide on both sides of the Indus Highway N55, National Highway N5, Motorway M9 and Jamshoro Bypass. As the areas on both sides of the highways, motorways and bypass will attract many developers. The land two hundred feet on both sides of the highways, motorways and bypass should be notified for development control where only planting of local trees should be allowed.

*4.3.3 **Vertical and Horizontal Connections – Grid Iron Pattern***

All the proposed roads are existing major roads, providing transport connectivity with other urban and rural areas. Most of these roads are crossing each other in core urban area, or in other words these roads are forming grid iron pattern from the existing town. In this way, the existing town will remain focal point of all development along roads and these roads will also serves as vital connections. As a result, there are proposed vertical and horizontal links as major roads, with increased ROW, which will serve as future connections. The following are included:

- Vertical Links: These are roads parallel to Indus Highway N55 incudes; Cadet College Petaro, Karachi Canal, Karo Kho, Khanpur, Railo Miyan, Kotri Station, Haider Nawab Chohan, Mill Area and New CBD Roads are forming vertical connections.
- Horizontal Links: These are roads parallel to National Highway N5 and Motorway M9 includes; Hyderabad-Jamshoro, LUMHS, SRTC and Zakriya Chohan Roads are forming horizontal links.

In addition, Railway Tracks are passing both vertically from Kotri towards Dadu and horizontally from Karachi to Hyderabad. All of these connections are forming sort of grid iron pattern around core areas of Bolhari, Kotri and Jamshoro. However, it is very important to control upfront development along the major roads. Likewise, motorway, highways and bypass, on both sides of major roads planting of local trees is also highly recommended.

4.4 Proposed Land Use Zoning

The proposed land use zoning is broadly based on NRM Standards[13]. The NRM has not been revised since decades, thus the Consultant have added new land uses in the prescribed categories, as primary zoning i.e. Level-1. Further, as per the contextual requirement of the local environment of kotri as DHQ Town, secondary zoning i.e. Level-2, is also categorized accordingly, again in consideration to the NRM Standards[14]. The proposed land use zoning is shown in the table:

Variations from NRM percentages highlight Kotri's compact medium-density pattern, the need for enhanced green buffers and institutional clustering, and the necessity to safeguard agricultural land from speculative conversion. Residential use is lower (25%) than NRM's 40–45%, as housing demand is partly met through compact, medium-density settlements and infill development. Commercial land (3%) is near the standard, and the proposed bypass. Institutional allocation (12%) is significantly above the NRM

[13] Guidelines for Land Allocation to Zones in the Preliminary Design of a New Town, Table 10.3, page no. 305, National Reference Manual on Planning and Infrastructure Standards
[14] Standard Land Use Classification for Urban Jurisdictions in Pakistan, Appendix 10.1, page no. 398, National Reference Manual on Planning and Infrastructure Standards

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benchmark (3–5%), accounting for large education, health, and administrative zones proposed in the master plan. Community open spaces (9% combined for recreation) also exceed the standard (4–6%), strengthening environmental sustainability and resilience. Agriculture retains the largest share at (33%), consistent with NRM's 15–25% but slightly higher to protect fertile land from urban encroachment. Overall, the proposed zoning demonstrates a balanced approach, prioritizing institutional, green, and agricultural allocations while keeping residential density compact and efficient.

Table 4-1:Proposed Land Use Classification for Kotri

S.No	NRM STANDARDS			DEVELOPMENT MASTER PLAN	
	Land Use Zoning	Land Uses (%)	Level - 1 Functional Zoning	Areas (acres approx.)	Land Uses (%)
1	Residential	40-45%	Residential	10,299	25
2	Commercial	2-3%	Commercial	1,167	3
3	Industrial	2-10%	Economic Livestock Industrial	4,510	11
4	Institutional	3-5%	Health and Welfare Educational Religious Public Administration	4,838	12
5	Community Open Spaces	4-6%	Recreational	3,551	9
6	Graveyards	2-3%	Graveyards	665	2
7	Arterial Circulation & Terminals	15-20%	Transportation Utilities and Services	2,271	6
8	Protected Reserved	15-25%	Agriculture	9,778	24
			Water Bodies	1024	3
			Vacant / Reserved	2562	6
	Total Area of Proposed Master Plan			40,666	100

The total area requirement for full fledge city of kotri will be around 40,666 acres. As shown in the table of proposed land use classification, the percentages of residential area are lesser in comparison to the NRM standards, although the required number of housings will be fulfilled from proposed residential area. Since, the institutional and industrial areas are of higher value, these will also contain residences for employees / staff / labor. In this way, institutional and industrial areas are sharing the residential load as well. Despite this factor, all the other land uses are distributed as per the standard.

Table 4-2:Proposed Land Use Classification NRM Standards - Kotri

NRM STANDARDS			PROPOSED LAND USE CLASSIFICATION FOR KOTRI CITY							
S. N	Land Use Zoning	Land Uses (%)	S. No	Level - 1 Functional Zoning	Level - 2 Functional Zoning	Areas (acres approx.)		Land Uses (%)	Areas (acres approx.)	Land Uses (%)
1	Residential	40-45%	1	Residential	Existing Residential	9638	10299	23.69968	10299	25
					Proposed Residential	662		1.626928		
2	Commercial	2-3%	2	Commercial	Existing Commercial	191	1167	0.469237	1167	3
					Main CBD	834		2.050853		
					Jamshoro CBD	37		0.090985		
					Kotri CBD	46		0.113117		
					Commercial	14		0.034427		
					CBD Bolhari	45		0.110658		
3	Industrial	2-10%	3	Economic	Trade and Commerce	302	787	0.743177	4510	11
					Technical Services	17		0.041804		
					New Godowns	326		0.802061		
					Existing Warehouses	142		0.349186		
			4	Livestock	Existing livestock	25	450	0.061476		
					Cattle Farms	425		1.04505		
			5	Industrial	Existing Industries	2182	3273	5.365908		
					New Industrial Extension	1091		2.682831		
4	Institutional	3-5%	6	Health and Welfare	Existing Health and Welfare	185	996	0.454925	4838	12
					Health Zone Near Proposed Main CBD	753		1.85167		
					Health Zone Near Proposed Kotri CBD	58		0.142625		
			7	Educational	Existing Educational	2772	2823	6.816505		
					Educational At Kotri	33		0.080951		
					Educational At Jamshoro	18		0.043955		
			8	Religious	Existing Religious	64	281	0.157699		
					Proposed Religious Near Bolhari	44		0.108198		
					Proposed Religious Near Botanical Garden	172		0.425417		
			9	Public Administration	Existing Public Administration	177	739	0.435253		
					Public Administration Area near Proposed Bus terminal	562		1.38199		
5	Community Open Spaces	4-6%	10	Recreational	Existing Parks and Playground	101	3351	0.248365	3551	9
					Botanical Garden	475		1.168052		
					Sports Complex	490		1.204938		
					Zoological Garden	847		2.082821		
					Central Park Kotri	81		0.200403		
					Visual Parks	3		0.008203		

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NRM STANDARDS		PROPOSED LAND USE CLASSIFICATION FOR KOTRI CITY								
S. N	Land Use Zoning	Land Uses (%)	S. No	Level - 1 Functional Zoning	Level - 2 Functional Zoning	Areas (acres approx.)		Land Uses (%)	Areas (acres approx.)	Land Uses (%)
					Green Space	912		2.24266		
					Plantation	493		1.212593		
					Sports Complex Kotri	113		0.277899		
					Central Park Near proposed Botanical Garden	35		0.087135		
6	Graveyards	2-3%	11	Graveyards	Existing Graveyards	173	665	0.425343	665	2
					Graveyard Near Power House	184		0.452466		
					Graveyard Near New Proposed Bypass	308		0.757389		
7	Arterial Circulation & Terminals	15-20%	12	Transportation	Existing Transportation	54	1744	0.132789	2271	6
					Public Transport Terminal Near	35		0.086067		
					Truck Terminal at N5	142		0.349186		
					Road Network	1513		3.72017		
			13	Utilities and Services	Existing Utilities and Services	365	527	0.897556		
					Proposed Water Supply	62		0.152146		
					Proposed STP At Kotri	15		0.03793		
					Proposed STP At Bolhari	69		0.169675		
					Proposed STP At Jamshoro	16		0.039345		
8	Protected Reserved	15-25%	14	Water Bodies	Water Bodies	1024	13364	2.518074	13364	33
			15	Agriculture	Agricultural Reserved	9778		24.04466		
			16	Vacant	Vacant Area	2562		6.300103		
Total Area for Future Development of Kotri City						**40666**	**40466**	**100**	**40666**	**100**

*4.4.1 **Residential Zone***

The important features of the proposed master plan is accommodation of all income groups with diverse options for housing. Therefore, in total 10299 acres of residential land use is proposed, which will create twelve housing units per acre on average. Thus, in overall city more than 124,068 housing units are expected to be in town by 2045.

There are existing vacant land parcels and abandoned housing schemes in overall town, specially in west side of the town, these have a considerable potential of infill development for residential use. This will somehow fulfill the partial need of new migrants coming from other areas in search of better living in the immediate phase. For low-income group in short term phase (priority project) land near Industrial Area Bolhari is proposed as Labor Colony for low to medium density development. While for other income groups, mixed density (low and medium) residential areas are proposed. Moving ahead, for the long-term phase, areas are also being reserved for residential development as per future requirement, which will also include apartment buildings.

The following land use division is for New Residential Schemes according to Sindh Building & Town Planning Regulations of Sindh Building Control Authority:

Table 4-3:New Residential Scheme [15]

S. No	Land Use	SBCA Standards
1	Residential	55% max
2	Commercial	5% max
3	Parks	5% min
4	Playgrounds	5% min
5	Public Uses	5% min
6	Educational	3% min
7	Roads	22% min

The Level II secondary zoning of residential land use will be as follow:

- **Houses**

Taking the existing trend of housing, it is recommended to concentrate more towards houses, as the cultural context favor low to medium density housing development. However, it is preferred to follow the standards and give ample spaces to neighborhood facilities as well.

The following guidelines are for houses zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
- Houses - Neighborhood level facilities like small commercial, parks, playgrounds, schools, religious, parking	- Utilities and services - Road accessibility - Pedestrian friendly streetscape - Mixed-used structures	- Apartments - Large health and educational - Large commercial activities

[15] Land Allocation for New Residential Schemes as per Sindh Building & Town Planning Regulations, Chapter 20.4.1, page no 124.

Houses - Applicable SBCA Bylaws[16]					
Types	**Densities per acre**	**Plot Sizes sq. yds**	**Foot Print FP %**	**Floor Area Ratio – FAR**	**No. of Floors**
Low Density Houses	50 – 100	1,000 or above	40% - 45%	1:1	G+2 (max)
Medium Density Houses	100 - 200	400 to 999	50% - 55%	1:1 - 1:1.5	G+2 (max)
High Density Houses	200 - 300	120 to 399	65% - 75%	1:1.8 - 1:2	G+2 (max)

- **Apartments**

In kotri city, the trend of vertical residential and commercial development is existing more than other cities of Sindh. Secondly, as new migrants are expected from other urban areas as well, thus there is a need to fulfill the modern residential need like apartments. On the other hand, apartments are more effective in accommodating large number of households in less acres of land due to increased density in comparison to houses. It is not necessary to build a concrete jungle, however with better design and new ideas different type of walkable as well as high rise could be made. The main focus should be to provide open and green areas as breathing spaces in between apartment buildings as per the standards.

The following guidelines are for apartment zone development:

Permitted Uses	**Allied Permissible Uses**	**Prohibited Uses**
- Apartments - Designated parking areas - Small commercial - Parks and playgrounds - Prayer areas	- Utilities and services - Road accessibility - Pedestrian friendly streetscape - Mixed-used structures	- Large health and educational institution - Large commercial activities

Apartments - Applicable SBCA Bylaws[17]					
Types	**Densities[18] per acre**	**Apartment Sizes sq. ft**	**Foot Print FP %**	**Floor Area Ratio - FAR**	**No. of Floors**
Low Density Apartments	325	2,500 – 4,000	40%	1:2.75	G+6 (max)
Medium Density Apartments	500	1,500 – 2,500	40%	1:2.75	G+6 (max)
High Density Apartments	650	1,000 - 1,500	40%	1:2.75	G+6 (max)

[16] Houses/Bungalows, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.2, page no 141.
[17] Flat Sites Category, Zoning Regulations /Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.4, page no 144.
[18] Residential Density Standards, as per Sindh Building & Town Planning Regulations, Chapter 20.3, page no 123.

4.4.2 Commercial Zone

This zone is mainly mixed-use commercial with state of art buildings. The smart development will be preferred from medium to high density and less foot print, in order to utilize the land efficiently with sufficient open and green spaces.

The Level II secondary zoning of commercial land use will be as follow:

- **New Main CBD (Commercial Business District)**
  Considering the shape and growth of the town, the New CBD has been located in the area of central attraction accessible from existing Jamshoro Bypass and Indus Highway (N-55). Main CBD is in the western side, parallel to new proposed road, beside the sport complex and the proposed health zone. The main land uses of the CBD will be regional corporate headquarters, financial centers, media houses, IT / software, specialized production service and retail shopping outlets with dedicated parking and large open spaces. This will integrate a great deal of financial, business, culture, service institutions and lots of supporting facilities; such as business office buildings, large shopping malls, hotels and apartments, etc. These will be developed with perfect and convenient traffic, communications and other infrastructures, favorable economic development, environment friendly places; which are convenient for commercial activities.

- **CBD Kotri, CBD Jamshoro and Sub-commercial Bholari**
  In continuation to the main CBD, it is recommended to place sub commercial areas along important roads of the town, to share the burden of commercial activities. Thus, two sub commercial centers are proposed, CBD Kotri is in the eastern side, parallel to central park kotri and opposite the proposed health zone. CBD jamshoro is in the Northeast side, parallel to jamshoro- Hyderabad Road and a sub-commercial zone in the northeast, along the existing road towards Jamshoro, near the kb feeder; to accommodate commercial facilities. Further small commercials within the residential areas will be formed for retail commercial activities of everyday goods required to fulfill the daily need of the residents.

  The following guidelines are for commercial zone development:

Permitted Uses	Allied Permissible Uses
- Corporate head office buildings, towers - Huge markets, malls, outlets - Large public squares and parks - Dedicated parking lots / spaces	- Pedestrian friendly streetscape - Mixed-used buildings - Medium to High Rise Apartments - Fueling stations
Applicable SBCA Bylaws[19][20]	**Prohibited Uses**
- Plot Sizes: 1,000 sq.yds. (min) - FP: 40% - 65% - FAR: 1:2.75 – 1:5.5 - Floors: G+6 & G+8 (max)	- Residential housing schemes - Large health and educational institution

[19] Commercial, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.3, page no 143.
[20] Flat Sites Category, Zoning Regulations /Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.4, page no 144.

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4.4.3 Economic Zone

In view of contextual requirement, the emphasis is given to other economic activities also, instead of only industrial development. The main criteria are to rely on local economic potentials, which mostly related to technical service and upcoming new type of markets.

The Level II secondary zoning of economic land use will be as follow:

- **Trade and Commerce**
  A Trade and Commerce zone is proposed in the southwest, strategically located parallel to the N5 National Highway and adjacent to the truck terminal, with additional access from the Indus Highway (N-55). This location is designed to support efficient trade flow within the region and to other parts of the district. The zone will accommodate a wide range of economic activities, including markets for grains, fruits, and vegetables; wholesale trading areas; a slaughterhouse; storage facilities; and sections for automobile parts and repair workshops. It will also feature outlets for building and construction materials, home improvement depots, furniture, housewares, food and beverages, and computer hardware. With ongoing technological advancement and shifting market demands, the zone is expected to evolve, incorporating new economic opportunities and technical services such as mechanical workshops and spare parts suppliers, thereby supporting regional development and job creation.

- **Warehouses**
  Proposed in the southwest, parallel to N5 National Highway, and situated opposite to the truck terminal. For all of these trading activities large to small scale warehouses will be required, comprises of general, bulk, liquid, dry and cold storage as well. These should be well equipped with all the required technology of good storage and management like CCTV surveillance, in and out data entry.

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The following guidelines are for economic zone development:

Permitted Uses	Allied Permissible Uses
- Warehouses and Workshops - Godowns and Cold Storage - Trade and Commerce Areas - Showrooms or Display Centers	- Mixed-used buildings - Residences for workers - Fueling stations
Applicable SBCA Bylaws[21]	**Prohibited Uses**
- Plot Sizes: o Small size: upto 0.5 acres o Medium size: 0.5 to 5 acres o Large size: 5 acres or above - FP: 60% - 70% - FAR: 1:2.5 - 1:1.5 - Floors: G+1 & G+2 (max)	- Private Residential housing schemes - Large health and educational institution

4.4.4 Livestock Zone

Since kotri is not only an agricultural city, local inhabitants also rely on livestock as main source of income. The Kotri City has a vast variety of livestock including; buffaloes, cows, goats, sheep, etc. Many people are involved in livestock business and earn a livelihood through this source.

In this regard, to promote livestock production, Cattle Park is placed in Located in the south, parallel to new proposed bypass Road. The main emphasis is to be given to cattle production and their required facilities and services. In addition, poultry is another requirement to fulfil through the livestock zone.

The Level II secondary zoning of livestock land use will be as follow:

- **Veterinary Hospital and College**
  A full-fledged veterinary hospital and college is proposed to cater to livestock health requirements and to produce more vet doctors.

- **Dairy Production[22]**
  Dairy area will be facilitated with mandi / cattle market, artificial insemination center, slaughter house, milk collection unit, chiller storage unit, fodder storage and purchase, bio gas plant etc.

- **Cattle Farms with Pasture and Grazing Lands**
  Cattle area will contain mainly cattle farms that could accommodate buffaloes, cows, sheep, goats, camel, poultry and ostrich; with pasture and grazing lands around the farms.

[21] Industrial Areas, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.6, page no 145.
[22] Dairy Plots, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.8, page no 149.

The following guidelines are for livestock zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
- Cattle Farms - Poultry Farms - Pasture and grazing lands - Slaughter Houses - Dairy production - Veterinary services - Veterinary education and training	- Low rise ancillary structures - Residences of caretakers - Related commercial activities - Fueling stations - Godowns and cold storage - Cattle market	- Other than permitted and permissible

*4.4.5 **Industrial Zone***

In order to increase employment opportunities and production activities; industrial areas need to be developed. It will create more jobs, investment options, open new markets and at the end of the day will boost the economy of the town.

The following land use division is for New Industrial Estate according to Sindh Building & Town Planning Regulations of Sindh Building Control Authority:

New Industrial Estate [23]		
S. No.	**Land Use**	**SBCA Standards**
1	Industrial	70% max
2	Commercial	1% max
3	Parks / Playground	3% min
4	Public Uses	6% min
5	Roads	20% min
6	Residential	8% min
No roads shall be less than 40 feet in small industries. No roads shall be less than 50 feet in medium and large industries. Industrial plot of 5 acres or more, residential area for labor and staff is allowed at rear.		

The Level II secondary zoning of economic land use will be as follow:

- **Existing Industrial Area**
  Initially for small scale industries existing industrial area of Industrial estate at Kotri situated on the right bank of River Indus over an area of 1875 acres was incorporated in 1960, recommended to be filled first. Mainly the small industries will be promoted like agriculture related industries. The small-scale industries may include flour mills, ice factories, packaging of fruits and vegetables, feeder crops, cottage industries etc.

- **New Industrial Area**
  The proposed industrial extension is planned for the southern side, directly opposite the proposed trade and commerce and behind existing industrial area. It is not suggested to develop whole area at once, instead as per the need. Preferably starting from the road accessible side and keeping further area reserved for future use when firstly developed area utilized.

[23] Land Allocation for New Industrial Estate as per Sindh Building & Town Planning Regulations, Chapter 20.4.2, page no 124.

The small and medium scale industries will include flour mills, rice husking mills, ice factories, packaging of fruits and vegetables, feeder crops, cotton ginning factories, sugar mills, etc.
As Jamshoro is considered an important district with a wealth of oil and gas reserves and precious stones, which brings large revenue. And the presence of BHP Company and ENI Company shows the existence and significance of gas and petroleum industries in the district. Thus, it is suggested to explore potential of heavy industries and recommended to develop oil and gas related industries but not inside and nearby town area.

The following guidelines are for industrial zone development:

Permitted Uses	Allied Permissible Uses
- Small, Medium and Large-Scale Industries - Processing Units - Manufacturing Activities - Warehouses or Godowns - Workshops	- Showrooms - Mixed-used buildings - Residences for workers - Fueling stations
Applicable SBCA Bylaws[24]	**Prohibited Uses**
- Plot Sizes: o Small size: upto 0.5 acres o Medium size: 0.5 to 5 acres o Large size: 5 acres or above - FP: 60% - 70% - FAR: 1:2.5 - 1:1.5 - Floors: G+1 & G+2 (max)	- Private Residential housing schemes - Large health and educational institution

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[24] Industrial Areas, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.6, page no 145.

4.4.6 Health and Welfare Zone

This zone is specifically for health and welfare related large scale activities. It will be a specialized area with high tech health facilities, social welfare and supporting services; with advance infrastructure. The aim will be to provide all specialized health solution within the town, and to serve the population beyond city borders, like nearby urban and rural localities.

The Level II secondary zoning of health and welfare land use will be as follow:

- **New Health and Welfare Area**

  Health facilities are planned in two areas: Northwest, parallel to new proposed road, and Karachi-Hyderabad Motorway M-9 beside the proposed Main (CBD). Northeast, parallel to the existing Karachi canal road, near the proposed educational zone and opposite to the Proposed CBD kotri. These are placed to make it reachable for other cities as well and to attract private investment in health and welfare sector. It is widely possible that these area will be utilized for distinct health and welfare facilities in long term phase; like specialized hospitals, research and welfare centers etc. It will comprise of the specialized units like oncology, urology, infertility centers, organ transplantation, and specialized treatment centers, research and development centers.

  The following guidelines are for health and welfare zone development:

Permitted Uses	Allied Permissible Uses
- Large Hospitals - Specialized treatment centers - Medical College - Dental College - Pharmaceutical College - Nursing College - Laboratories and Diagnostic Centers - Blood Banks - Health Research Institutes	- Staff Residences (medical and paramedic) - Separate Hostels for Boys and Girls - Auditoriums, seminar halls, workshop spaces - Community facilities (parks, playgrounds, schools, clinic, neighborhood commercial) - Support facilities (gym, health club, bus stops, taxi stand, banks, fueling stations)
Applicable SBCA Bylaws[25]	**Prohibited Uses**
- Plot Sizes: 1.0 acre or above - FP: 50% - FAR: 1:1.5 - Floors: G+2 (max)	- Private residential housing schemes - Large commercial activities

[25] Amenity Plots, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.5, page no 145.

4.4.7 Educational Zone

The large-scale educational land uses will be development in this zone, focusing towards the global trend of education specially for upcoming generations. The aim is to create a knowledge base hub, to provide quality education in all diversified filed, in order to upgrade the livelihood of the local as well as the regional population.

The Level II secondary zoning of educational land use will be as follow:

- **Educational Areas**

  In order to improve educational facilities at all levels, two educational zones are proposed: Educational zone one in the NE, near sport complex kotri and proposed health zone. Another in the northeast, parallel to the Jamshoro- Hyderabad Road. These will serve the need of the resident within the neighborhood area. It is mainly proposed to provide more schools and colleges for both boys and girls. It is suggested to accommodate all the required facilities and service like; libraries, laboratories, playgrounds, washrooms, etc. The library, data and information centers and scientific research institutes are also recommended in this zone to provide all kind of facilities for research and development in different fields.

  It will also include; poly technical college for boys and girls, women development center (working women hostels, day care centers), certified computer and IT training centers, research centers, etc. The vocational training center are also suggested to be placed in this area to cater need of under privileged youth for better skills and technical knowledge. This will provide space for skill development centers, technical education for the local and surrounding population to accommodate in the current job market.

  The following guidelines are for educational zone development:

Permitted Uses	Allied Permissible Uses
- Large scale educational areas - General Education Universities - Scientific Research Institutes - Engineering colleges / universities - Business and management schools - Finance and accountancy Institutes - IT and media Institutes - City level libraries, book banks, data and information centers	- Staff Residences (teaching and non-teaching) - Separate Hostels for Boys and Girls - Auditoriums, seminar halls, workshop spaces - Community facilities (parks, playgrounds, clinics, schools, neighborhood commercial) - Support facilities (gym, health club, bus stops, taxi stand, banks, fueling stations)
Applicable SBCA Bylaws[26]	**Prohibited Uses**
- Plot Sizes: 1.0 acre or above - FP: 50% - FAR: 1:1.5 - Floors: G+2 (max)	- Private residential housing schemes - Large commercial activities

[26] Ibid

4.4.8 Religious Zone

In the proposed master plan two religious sites are allocated in the Kotri city. One is in Bolhari along Indus Highway N55 and second is located opposite to the botanical garden in the north. These are not necessarily to be developed soon, as presently there are sufficient religious places. These will be grand religious monumental buildings and structures, to enhance aesthetic of the town. Further it is suggested to fulfill the future requirement of different religious groups in sub divisions of other areas.

The following guidelines are for religious zone development:

Permitted Uses	Allied Permissible Uses
- Religious buildings like mosques, imam barghahs, mandir, churches, etc. - Religious teaching areas - Religious preaching grounds - Orphanage	- Residences for religious leaders - Accommodation for religious scholars, students - Small parks, playgrounds, clinics, commercial - Support facilities (bus stops, taxi stand, banks, fueling stations)
Applicable SBCA Bylaws[27][28]	**Prohibited Uses**
- Plot Sizes: 1.0 acre or above - FP: 50% - FAR: 1:1.5 - Floors: G+2 (max)	- Private residential housing schemes - Large commercial activities

4.4.9 Public Administration Zone

The public administration offices will include District Secretariat, Development Authority, Town Committee Offices, Line Departments, Local Government Offices, Town Planning Department, Circuit House etc.

The Level II secondary zoning of public administration land use will be as follow:

- **New Public Administration Area**
  The New Public Administration Area is proposed in the western side of the city, along Motorway M9. In future with the rising activities more space for different public offices and institutions will be required. With this assumption future extension area for public administration need to be reserved.

The area for public employee housing is also suggested here to cater the need of housing for public employees. This will include houses and walkable apartments for all employees, according to their grade levels and status.

[27] Ibid
[28] Religious Buildings, Plots, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.13, page no 156.

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The following guidelines are for public administration zone development:

Permitted Uses	Allied Permissible Uses
- District Secretariat, - Development Authority - Town Committee Complex - Line Departments - Local Government Offices - Town Planning Department - Judiciary Complex - Circuit House	- Employees Residences (for all grades) - Auditoriums, seminar halls, workshop spaces - Community facilities (parks, playgrounds, clinics, schools, neighborhood commercial) - Support facilities (gym, health club, bus stops, taxi stand, banks, fueling stations)
Applicable SBCA Bylaws[29]	**Prohibited Uses**
- Plot Sizes: 1.0 acre or above - FP: 50% - FAR: 1:1.5 - Floors: G+2 (max)	- Private residential housing schemes - Large commercial activities

4.4.10 Recreational Zone

In the existing towns, disappearance of open spaces and non-provision of planned open spaces are seen. Thus, in the proposed master plan, recreational land use has been given a vital importance in order to create a healthy environment. Several types of regional level recreational activities are recommended like sports and cultural complex, amusement and theme parks, grounds etc.

The Level II secondary zoning of recreational land use will be as follow:

- **Central Parks –Kotri**
  The large Central Park is proposed in Kotri. This will be general public parks; however their sub portions could be reserved for families (ladies and children). Thus, this will also contain area for family park; swings, sitting, walking, jogging with allied facilities of washrooms, tuck shops, parking etc. This could also include multipurpose playgrounds and orchards for active and passive facilities.

- **Sports Complex**
  Two sports complexes are proposed; one is proposed next to Main CBD, and accessible from National Highway N5 and New Road. Sport Complex Kotri center part of the city, parallel to the existing Karachi canal road, near proposed education zone. It will include cricket, football,

[29] Ibid

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hockey and other ground, and gymnasium. These types of sports facilities will be of national level standards to promote domestic sports.

- **Amusement Park**
  A large site for amusement park is opposite to the religious zone in the north, near proposed Botanical Garden. In this area large scale amusement facilities like thrilling rides in a safe and pleasant manner will be provided. Some of its area could be reserved for other recreational activities of theme parks like art park, ice park, floral garden, glow garden etc. could also be introduced as per the demand of the region.

- **Botanical and Zoological Gardens**
  Moreover, there is also need to locate botanical and zoological gardens. These gardens will serve not only a metropolis of future but urban and rural areas of Jamshoro region as well. Zoological garden in Northwest (NW), near the proposed public administration zone, parallel to the Karachi-Hyderabad Motorway M-9. While Botanical Garden located opposite to the religious zone in the north, near proposed park.

The following guidelines are for recreational zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
- City scale parks - Large public squares - Sports facilities - Cultural activities - Amusement area - Special theme parks - Regional level gardens like botanical, zoological	- Ancillary structures - Accommodation for caretakers / workers - Related commercial activities - Fueling stations - Parking - Public washrooms	- Other than permitted and permissible

4.4.11 Graveyards Zone

- At present there are graveyards in the town, which have sufficient space available for immediate need. However, for long term there are two large graveyards proposed, in Southwest, parallel to the N5 National Highway and new proposed Bypass Road and in north near Thermal Power Station. These graveyards can be further divided according to the requirement of practicing religions in the town.

The following guidelines are for graveyard zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
- Graveyard area	- Related commercial activities - Accommodation for caretaker	- Other than permitted and permissible

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4.4.12 **Transportation Zone**

In kotri city, the transportation is mainly based on railway and road network of major roads, highways and motorway with terminals and intersections. Road network is considered as a vehicle for economic development and social change. Efficient road network not only develops a quick and efficient transportation system but also opens up new areas previously remained closed. It brings about social integration among rural and urban sectors and greatly assists in providing access to basic amenities such as education, health facilities, etc. It brings rural areas in constant touch with urban segment of a society and creates better understanding necessary for social change and economic activities.

The Level II secondary zoning of transportation land use will be as follow:

- **Air Connectivity**
  Regarding air connectivity, Jamshoro is connected to Hyderabad and Karachi Airports at a distance of 24 and 140 kilometers respectively via National Highway N5 and Motorway M9. In addition, Sehwan Sharif Airport serves during the Urs festival, which operates a daily flight between Karachi and Sehwan. However, it is suggested that residents of Kotri Town should utilize Hyderabad and Karachi Airports. Thus, a new airport for Jamshoro Town is not feasible due to nearby airport facilities and with projected population.

- **Railway Reserved Area**
  The Railway Station lies in southeast in the core urban area of the Kotri Town. Kotri Junction Station is among the oldest railway stations in Pakistan. It is linked with the main national network of Pakistan Railways. This line is the part of the first railway line (Karachi-Kotri) between Karachi and Lahore. Currently, this railway track is considered as the busiest track for long route trains to facilitate the public. In addition, Jamshoro is also connected to Quetta via Kotri-Dadu railway line.

  However, it is suggested to reserve the area for railway use only, to avoid any sort of encroachments. Consequently, the available vacant land parcels have been marked as Railway Reserved Area, in order to avoid further violation of railway ROW. Further it is recommended to improve the railway service for better cost-effective connectivity for the town's economy.

- **Proposed Road Network**
  The proposed road network is originated from the existing major roads i.e. National Highway N5, Motorway M9 and Indus Highway N55. And the major regional connectivity is developed through proposed Jamshoro Bypass. However, the widening and beatification of Indus Highway N55 is forming the vertical link in north-south direction, while National Highway N5 and Motorway M9 are creating horizontal links from east to west. And Jamshoro Bypass is proposed to provide a bypass from Jamshoro to connect Karachi with left bank areas of Sindh without entering in Jamshoro Town.

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All proposed Major Roads (primary, secondary and tertiary roads) of the master plan will be dual carriageways with green medians in the center; as shown:

Table 4-4: All proposed Major Roads (primary, secondary and tertiary roads)

S. No.	Major Roads	ROW (ft)	Forestation (ft)
i.	Jamshoro Bypass (newly proposed)	200	200
ii.	Karachi-Hyderabad Motorway M9	200	200
iii.	National Highway N5	200	200
iv.	Indus Highway N55	200	200
v.	Hyderabad-Jamshoro Road	150	100
vi.	Mill Area Road	150	100
vii.	New CBD Road (newly proposed)	150	100
viii.	Cadet College Petaro Road	150	100
ix.	Khanpur Road	100	50
x.	Karo Kho Road	100	50
xi.	Railo Miyan Road (newly proposed)	100	50
xii.	Karachi Canal Road	100	50
xiii.	Kotri Station Rad	100	50
xiv.	SRTC Road	100	50
xv.	LUMHS Road	100	50
xvi.	Haider Nawab Chohan Road	100	50
xvii.	Zakria Chohan Road	100	50
ROW – property to property distance **Forestation on both side of ROW**			

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Primary Roads: The proposed Jamshoro Bypass, existing National Highway N5, Motorway M9 and Indus Highway N55 are considered as Primary Road. These will have a right of way of 200 feet (min) with initially a four-lane divided road, service road, median, parking, and cycle/pedestrian track and local tree plantation on both sides. In addition to the 200 feet ROW, urban forestation of 200 feet on both sides are also proposed, to avoid direct / upfront development along primary roads. All primary roads crossings will be initially roundabouts with enough space for grade separated junctions in the future.

Secondary Roads: The secondary roads, are vertical and horizontal major roads connecting the town with other towns. It will have a right of way of 150 feet (min) with three lanes, service road, median, footpaths, parking and cycle/pedestrian tracks. These roads include; Hyderabad-Jamshoro Road, Mill Area Road, New CBD Road and Cadet College Petaro Road.

Tertiary Roads: The tertiary roads will have a right of way of 100 feet (min) with at least two lanes, median, footpaths, parking and cycle/pedestrian tracks. These roads are comprises of; Khanpur, Karo Kho, Railo Miyan, Karachi Canal, Kotri Station, SRTC, LUMHS, Haider Nawab Chohan and Zakria Chohan Roads. It also includes proposed New Roads providing horizontal and vertical connections between primary and secondary roads.

- **Public Transport Terminal**

  The Public Transport Terminal is placed near Jamshoro Interchange at M9 Motorway in center of the town and also accessible from Indus Highway N55. It is proposed in order to provide better and nearby multi-intermodal transport connectivity. Since major regional communication of general public is expected via these major roads; as most of residential, educational and health related traffic will be generated and these will cover most of the town. These will be comprises of the parking for public buses, hiace, wagons, taxis; with allied facilities like ticking booths, sitting / waiting areas, washrooms, shops and required residence for the drivers and staff.

- **Truck Terminals**

  Considering the location of proposed economic activities, truck terminal is placed in the southwest, parallel to N5 National Highway and beside the trade and commerce zone. As from this point all industrial and economic activities are connected, this is found more appropriate location for heavy traffic and goods transport. The proposed terminal will help in transporting goods from / into the town, which will benefit and boost the economic activities of the town.

  The following guidelines are for transport zone development:

Permitted Uses	Allied Permissible Uses
- All types of parking areas - Designated ROW - Green belts - Footpaths - Traffic management devices	- Drivers and staff accommodation - Support offices, rest areas, washrooms, shops etc. - Street furniture like lights, trash bins, benches etc.
Applicable SBCA Bylaws[30]	**Prohibited Uses**
- No direct access to major roads will be allowed except through service road - No structure or part of a structure may project beyond building line	- Any kind of encroachment

[30] Highway Major Roads, General Standards, as per Sindh Building & Town Planning Regulations, Chapter 21, page no 126.

4.4.13 Utilities and Services Zone

The utilities and services provision are also made in the master plan. This land provision is mainly for large scale utilities and services.

The Level II secondary zoning of utilities and services land use will be as follow:

- **Water Supply**
  The main water source is Indus River, from where water takes off through Karachi Canal also known as KB (Kotri Barrage) Feeder; which feeds to whole Jamshoro Town (Kotri MC, Bolhari MC, and Jamshoro TC). In continuation extension in Bolhari, Kotri and Jamshoro, additional areas are proposed for water supply works. These additional areas have been reserved to extend the water reservoirs as per the town's water demand and related water supply infrastructure. These areas will also cater to water supply filtration plant and other advance purification mechanism.

- **Sewage Treatment Plant**
  Three areas are designated for STPs and their related uses, in Bolhari, Kotri and Jamshoro. These sites are low in elevation level with respect to nearby main drain, which will helpful to relay mainly on gravity flow. From very first it is not necessary to setup a fully mechanized STP, but it is suggested to start with oxidation ponds then proceed toward advance management of waste water.

  The following guidelines are for utilities and services zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
- Land use for Utilities and Services like Water Supply, Filtration, Oxidation Ponds, Sewage Treatment, Landfill Sites, Grid Station etc.	- Related land development and building activities - Accommodation for staff, operators and labors. - Specific parking area.	- Other than permitted and permissible

4.4.14 Urban Forestation Zone

Urban forestation along bypass, highways, motorway and major roads is proposed to avoid rapidly increasing disorganized private development. Instead planned residential areas as per building control rules and regulations which are proposed on both sides of road after urban forestation reserved areas.

In order to protect Jamshoro Bypass, National Highway N5, Motorway M9 and Indus Highway N55 from uncontrolled development, urban forestation of two hundred feet at both sides of the road should be planted. It is advised to restrict development in this area and implement the rules and regulations to keep the town green. In addition to bypass, highways and motorway urban forestation of 50 to 100 feet on both

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side of the Major Roads are also proposed depending upon their ROW, to avoid direct / upfront development along roads. All major roads crossings will have initially green roundabouts with enough space for grade separated junctions in the future.

It is recommended to plant locally available species for urban forestation. This region is gifted with a large variety of natural vegetation of grasses, shrubs and trees.

The following guidelines are for urban forestation zone development:

Permitted Uses	Allied Permissible Uses
- Land use for horticulture, landscaping, plantation, green belt, forestation.	- Related land use and activities, while no land development or buildings. - Temporary accommodation for labor and security persons. - Specific parking area for any accident and unplanned incident.

*4.4.15 **Agricultural Zone***

In order to limit the town development agricultural reserved areas are proposed mostly along River Indus. In this manner not only town spatial growth will be confined but also essence of agriculture activities will remain close to the town. It will also create a healthy environment and less burden will be on spread of infrastructure network. The existing villages or settlements in the periphery of the town will also be benefited and not removed from their place of livelihood. The recommended crops for production are; wheat, cotton, sugar-cane, maize, barley, bajra, gram, pulses and oil seeds. In addition, fishing activities are also suggested in these reserved areas along River Indus.

The following guidelines are for agriculture zone development:

Permitted Uses	Allied Permissible Uses
- Land use for proposed agricultural and its necessities.	- Related land activities with respect to its rules and regulations. - Accommodation for farmers and labor in associations with MC.

- **Water Bodies**

The main water source is Indus River, from where water takes off through Karachi Canal also known as KB (Kotri Barrage) Feeder; which feeds to whole kotri city (Kotri MC, Bolhari MC, and Jamshoro TC). Thus the beautification of Karachi Canal and Indus River are highly recommended. It includes:

- Protection of its right of way and removal of encroachments
- Control on incompatible development in its surrounding

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- Restriction on disposal of waste water
- Restriction on dumping of solid waste
- Provision of roads on both sides of its course
- Native plantation on both sides of its course

The following guidelines are for Water Bodies zone development:

Permitted Uses	Allied Permissible Uses
- Land use for water bodies like rivers, tributaries, canals, water channels, irrigation network, ponds, lakes, water courses.	- Related land use and activities, while no land development or buildings. - Temporary accommodation for labor and security persons.

- **Vacant Zone**

The objective of providing vacant area is to cater the emergency need at time of any disaster. With this respect areas outside the main town will be kept reserved for emergency need, which could be utilized for portable homes, mobile health care facilities, camping for vulnerable of calamities, temporary storage of bulk material etc. The proposed vacant area is at outskirts of kotri city but being on the peripheral area, would not disturb the town activities in general and it is accessible from Karachi-Hyderabad Motorway M9.

However, the control on vacant land is extremely important, leap-frog development create pressure to utilize for other uses. Thus, there is a need to make sure that no development would take place in these types of reserved areas.

The following guidelines are for vacant zone development:

Permitted Uses	Allied Permissible Uses
- Land use for proposed emergency and imminent necessities	- Related land development and building activities. - Temporary accommodation for operation and maintenance staff in associations with MC.

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5. HOUSING

5.1 Existing Situation

In the context of Kotri City, the significance of adequate housing as a cornerstone of social infrastructure cannot be overstated. It is a crucial factor in elevating living standards, particularly among poor and low-income households. Housing is not just about shelter; it's a foundational element that influences various facets of life, from health and education to resilience against natural disasters and social stability.

The absence of adequate housing is often a primary factor that perpetuates poverty. Families lacking safe, affordable, and decent housing are frequently trapped in a cycle of impoverishment, marked by detrimental health outcomes, diminished educational achievements, and increased vulnerability to environmental and social upheavals. The impact of inadequate housing extends beyond the individual household, affecting the broader community's socio-economic fabric.

In Kotri City, like many urban areas, the challenge of housing is twofold. First, there is the issue of availability – ensuring that there are enough housing units to meet the demand of a growing population. Second, and equally important, is the issue of housing quality. This encompasses not just the physical structure, but also access to essential services such as water, sanitation, electricity, and safe living conditions.

Moreover, housing adequacy is also about location. Housing that is far removed from employment opportunities, educational facilities, healthcare services, and social amenities further marginalizes the poor and low-income families. It can lead to increased transportation costs, reduced employment opportunities, and limited access to vital services, thus exacerbating the hardships faced by these populations.

As Kotri City develops, there is a pressing need to address these housing challenges holistically. This requires not just the construction of more houses, but also ensuring that these houses are affordable, of decent quality, and well-located. It necessitates collaborative efforts involving government bodies, private sector stakeholders, community organizations, and urban planners. Such efforts should aim at integrating housing policies with broader urban development plans, ensuring that housing development contributes to, and benefits from, the city's overall growth and progress.

Addressing the housing needs in Kotri City is thus a critical step towards breaking the cycle of poverty, improving overall living standards, and building a more equitable and sustainable urban environment. It is an investment not just in physical infrastructure, but in the city's most valuable asset – its people.

5.1.1 **Katchi Abadis**

In urban areas, the problem manifests as unstoppable growth of squatter settlements known as katchi abadis and encroachment of state and private land. The phenomenon of Katchi Abadis, or squatter settlements, represents an important challenge in urban areas, particularly in Kotri MC, Bolhari MC, and Jamshoro TC. These informal settlements, often resulting from uncontrolled urban sprawl and inadequate

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housing policies, now accommodate an estimated 50% of the urban population. The data provided by the Sindh Katchi Abadis Authority (SKAA) identifies sixteen such sites in these areas.

5.1.2 Katchi Abadis of Kotri MC, Bolhari MC and Jamshoro TC

The data provided by the Sindh Katchi Abadis Authority (SKAA) identifies sixteen such sites in these areas.

According to data provided by Sindh Kacthi Abadis Authority (SKAA), The sixteen identified Katchi Abadis cover an area of 180.35 acres and consist of approximately 4,572 housing units, sheltering an estimated population of 21,810. This accounts for about 7.42% of the total population of Kotri MC, Bolhari MC, and Jamshoro TC. Of these settlements, six are yet to be officially notified. These sixteen sites are covering an area of 180.35 acres with 4,572 housing units (approx. 21,810 population). It is estimated that 7.42% population of Kotri MC, Bolhari MC and Jamshoro TC resides in katchi abadis.

Table 5-1: List of Katchi Abadis in Kotri MC, Bolhari MC and Jamshoro TC DHQ Town[31]

S. No.	Location	Name of Katchi Abadi	Total Area in (acres)	No. of Housing Units	Estimated Population	Date of Notification
1	Korti MC	Azad Colony	1.05	45	280	31-08-1988
2		Adjacent Petrol pump	1.01	41	310	Un-Notified
3		Al-Shahbaz Colony	1.20	78	970	1'8-01-1992
4		Baba Mehmood Shah	5.00	125	500	18-01-1992
5		Bilal Colony	2.00	70	250	Un-Notified
6		Darya Abad Colony	8.83	221	800	31-08-1988
7		Gharibabad Colony	1.48	41	200	18-01-1992
8		Jeno Para	1.00	125	400	Un-Notified
9		Mehran Colony	1.30	70	250	Un-Notified
10		Muhajir Colony	2.29	231	1000	1'8-01-1992
11		Near Old Musafar Khana	1.21	50	100	Un-Notified
12		Pathan Colony	5.00	125	150	Un-Notified
13		Qalandarabad	10.97	1000	2650	31-08-1988
14		Sikandarabad	63.00	575	2800	02-05-1996
15		Station Road	3.83	275	650	18-01-1992
16	MC Bolhari	Asad Abad	71.18	1500	10500	12-11-2017
Total			**180.35**	**4,572**	**21,810**	

[31] Sindh Katchi Abadis Authority (SKAA)

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5.1.3 Human Settlement Authority (HSA) Low-cost Housing Schemes in Kotri

The Human Settlement Authority (HSA), formerly known as the Sindh Katchi Abadis Authority (SKAA), has successfully launched Low-cost Housing Schemes, commonly known as Sasti Basti, in Kotri. These schemes aim to provide affordable housing solutions to shelter-less, low-income families.

Details of the Low-cost Housing Scheme[32]

District	Location	Area (acres)	Total No. of Plots	No. of Possessions Handed Over	No. of Families Shifted
Jamshoro	Kotri	14.00	477	350	350

Given the scale of informal settlements, inadequate housing quality, service deficits, and exposure to environmental risks, the housing strategy must prioritize: I. rehabilitation and upgrading of existing housing stock, particularly in katchi abadis, to improve structural safety, habitability, and resilience against floods and climate stresses; II. regularization, planning, and phased redevelopment of informal settlements covering 180.35 acres with 4,572 housing units to ensure secure tenure, proper layout, and access to basic services; III. provision and expansion of affordable and low cost housing through planned schemes such as HSA initiatives to address the needs of low income and shelter less households; and IV. integration of housing development with urban infrastructure, land use planning, and service delivery to ensure safe locations, access to livelihoods, and improved living standards while reducing socio economic vulnerability.

5.2 Issues:

General housing condition of surveyed houses was satisfactory although major reasons for the housing backlog are lack of resources, inadequate planning, and wrong land development policies. The following are the major issues in the housing sector:

- Inadequate supply of developed land.
- Poor land administration with inadequate legal and regulatory systems.
- Housing and associated infrastructure is in dilapidated condition requiring improvement / replacement
- Unchecked growth of squatter settlements: Katchi Abadis encroachment on state and vacant land is a direct outcome of the housing shortage.
- Shortage of finance continues to be the major constraint in housing production, maintenance and growth.
- Due to inflationary trends in the economy; the cost of building material have sky rocketed.
- Lots of slum areas especially in Bolari near Khuda ki Basti
- The housing density is quite high in the core areas, causing congestion and issues of poor light and ventilation.
- There is a lack of basic utility services such as water supply, sewerage and drainage system.

[32] Sindh Government

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5.3 SWOT Analysis:

HOUSING			
Strength	**Weakness**	**Opportunity**	**Threats**
1. A majority of the houses are Pacca (brick construction), comprising 63%. 2. There is a growing trend of new private house schemes. 3. The majority of the formal population is supplied with gas and electricity. 4. A significant majority (79%) express a pronounced inclination towards homes owned by families, potentially cultivating a feeling of stability and community.	1. A significant majority, 68%, use un-drained toilets with manual cleaning. 2. Inhabitants of Katchi Abadis face daily struggles with poverty, health risks. 3. Lack basic amenities in Katchi Abadis.	1. Demand for new sustainable and environmentally friendly low-income public housing projects. 2. Potential for community-based micro-financing for housing. 3. Installation of basic utility services through new projects Provides an opportunity to significantly improve living standards and community well-being. 4. Promoting vertical development can address urban space constraints and enhance land use efficiency.	1. Development of informal housing in empty/vacant spaces available within City. 2. The creation of urban slums. 3. Urban sprawl.

5.4 Need Assessment:

Table 5-2: Housing Backlog: Kotri MC, Bolhari MC, and Jamshoro TC

City	Census 2023				Population Projection in 2025 (Current year)		Population Projection in 2045	
	Pop:	AGR	HH Size	HU	PP	HU	PP	HU
Kotri MC + Jamshoro TC+ Bolhari MC	364,418	-	-	65,929	382,492	68,987	714,441	124,068

*Average Household (HH) Size is taken as the combined average of Kotri MC, Bolhari MC, and Jamshoro TC
**AGR of Kotri MC (0.89%), Bolhari MC (1.17%) and Jamshoro TC (6.68%), for further details please check Section 2.2.3

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In 2023, the collective population of these areas was recorded at 364,418 with, supported by 65,929 housing units. Projections for 2025 suggest a steep rise in population to 382,492, necessitating a substantial increase in housing units to 68,987 to accommodate this growth. The trajectory extends further to 2045, with an anticipated population surge to 714,441, nearly doubling from 2017, and a corresponding housing unit requirement of 124,068.

The need assessment confirms that the housing response cannot rely on new construction alone; it must be delivered through a combined approach: (i) rehabilitation and upgrading of existing housing stock, particularly in dilapidated units and high density core areas, where 68 percent of households rely on un drained sanitation and many lack basic utilities; and (ii) planned expansion of housing supply to address the quantified backlog, as population growth from 364,418 in 2023 to 382,492 in 2025 requires an increase from 65,929 to 68,987 housing units, rising sharply to 124,068 units by 2045 for a projected population of 714,441. This phased approach will support immediate habitability improvements, regularization of informal settlements, and long-term accommodation of demographic growth while reducing congestion, service deficits, and urban sprawl.

5.5 Policy Guidelines[33]

Housing sector is divided in various sub sectors. Policy guidelines for all sub sectors are given below:

6.5.1 Policy Measures for Land[34]

- Employing the Land Banking Approach
- Land Pooling by Engaging the Small Landowners
- Growth Boundaries and Green Belts
- Land Hoarding and Speculation
- Land Consolidation and Comprehensive Land Information Systems

6.5.2 Policy Measures for Housing Finance[35]

- Flexible & small loans with low or zero-interest rates to build or improve homes incrementally.
- Micro-financing could be provided through NGOs in line with the Akhuwat and Kashf foundation's models.
- Fixed Term loans for different periods like 5, 10 and 20 years.
- Re-introduce the option of mark-up subsidy for low cost and affordable housing. This subsidy could only be for the eligible poor income class emanating from a credible data base such as BISP (Benazir Income Support Program).

[33] Strategic National Housing Policy Framework 2025

[35] Strategic National Housing Policy Framework 2025

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6.5.3 Policy Measures for Katchi Abadis, Squatter Settlements & Slums[36]

These are two planning approaches to effectively deal with slums and squatter settlement issues in a sustainable manner. These effectively tackle not only the physical upgradation of the area, but also promotes its social, economic and environmental development.

The wide-ranging and far-reaching policy measures to overcome the issue of slums and squatter settlements in major cities of Pakistan:

- High-rise with Mixed Land Use Development:
- Land/Apartment Ownership Rights
- Preference to Apartment Buildings

6.5.4 Policy Measures for Low Income Housing[37]

- Part of the sale proceeds of valuable public land shall be set aside to provide plots for low-income housing and housing for the poor and needy at concessionary rates
- The land identified for low-cost housing shall be physically accessible preferably near the city centre, socially acceptable, economically affordable and environmentally resilient
- Only one house for one low-income family in life in entire country will be allowed
- Low-cost houses shall be allowed to use certain part i.e. upto 25% of the house for commercial activity to earn livelihood for the family at home without compromising the local environment.
- The minimum size of the house shall not be fixed.
- Dedicated approval window for affordable housing
- Slums / Katchi abadies upgradations and regeneration must be carried out

5.6 Strategic Development Plan

I. Long Term Plan:

- Development of indigenous and cost-effective approaches particularly for low-income group and mass production.
- Capacity building of institutions involved in housing provision and related sectors, to safeguard against malpractices, inefficiencies, weaknesses and mafia assaults.
- Land bank to be formed to facilitate availability of suitable, affordable, safe and secure land parcels within the town for the development of housing schemes.
- Concepts of small towns should be worked out to minimize the housing requirement in secondary cities.

[36] Strategic National Housing Policy Framework 2025
[37] Strategic National Housing Policy Framework 2025

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- An affordable housing program for low income group in different phases up to 2045, through one window operation (including technical guidance, easy loan provisions, legal procedures)
- Formulation of Green Building Byelaws for future housing to address water conservation, low energy consumption, waste recycling etc.

II. Short Term Plan:

- Incremental housing schemes on the lines of Orangi, Qasba, and Khuda Ki Basti etc. should be initiated based on lessons of experience.
- One stop facilitation center should be established to facilitate public, especially for unprivileged and poor households.
- Increase in proportion of small size plots could be made for low income groups in all new housing schemes.
- Low-income Housing Funds would be established to provide sufficient and affordable credit for housing to meet the needs of shelter less poor. Example is Grameen Bank which is a microfinance organization and community development bank founded in Bangladesh. It makes small loans to the impoverished without requiring collateral.

Housing interventions will be integrated with municipal infrastructure planning, particularly land development controls, drainage and sewerage networks, water supply, solid waste management, energy reliability, road access, and public safety in residential areas, including katchi abadis and low-income housing schemes. This integration will reduce vulnerability to flooding and environmental hazards, improve livability and service continuity, and support orderly, affordable, and resilient housing development aligned with long term urban growth objectives.

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5.7 Priority Projects

i. CONSUTRUCTION OF HOUSING SCHEMES FOR LOW INCOME PEOPLE

According to the 2023 Census, the total housing stock in Kotri MC, Bolhari MC and Jamshoro TC is 65,924 units, of which 12,609 (19%) are rented houses. A significant portion of households have low incomes, which restricts their ability to acquire adequate housing and has contributed to the proliferation of slums and informal settlements. Living conditions in these areas are poor, with residents facing numerous challenges, including a lack of essential utility services. To address these issues, it is imperative for the public sector in Kotri city to implement an affordable housing program specifically designed for low-income households as part of an overarching urban strategy. The program should be launched in areas where slums already exist. It will be developed in phases and is expected to target at least 400 families in the first phase.

The purpose of this project is

- Provide affordable shelters to the poor people
- Through this process alternate resettlement of the congested part of the city may be possible
- Improvement in living standards, with enhanced access to basic services

The housing scheme will be as per the minimum standards to reduce the cost of the project

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Unplanned Street network

Dilapidated houses

➢ **Scope**

The project focuses on providing affordable and secure housing for low-income households currently residing in slums and informal settlements in Kotri City. Phase 1 aims to resettle 400 families into a planned urban environment, improving their access to essential services and overall living standards.

The housing units will be developed on 80 sq. yd. residential plots and will include two rooms, a kitchen, a bathroom, and a living area. The project scope also includes the development of supporting infrastructure such as road networks, water supply, sewerage, drainage, electricity, and community amenities.

To support financial sustainability, commercial plots will be integrated within the scheme, enabling partial recovery of capital investment through commercial property sales. The initiative will be executed in phases to ensure smooth relocation and systematic upgrading of informal areas.

- **Size**

The Affordable Housing Project will accommodate 400 residential units in Phase 1, benefiting approximately 2,400–2,800 residents (based on an average household size of 5–6 persons). Each housing plot will measure 80 sq. yd., ensure an efficient use of land while maintain acceptable living space standards for low-income households.

In addition to residential units, a limited number of commercial plots and buildings will be included to support economic activity and help offset development costs. The total project area will encompass residential, commercial, and community service components, along with the necessary physical infrastructure to ensure a safe, healthy, and sustainable living environment.

- **SDG's Alignment**

I. **GOAL 3 – Good Health and well-Being:** Improved living environments through access to clean water, sanitation, better housing, and reduced overcrowding will directly reduce the incidence of communicable diseases and improve public health. Healthier communities lead to increased productivity and reduced healthcare costs, contributing to overall societal well-being.

II. **GOAL 11 – Make cities and human settlements inclusive, safe, resilient and sustainable:** This initiative promotes inclusive urban development through the provision of affordable housing, improved public infrastructure, and equitable access to services. It supports the creation of safe, resilient, and sustainable communities, particularly benefiting low-income and vulnerable populations.

- **Implementing Authority:** Government of Sindh, Kotri Municipal Committee, etc.
- **Preliminary cost estimate:** Estimated Cost: 1300 million PKR Approx.

Table 5-3: Low-Income Housing Estimated Cost (Kotri City)

S. No.	Project Name	Estimated Cost In Millions	ADP	Non ADP	Status	
					Short Term	Long Term
	Housing					
# 1	Phase wise Land acquisition for low-income public housing project	500	**-**	Non ADP	**Short Term**	-
#2	Phase wise Master Planning & infrastructure Designing of low-income public housing project for additional population	800	-	Non ADP	-	**Long Term**

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5.8 Immediate Action Plan for Core Urban Area

- **Improvement of Housing in Core Urban Areas**

The core urban areas of Kotri MC, Bolhari MC and Jamshoro TC, particularly the older sections, are experiencing decay and face significant housing challenges. Revitalization of these neighborhoods is essential to improve residents' living conditions. From Social survey the Sami-Pacca housing, built primarily with (stone/bricks in mud mortar/thatched roof), makes up 8% of the housing stock according to the census 2023, yet sanitation remains a major concern. According to the social survey, nearly 68% of households rely on un-drained toilets requiring manual cleaning, underscoring the urgent need for improved sanitation infrastructure. Housing conditions are dilapidated, with unplanned street networks and wastewater flowing openly. This creates foul odors and poses serious health risks for residents.

Upgrading the core urban area is essential for restoring livability, improving public health, and enhancing the socio-economic environment. The Immediate Action Plan (IAP) proposes two tiers of interventions:
Tier 1: Quick-Win Improvements (Priority Streets – meters)

Targeted interventions along high-density, high-visibility corridors including pathan Colony, shirazi paro, Bhatti Para, Malik Town, Telegraph Colony, SikanderAbad, Gharibabad, Khanzada colony, Behar Colony and connector streets between Haji Ali Nawaz Chohan Road, Riswa Mori Road, and Kotri city high school Road.
Tier 2: Medium-Term Upgrading for Entire Core Residential Area (591 Acres)

Comprehensive rehabilitation of housing facades, pavements, footpaths, utilities, stormwater drainage, sanitation lines, streetlights, street furniture, green pockets, and garbage collection facilities across the entire core residential area.
These interventions support **SDG 11.1 (adequate housing), SDG 6.2 (safe sanitation), and SDG 7.2 (clean energy access)**.

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Unplanned Street network

Dilapidated houses

I. Scope

A. Tier 1 – Priority Streets (Quick-Win IAP)

These streets have been identified as **urgent action zones** due to high population density, heavy foot traffic, and severe deterioration.

a. Urban Face-Lifting Program

Street Name	Length (m)	Estimated Houses
Internal street of Shirazi Paro	300 m	36
Kotri City high School Road	400 m	48
Lohana Clinic And Maternity Home street	150 m	18
Cloth Market Road	100 m	12
Street parallel to CMO office	200 m	12
Street linking Juman shah Rd & Bareja Chowk Rd	400 m	12
Street linking Juman shah Rd & Malik Town Rd	250 m	42
Street linking Kotri Station Rd & N-5	200 m	24
Pathan Colony street leading towards N5	250 m	30
Street parallel to office of the Executive Engineer Building	250 m	30
Street parallel to office of the Executive Engineer Highways	200 m	24
Street parallel to Murad Shah Masjid Kotri	100 m	12
Internal street of Pathan Colony	100 m	12
Street parallel to Khanzada Ground	200 m	24
Street leading towards Telegraph colony Road	550 m	66
Street Leading towards Majeed Foundation School	200 m	24
Street starting from Mudassir Education Academy to Al Mehran Government Boys Primary School	850 m	102
Street beside Sindh Grammar School	350 m	42
Street starting from Govt Boys Lower Secondary School Sikanderabad	500 m	60
Street linking Bihar Colony road and Ali Nawaz Chohan Road	350 m	42
Street leading towards Govt Primary School Sikanderabad	300 m	36
Garho Ghot Ground	200 m	24

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Street Name	Length (m)	Estimated Houses
Street beside rahat nabi pso petrol pump	300 m	30
Street beside tahiri mart jamshoro	250 m	25
Street parallel to Faizan e Madina and Jamiat ul Madina Jamshoro phatak (Dawat e islami)	350 m	35
Street beside babri masjid	400 m	40
Street leading towards Disposal station	200 m	20
Street parallel to Dawat e Islami Jamshoro	100 m	10
Street Intersecting Faizan e Madina and Jamiat ul Madina Jamshoro phatak street	200 m	20
Street beside dubai shopping centre	250 m	25
Street beside masoodani filling station- total petrol	250 m	25
Total	8700 m	962

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Scope of Work

- Plastering, painting, and structural correction of front facades
- Alignment of uneven facades to improve visual appearance
- Minor structural reinforcement where necessary
- Government-funded façade interventions; internal improvements covered by homeowners

b. Street & Pavement Rehabilitation

- Use of **paver blocks**, CC flooring, or brick tiles.
- Sub-base re-grading and utilities corridor correction prior to paving.
- Improvement of pedestrian accessibility.

c. Solar Street Lighting

- Installation of **220 solar LED street lights** along the km priority network.
- Poles: 16–18 ft; 150–200W LED heads.

d. Greenery & Environmental Improvement

- Plantation of **native shade trees** along priority corridors.
- Creation of micro-green spaces and community pocket gardens.

- Designation of **micro garbage collection points** along priority streets
- Linkage with MC's and TC primary collection route

B. Tier 2 – Medium-Term Upgrading for Entire Residential Area (591 Acres)

This phase covers the wider core urban area and is intended for ADP-funded implementation.

Key Interventions:

- Upgradation of **internal streets (~75 km total)**.
- **Pavement rehabilitation** in all unpaved lanes.
- Installation of **solar lights**.
- **housing front facades** improved.
- Tree plantation of **native trees** across neighborhoods.
- Utility upgrades: minor drainage corrections, covered drains, sanitation improvements.

An immediate action plan is needed to enhance the housing situation in the core urban areas. Thus, slum and housing improvement programs/packages should be implemented in these areas, encompassing the following measures

II. Size:

The program will target approximately **591 acres** of residential land in the core urban area (71.62% of total 825 acres, as per Land Use Table 3.1), covering streets, utilities, and public spaces within residential clusters.

III. Preliminary cost estimate

The preliminary cost estimate will include itemized costs for each component:

Table 5-4: Preliminary cost estimate of Rehabilitation work

Rehabilitation work	Cost
Urban Face-Lifting Program	140
Street and Pavement Rehabilitation	200
Solar Street Lighting and Greenery	60
Total	400

Note:

The 400 million PKR estimate covers Tier 1 (Priority Streets) only.

Tier 2 will require detailed engineering designs and a separate PC-I, for ADP-funded projects.

Total Estimated Cost: 400 million approx.

IV. Implementation Framework

- **Funding:** Municipal budgets, provincial ADP allocations, PPPs, and external development partners (aligned with SDGs).
- **Execution:** Phased approach — short-term quick wins, medium-term infrastructure upgrades, long-term smart systems and redevelopment.

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- **Monitoring & Evaluation:** Sector-specific KPIs (e.g., % households with piped water, number of schools rehabilitated, km of roads upgraded, improved patient outcomes).
- **Sustainability:** Dedicated O&M budgets, community participation, and revenue generation (waste fees, parking, commercial activity).

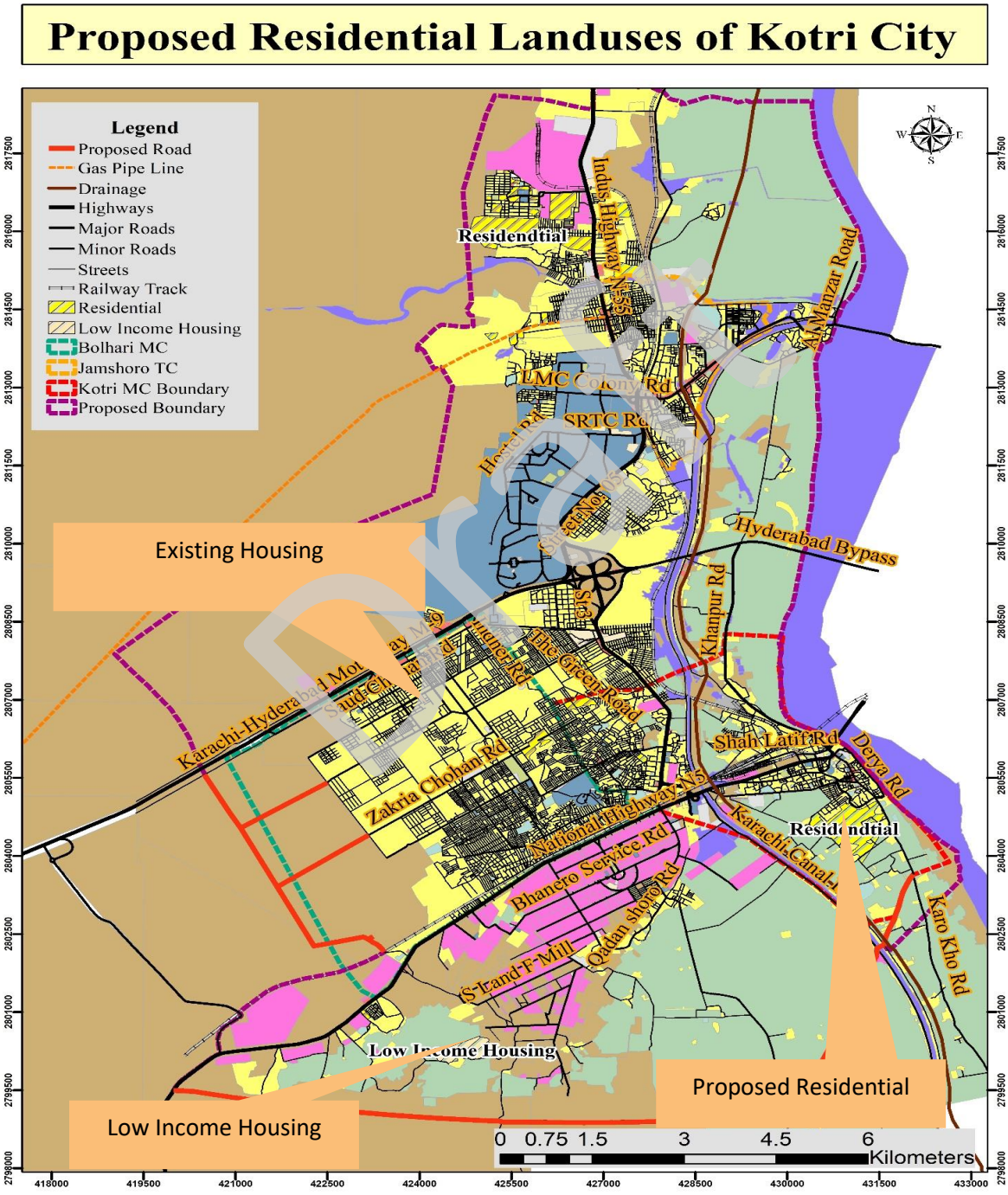
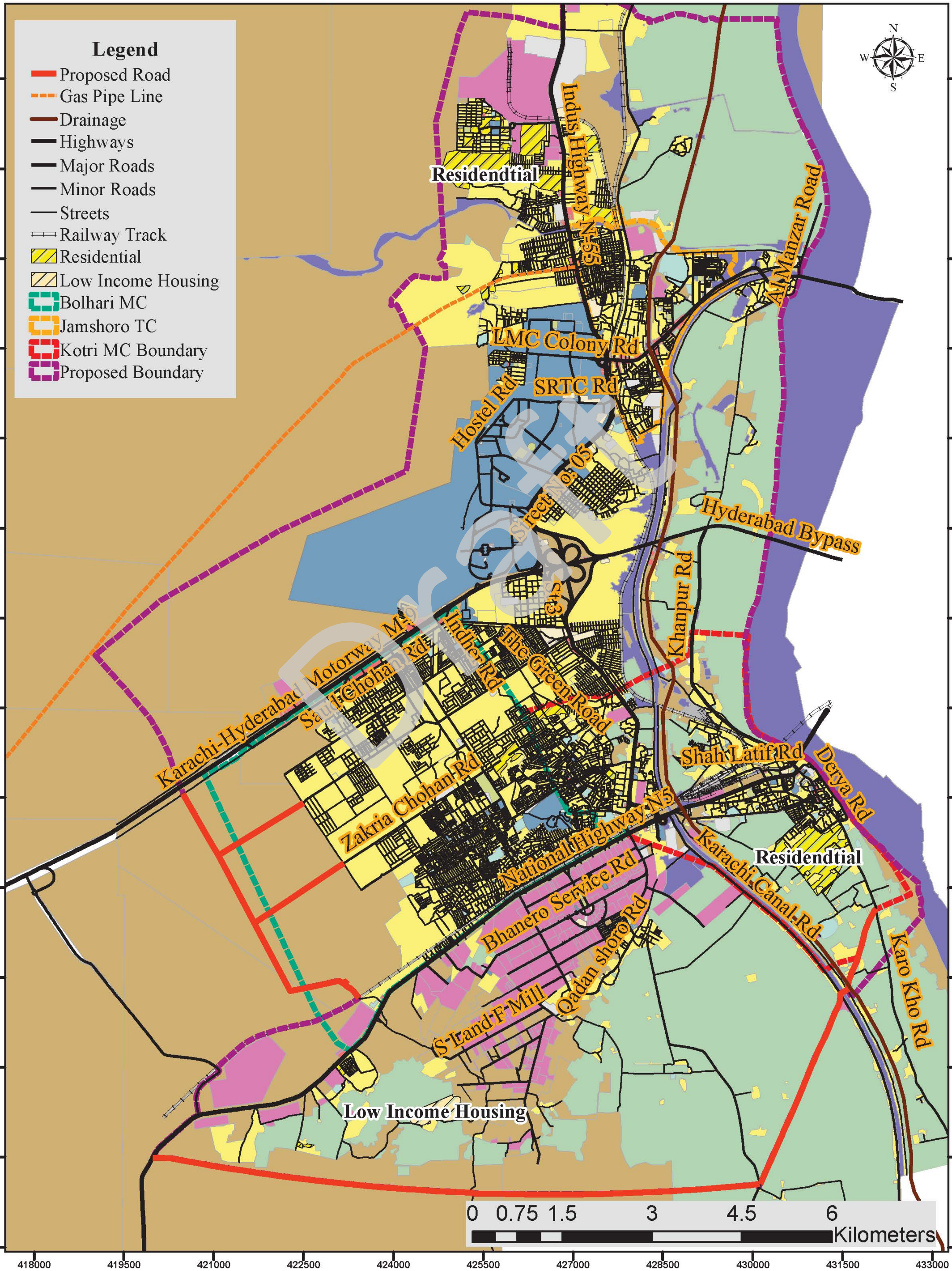


Figure 5-1 : Proposal for Residential Landuse for Kotri City

Proposed Residential Landuses of Kotri City



6. SOCIAL INFRASTRUCTURE

6.1 Education

6.1.1 Existing Situation

The education sector in Kotri reflects a diverse but uneven landscape, marked by acute infrastructural challenges, resource gaps, and gender disparities. While the city hosts a wide range of primary, secondary, and higher education institutions including major universities at Jamshoro the quality and accessibility of education are significantly shaped by overcrowding, underinvestment, and inconsistent provision of basic services.

Primary Schools

- **Boys' Primary Schools:**

  Kotri has 18 government boys' primary schools with a total enrollment of 4,590 students across 103 classrooms, supported by 123 teachers. On average, class sizes hold 45 students, though extremes exist—from as low as 15 at GBPS Bolhari Camp to as high as 94 at GBPS Miskeen Colony. Conditions of buildings vary from "good" to "danger," with several schools (e.g., GBPS Mehar Khan Machhi, Mill Area–I, and Manjhi Shudo) marked unsafe. Furniture shortages and breakages are widespread. Utilities such as water, sewerage, and electricity are inconsistently available, while none of the schools possess libraries or laboratories. Drop-out rates range widely, from 1% to 32%, underscoring serious inequities in educational continuity.

- **Girls' and Co-Educational Primary Schools:**

  Kotri also accommodates 34 government girls' and co-educational primary schools, serving 5,769 students in 130 classrooms, with 220 teachers. Average class sizes hover around 44 students, though several institutions face severe overcrowding—such as GGPS Ali Murad Shoro (90 students per room) and GGPS Sayedabad Jamshoro (130 students per room). While a handful of schools (e.g., GBPS Syed Abad, GBPS Subhanallah) are in "excellent" condition, many require urgent repairs, and some (GGPS Bolhari Camp, GGPS Amin Jut Mill) are labeled "dangerous." Furniture is often poor or repairable, and libraries and laboratories are absent. Utilities are inconsistently available, though toilets are present in most institutions. Drop-out ratios range from 0% to 20%, reflecting the uneven quality of schooling environments.

- **Middle, High, and Higher Secondary Schools**

  Kotri's 17 middle, high, and higher secondary schools (boys and girls combined) serve a total enrollment of 16,775 students across 199 classrooms, supported by 488 teachers. Average class sizes are large, with about 84 students per room, and in some cases exceed 100 (e.g., GBHS Khurshed Colony and GGHSS Jamshoro Colony). Building and furniture conditions are often poor, with a 50–60% shortfall reported in several schools. Utilities such as water and electricity are generally available, but sewerage and drainage systems are inadequate. Libraries are scarce, and

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laboratories are present in only a few institutions. Drop-out ratios vary from 30 to 40 per school, highlighting retention difficulties linked to overcrowding and weak infrastructure.

- **Colleges**

Kotri hosts three key colleges:

- **Ali Baba Govt. Boys Degree College** enrolls 2,553 students across 8 classrooms with 65 teachers. The building requires repairs, furniture is in bad condition, and no playground is available, though utilities, library, and laboratory facilities exist.
- **Govt. Girls Degree College Kotri** serves 2,006 students in 9 classrooms with 51 teachers. The building and furniture need repairs, but facilities include a playground, utilities, library, and laboratory.
- **Workers Intermediate College (Girls)** enrolls 328 students across 12 classrooms with 14 teachers. Conditions are average to good, and the college is adequately served by utilities, library, and laboratory facilities.
- **Vocational Education**

Vocational training opportunities are extremely limited. The Government Vocational School (GVS) Kotri, exclusively for girls, enrolls only 35 students in 4 classrooms but has no teaching staff currently in place. The building is in very poor condition, furniture is merely fair, and essential facilities such as playground, library, and laboratory are absent. A 20% drop-out rate underscores the urgent need for institutional strengthening and staff recruitment.

- **Higher Education**

Kotri, through Jamshoro, serves as a major regional hub for higher education:

- **Mehran University of Engineering & Technology** enrolls 9,177 students (7,380 male, 1,797 female).
- **Liaquat University of Medical & Health Sciences** enrolls 3,912 students (1,551 male, 2,361 female), showing female majority in health sciences.
- **University of Sindh** is the largest institution, with 37,189 students (27,043 male, 10,146 female).

Together, these universities enroll 50,278 students, though gender disparities persist, with male students forming the majority in engineering and general programs, while women are more represented in health sciences.

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- **Institutional Conditions and Vulnerabilities**

Educational institutions in Kotri are marked by overcrowding, unsafe or deteriorating buildings, inadequate furniture, and a lack of libraries and laboratories across most levels. Utilities water, sewerage, and electricity are inconsistently available, with stormwater drainage and sanitation presenting recurrent challenges. The 2022 floods exposed the fragility of school infrastructure, particularly in low-lying areas, where damage and inaccessibility disrupted learning for weeks.

Despite hosting some of Sindh's leading universities, Kotri's education system faces systemic constraints at the school level. Addressing overcrowding, upgrading infrastructure, expanding vocational training, and promoting gender equity in higher education are essential priorities for a sustainable educational future.

The education sector in Sindh faces challenges stemming from a lack of organization and planning. Despite the presence of various public sector facilities, including technical and vocational centers, primary/secondary school buildings, and teacher-training centers, these resources are not fully utilized and suffer from inadequate funding. Consequently, a parallel education system, fueled by the private sector and donor-led projects, has emerged, contributing to income disparities and variations in educational quality. Much of the available data from government sources is at the district level.

The imperative for consolidation arises from the historical proliferation and unchecked growth of schools, coupled with insufficient planning and arbitrary practices. One-room or two-room schools with a single teacher fail to provide equitable educational opportunities and result in subpar service delivery. The establishment of Campus Schools is envisioned to significantly support the Department of Education in delivering quality education and enhancing effective management.

Given the documented classroom pressures, uneven infrastructure quality, flood related vulnerabilities, and limited post school skill development options, the education strategy for Kotri must prioritize: I. systematic rehabilitation and safety retrofitting of existing institutions, particularly in flood prone and low-lying areas; II. targeted classroom expansion and rationalization to address overcrowding and align provision with NRM standards;III. phased provision and upgrading of allied facilities including WASH services, reliable electricity, boundary walls, libraries, laboratories, and safe play spaces with gender sensitive and inclusive design; and IV. strengthening and diversification of technical and vocational education to align with local labor markets, reduce early dropouts, and support youth employability and economic resilience.

*6.1.2 **Issues:***

Identification of major issues of education sector in Kotri city are as follows:

- Shortage of class rooms as per current enrolment
- Low enrolment level with gender disparity
- Shortage of teachers causing low quality of education
- Lack of provision of basic facilities i.e. washrooms, electricity, drinking water etc.
- Poor condition of schools and colleges due to lack of repair and maintenance of buildings

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- In addition to classrooms, the rehabilitation of existing educational buildings with all basic and allied facilities are also required. Lack of allied facilities includes furniture, playground, laboratories, libraries etc.

*6.1.3 **SWOT Analysis:***

Strength	Weaknesses	Opportunity	Threats
Education & Literacy			
1. Availability of high standards education institution. 2. Urban literacy rate is higher than rural. 3. High demand rate for private schooling educational system. 4. The urban educational system shows commendable gender balance in both student enrolment and teaching staff, indicating a positive trend towards gender parity in urban areas. 5. 42% of the population has access to education.	1. Literacy rate in rural areas is low as compare to urban. 2. Un-availability of play grounds libraries, and laboratories, which are crucial for the all-round development of students. 3. Gender inequality in rural areas. 4. primary schools for boys is characterized by pressing infrastructural needs 5. Absence of recreational and learning facilities is a significant gap	1. A growing number of individuals will relocate to urban areas in pursuit of education. 2. The urbanization process will witness consistent growth in the demand for education services. 3. Highly qualified professionals are intellectual assets. 4. Targeted initiatives can be implemented to promote gender equality in education, especially in rural areas where there is a noticeable gender disparity in student enrolment and teaching staff.	1. Illiteracy, dropouts. 2. Overcrowding of students in classrooms. 3. Affordability challenges. 4. Inadequate funding. 5. Infrastructural deficiencies.

*6.1.4 **Need Assessment***

Present Education Need Assessment of Kotri City

In conducting the Education Need Assessment of Kotri City, an evaluation was carried out based on the National Reference Manual (NRM) standards, which recommend a student capacity of 30 students per classroom. The analysis uncovered notable discrepancies between the existing student capacity per room and the prescribed standard across different education levels. Specifically, the Primary School, Elementary School, High School, and College levels demonstrated variations in student-teacher ratios. To further gauge the adequacy of infrastructure, the actual room required was calculated following the NRM standards. The findings highlight potential needs for infrastructure development and optimization, particularly in the High

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School and College levels, to ensure alignment with national educational standards and facilitate an optimal learning environment for students in Kotri City.

I. Current Scenario (2025)

The Education Need Assessment for Kotri City in 2025, aligned with the National Reference Manual (NRM) standards, reveals significant infrastructural challenges in the educational sector, particularly at the primary and high school levels. According to the NRM, an optimal classroom should accommodate 30 students for effective learning. However, the current scenario in Kotri City deviates markedly from this standard. At the primary school level, with an enrollment of 10,359 students and 233 classrooms, the average student capacity per room is approximately 44, significantly above the NRM recommendation. This situation necessitates 1847 classrooms to meet the standards, leaving the city short of 1,569 classrooms. For Middle and high schools, the enrollment stands at 16,775 students with 199 classrooms, resulting in an even higher average of 84 students per classroom. The required number of classrooms, as per NRM standards, is 2,798, indicating a shortfall of 2,599 additional classrooms needed. For College, the enrollment stands at 4,887 students with 29 classrooms, resulting in an even higher average of 169 students per classroom. The required number of classrooms, as per NRM standards, is 895, indicating a shortfall of 866 additional classrooms needed.

These figures underscore a substantial infrastructure deficit in Kotri City's educational system. The primary and high school levels, in particular, face a critical shortage of classroom space. Moreover, the student-teacher ratios at these levels highlight the need for not only more classrooms but also an increase in teaching staff to maintain effective educational delivery. Addressing these gaps is crucial for aligning Kotri City's educational infrastructure with national standards, thereby ensuring an optimal learning environment that can adequately support the city's student population. This calls for strategic investments in the construction of new classrooms, hiring of additional teachers, and overall enhancement of educational facilities to meet the growing and diverse needs of students in Kotri City.

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Table 6-1. Need Assessment Class Room of Kotri City 2025

Need Assessment Class Room of Kotri City 2025									
Education Level	**Enrollment**	**Classrooms**	**Student Capacity**	**Number of Teachers**	**Teacher-**	**Actual Room required**	**attainment**	**Current 2025 required class room**	**Additional required classroom**
Primary School	10,359	233	44	343	30	345.30	5,412	1,847	1,614
Middle &High School	16,775	199	84	488	34	559	83,948	2,798	2,599
College	4,887	29	169	130	38	163	35,811	895	866
As per NRM (National Reference Manual) recommended students per class room occupancy is 30 students per class room									

II. Future Need Assessment (2045)

The future need assessment for Kotri City, projecting towards 2045, underscores a significant infrastructural challenge in the education sector, particularly in accommodating the expected surge in student population at both primary and high school levels. According to the assessment, which aligns with the National Reference Manual (NRM) standards recommending a classroom occupancy of 30 students, Kotri City faces a substantial increase in educational infrastructure requirements.

For the primary school level, with a current enrollment of 10,359 students and 233 classrooms accommodating an average of 44 students each, the city is already stretching its capacity. Looking ahead to 2045, the projected enrollment is expected to leap to 100,249 students. To meet this demand, Kotri City will require 3,475 classrooms, an increase of 3,242 from the current number. This dramatic rise in the need for additional classrooms reflects the burgeoning educational needs of a rapidly growing young population. Similarly, at the middle and high school level, the current setup with 199 classrooms and an average capacity of 84 students per room is poised for a significant expansion. The projected high school enrollment by 2045 stands at 157,937 students. To accommodate these students while adhering to the NRM standards, the city will need 1,684 classrooms, necessitating an additional 5,066 classrooms beyond the existing infrastructure.

Likewise, at the college level, the current setup with 29 classrooms and an average capacity of 169 students per room is poised for a significant expansion. The projected high school enrollment by 2045 stands at 67,374 students. To accommodate these students while adhering to the NRM standards, the city will need 1,684 classrooms, necessitating an additional 1,655 classrooms beyond the existing infrastructure.

This future scenario for 2045 highlights the pressing need for comprehensive planning and robust investment in educational infrastructure in Kotri City. The focus must be on building new classrooms, enhancing existing facilities, and ensuring adequate staffing to keep pace with the growing educational demands. This proactive approach is vital for Kotri City to provide quality education and cater to the needs of its expanding student population, thereby nurturing the intellectual and professional growth of its future generations.

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Table 6-2: Need Assessment Class Room of Kotri City 2045

Education Level	Enrollment	Classrooms	Student Capacity per Room	Number of teachers	Teacher-Student Ratio	Actual Room required	attainment	Current 2045 Required class room	Additional required classroom
Primary School	10,359	233	44	343	30	345	100,249	3,346	3,242
Middle & High School	16,775	199	84	488	34	559	157,937	5,265	50,66
College	4,887	29	169	130	38	163	67,374	1,684	1,655
As per NRM (National Reference Manual) recommended students per class room occupancy is 30 students per class room									

The need assessment for Kotri City confirms that the education response cannot rely on new construction alone; it must be delivered through a dual approach: (i) rehabilitation and functional upgrading of existing institutions to address deteriorated school and college buildings, shortages of furniture, lack of WASH facilities, unreliable electricity supply, absence of playgrounds, laboratories, libraries, and boundary security; and (ii) targeted classroom additions to reduce severe overcrowding across priority education levels. Under the current scenario (2025), Kotri City faces a quantified shortage of 1,614 classrooms at the primary level, 2,599 classrooms at the middle and high school level, and 866 classrooms at the college level against NRM standards of 30 students per classroom, with average class sizes ranging from 44 students in primary schools to as high as 169 students in colleges. The challenge is expected to intensify by 2045, with projected additional requirements of 3,242 primary classrooms, 5,066 middle and high school classrooms, and 1,655 college classrooms due to rapid population growth and rising enrolment demand. This phased and integrated approach is essential to ensure immediate service continuity, address quality gaps linked to low enrolment, teacher shortages, and inadequate facilities, and achieve long-term attainment targets aligned with national standards and Kotri City's urban growth trajectory.

*6.1.5 **Policy Guidelines**[38]*

- Development of Teachers and professional substitutes.
- Introduce farmer field trainings in rural schools to ensure that the next generation of farmers is already tuned to market intelligence and opportunities. Introduce wider farm mechanization.
- Construct required schools and higher education institutions in all districts. Take stock of operational and staffed schools and eliminate ghost schools.
- Ghost Schools and absentee teacher should be identified and removed.
- Maintenance of existing dilapidated schools and buildings should be given top priority.

*6.1.6 **Strategic Development Plan***

This Strategic Development Plan aims to strengthen existing schools system to bring socio-economic and sustainable development in the region. The focus of this plan is centered chiefly on improving education standard at primary and secondary levels and providing extra curriculum opportunities to address the needs of youth in rural and remote areas. This will increase the literacy ratio, living standard, employment opportunities of the future population.

I. Long Term Plan

- Increasing equitable access to quality ECE, primary and secondary education
- Improving the quality of learning outcomes through strengthening the teaching/learning process, improving the quality of teachers through merit-based selection and recruitment; improved accountability, and establishing a competency-based constructivist system of educational professional development.

[38] Sindh Vision 2030

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- Enhancing the equity of resource allocation and improving the fiscal sustainability and effectiveness of educational expenditure, thereby fostering transparency and accountability in the use of public resources.
- Sindh Technical and Vocational Training authority (STEVTA) is providing the technical education to the people of Sindh for increasing their technical Skills. In Jamshoro District, the peoples are significantly deficit in technical skills. By implementation of this project, people will enhance their technical skills and it also increase the employment status of the district.
- Up gradation of existing universities.

II. Short Term Plan

- Rehabilitations of Schools and Colleges with allied infrastructure
- MC to take over all site provided for schools in the new housing schemes to eliminate the chances of misuse and encroachment.
- Training programme for teachers to increase capacity building
- Vocational and skill training centers in alliance with contemporary demand
- Rehabilitation/Construction of Women Hostels for Teaching Staff and Working Women in Jamshoro

Education interventions will be guided by policy driven and phased implementation that prioritizes strengthening the existing school system through teacher development, elimination of ghost schools, rehabilitation of dilapidated buildings, and targeted expansion of classrooms and allied facilities, while progressively introducing vocational, technical, and skill-based learning aligned with market demand and local livelihoods. The strategic focus will remain on improving learning outcomes at primary and secondary levels, enhancing teacher quality through continuous professional development, and expanding access to vocational and technical training in coordination with relevant authorities, alongside the upgradation of higher education institutions. In the short term, emphasis will be placed on rehabilitating schools and colleges, upgrading utilities and learning environments, deploying modern educational technology, and engaging communities and local stakeholders to ensure ownership and sustainability. These interventions will be integrated with municipal infrastructure planning, particularly drainage access, road connectivity, WASH services, solid waste management, energy reliability, and public safety around schools, to minimize service disruption during extreme weather events and ensure long term continuity, resilience, and socio-economic uplift.

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6.1.7 Priority Projects

i. Extension and Rehabilitation of Schools and Allied Infrastructure (Excluding IAP Schools)

The education sector in Kotri faces severe infrastructure and capacity challenges. Many schools operate in unsafe or deteriorated buildings, lack essential facilities, or are overcrowded. According to the secondary data and need assessment, urgent rehabilitation and additional classrooms are required, particularly in high schools and selected primary schools. Without timely intervention, student–classroom ratios will remain above the **NRM standard of 30:1**, further undermining learning outcomes.

➢ **Scope**

- Rehabilitation of Existing Infrastructure: Structural repairs of classrooms, roofs, toilets, boundary walls, electrical and water supply systems.
- Classroom Expansion: Construction of additional classrooms to meet NRM-recommended student–classroom ratio of 30:1.
- Access to Essential Educational Facilities: Development of science labs, libraries, and IT learning spaces in targeted high schools.
- Inclusive Learning Features: Installation of ramps, accessible toilets, and safety enhancements for all learners including children with disabilities.
- Service Upgradation: Provision of clean drinking water, sanitation systems, playgrounds, and improved access roads where necessary.
- Construction of approximately 52 new classrooms to reduce overcrowding and improve student–classroom ratios.
- Engagement across multiple locations including schools in Kotri, Bolhari, and Jamshoro jurisdictions.

GGELS Campus School

Govt Boys High School

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GBPS-Campus Ghousia Colony

GGPS Nago Line 1st – kotri

- **Size**

- The project will directly benefit over 27,134 students, teachers, and families in Kotri city.
- Target schools include:
    - Primary Boys Schools: GBPS Campus Ghousia Colony, GBPS Muslim Town.
    - Primary Girls Schools: GGPS Shah Latif, GGPS Bolhari Camp, GGPS Sayedabad, GGPS Nago Line 1st, GGPS Amin Jut Mill.
    - High Schools (Boys): GBHS Jamshoro Colony, GBLSS Behar Colony.
    - Facility upgrades in GGHS Labour Square, GGLSS A.D Baloch, GBLSS Khuda Ji Basti, and GBLSS Miskeen Colony.

- **SDGs Alignment**

I. **Goal 4 – Quality Education (4.1, 4.a):** Ensure inclusive and equitable quality education and safe, effective learning environments.

II. **Goal 6 – Clean Water and Sanitation (6.1, 6.2):** Provide access to clean water and functional sanitation in schools.

III. **Goal 11 – Sustainable Cities and Communities (11.7):** Promote inclusive, safe, and accessible public infrastructure.

- **Project List and Locations**

I. Primary Schools (Boys):

1. GBPS-Campus Ghousia Colony – Kotri (building/furniture need repair+7 classrooms).
2. GBPS Muslim Town – kotri (building/furniture need repair +5 classrooms).

II. Primary Schools (Girls):

3. GGPS Shah Latif – Kotri (building/furniture need repair+ 7 classrooms needed).
4. GGPS Bolhari Camp – Bolhari (7 classrooms needed).
5. GGPS Sayedabad – Jamshoro (building/furniture need repair+ 6 classrooms).

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6. GGPS Nago Line 1st – kotri (5 classrooms needed/ building/furniture need repair).
7. GGPS Amin Jut Mill– Kotri (4 classrooms needed/ building/furniture need repair).

III. High School (Boys):

1. GBHS Jamshoro colony – Jamshoro(rehabilitation).
2. GBLSS Behar Colony- Bolhari (11 classrooms + rehabilitation).

IV. Schools (facility upgrades only):

1. GGHS Labour Square – Kotri (furniture).
2. GGLSS A.D Baloch- Kotri (Furniture).
3. GBLSS Khuda ji Basti- Bolhari (furniture, facility improvements).
4. GBLSS Miskeen Colony (furniture, facility improvements).

- **Implementing Authority:** Department of Education, Government of Sindh; District Government Jamshoro; Kotri Municipal Committee, Bolhari Municipal Committee, Jamshoro Town Committee.
- **Preliminary cost estimate:** Estimated Cost: 2400 million PKR Approx.

Table 6-3: Education Sector Estimated Cost (Kotri City)

Component	Units	Cost (PKR Million)
Structural rehabilitation (9 schools)	Lump sum	500
Classroom construction (~52 rooms total)	52	600
WASH & electricity upgrades	15 schools	400
Libraries & labs (6 HS)	6	400
Furniture replacement & Inclusive education facilities	Lump sum	500
Total Estimate	2400	

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ii. Construction of vocational training centers for males and females at kotri city

Kotri city, despite being a major industrial and commercial hub, lacks adequate vocational training facilities for both males and females. The absence of modern training centers equipped with workshops, laboratories, and up-to-date machinery has created a significant gap in skill development opportunities for the local youth. Existing institutions in nearby areas are either overcrowded or limited in scope, failing to address the diverse needs of emerging industries. With a rapidly growing population and increasing demand for skilled labor in sectors such as textiles, construction, information technology, and services, the establishment of dedicated vocational training centers in Kotri is essential. These centers will not only provide equitable access to education and training for both genders but also contribute to reducing unemployment, fostering entrepreneurship, and meeting the evolving requirements of the regional job market.

- **Scope**

  - Establishment of separate vocational training centers for males and females to ensure inclusive and equitable access.
  - Development of modern classrooms, ICT labs, and specialized workshops equipped with updated training machinery and tools.
  - Curriculum design aligned with market demand in sectors including ICT, construction, textiles, and services.
  - Implementation of gender-sensitive training programs to promote women's workforce participation.
  - Integration of practical, hands-on training modules to enhance employability and entrepreneurship skills.
  - Collaboration with local industries to ensure relevance of skills and potential job placements.
  - Deployment across Kotri MC, Bolhari MC, and Jamshoro MC to serve the broader regional youth population.
  - Industry-Relevant Training: Introduction of practical courses driven by market requirements to improve employment outcomes.

- **Size**

  - The centers will annually train and skill-develop 600+ youth from Kotri and neighboring municipalities.
  - Infrastructure will include multiple classrooms, ICT laboratories, and specialized workshops per center.
  - The project covers at least two separate facilities (male and female centers) serving a combined population across the three municipalities.
  - Targeted at addressing the skill gap for a growing population involved in textiles, construction, IT, and services sectors.

- **SDGs Alignment**

I. **Goal 4.3, 4.4 – Quality Education:** Expand access to technical and vocational education, improve employability skills.

II. **Goal 8.3, 8.6 – Decent Work and Economic Growth:** Promote productive employment, reduce youth unemployment, and support skills development for local industries.

- **Project Location**

- **Kotri MC, Bolhari MC and Jamshoro MC.**

- **Implementing Authority:** Department of Education (Technical), Government of Sindh; District Government Jamshoro.
- **Preliminary cost estimate:** Estimated Cost: 300 million PKR Approx.

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Table 6-4: Vocational Training Centers Estimated Cost (Kotri City)

Component	Units	(PKR Million)
Construction of classrooms (10 CRs)	8	300
ICT computer lab with internet	1	
Technical workshops (mech/electrical)	2	
Resource library & study hall	1	
Furniture & modern equipment	Lump sum	
Facility upgrades (sanitation, cafeteria, boundary, accessibility)	Lump sum	
Total Estimate		

6.1.8 Immediate Action Plan for Core Urban Area

- **Improvement of Education in Core Urban Areas**

Core urban schools in Kotri, Bolhari and Jamshoro, including Govt Vocational Center, Govt Boys Lower Secondary School Sikanderabad, GGHS Kotri, Government Girls Primary School Telegraph Colony, Govt Boys High School require urgent rehabilitation as deteriorating facilities pose risks to student safety and hinder effective learning.

To improve educational outcomes, a comprehensive and targeted approach is needed one that invests in infrastructure and technology, while also addressing challenges such as overcrowded classrooms and limited funding. Expanding access to support services, and engaging local stakeholders will help ensure solutions are tailored to community needs. The proposed project seeks to rehabilitate key institutions and introduce systemic improvements, creating a safe, inclusive, and effective learning environment. This approach is aligned with Sustainable Development Goal 4 (SDG 4), which aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Govt Boys Primary School Kotri

Govt. Vocational School Kotri

I. Scope

The scope of the immediate action plan for educational improvement includes the following initiatives, specifically targeting key educational institutions in the core urban area:

- **Infrastructure Upgradation**: Expansion of existing schools by adding new buildings within the same compound or constructing additional floors to accommodate new classrooms and facilities. This will reduce overcrowding and improve access to education for the existing population. The schools included in this upgradation plan are:
- **Rehabilitation of Existing Facilities**: Repair of classrooms, roofs, sanitation, and utility systems main gate and boundary wall in priority schools like GGPS Telegraph Kotri, GBHS Sikandarabad, GGHS Kotri, GBHS Kotri and GVS Kotri.
- **Technology Integration**: **Technology Integration:** Establishment of library at GGPS Telegraph Kotri, GBHS Sikandarabad, GGHS Kotri, GBHS Kotri and GVS Kotri. Government Shah Abdul Latif High School, smart classrooms, and digital learning tools. This aligns with **SDG 4.4**, which focuses on increasing the number of youth and adults with relevant skills for employment and entrepreneurship.
- **Community and Stakeholder Engagement**: Engaging local stakeholders, including parents, community leaders, and NGOs, to support educational initiatives and ensure they address the community's specific needs. This engagement is vital for the long-term success and sustainability of the educational improvements.

II. Size:

The rehabilitation and upgradation of buildings and furniture will focus on three priority educational institutions located within the core urban areas of the Kotri Municipal Committee, Bolhari Municipal Committee. Collectively, these schools occupy an area of approximately 6.47 acres.

A **condition assessment** was conducted to identify infrastructure gaps and prioritize investment needs. The assessment provides a concise overview of enrollment pressures, classroom conditions, building deterioration, sanitation issues, furniture needs, and availability of essential services.

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Sr. No.	Name of School	Enrolment	Class Room	Student Capacity Per Room	No of Teachers	condition of Building	Condition of Furniture	Play Ground Available	Toilets	Water/Sewerage Available	Electricity /Power Available	Library	Laboratory	Student Drop Out Ratio
1	GGPS Telegraph Kotri	157	5	31	5	Dangers	damage	Available	Available	Available	Available	N.A	N.A	Nil
2	**GBHS Sikandarabad**	1260	11	115	16	GBPS campus primary need Rehabilitation scheme	50% shortfall	Yes	yes, but primary section needs repair	need repair	No	No	No	30
3	**GGHS Kotri**	1925	23	84	67	Good	Need	Yes	Available	Available	Yes	No	Yes	No
4	**GBHS Kotri**	1400	15	93	52	Need Add: class rooms & Repair	60% shortfall	Yes	Yes but no drainage	water available · but no serve	Yes	No	Yes	40
5	**GVS Kotri**	35	4	9	Vacant 4 None	Very Poor	Fair	No	4 Yes	Yes	Yes	No	No	20%
	Total	**4777**	**58**	**332**	**140**									

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Target Institutions:

- GGPS Telegraph Kotri - 0.15 acres
- GBHS Sikandarabad -0.15 acres
- GGHS Kotri – 3.09 acres
- GBHS Kotri – 3 acres
- GVS Kotri – 0.08 acres

Table 6-5: Repair & Rehabilitation of Educational Facilities– Activity Wise Cost in Millions

S.No	Education Facility Name	Area (acre)	Repair & Rehabilitation – Activity Wise Cost in Millions
1	**GVS Kotri**	0.08	20
2	**GBHS Sikandarabad**	0.15	50
3	**GGHS Kotri**	3.09	280
4	**GGPS Telegraph Kotri**	0.15	50
5	**GBHS Kotri**	3	200
Total		6.47	600
		Total PKR Rs. Million	**600**

III. Preliminary cost estimate

Total Estimated Cost: 600 million approx.

IV. Implementation Framework

- **Funding:** To be mobilized through municipal allocations, provincial ADP funds, and external development support.
- **Execution:** Works will be phased, starting with the schools in most urgent need.
- **Monitoring & Evaluation:** KPIs will include number of classrooms rehabilitated, student–teacher ratios improved, and successful technology integration.

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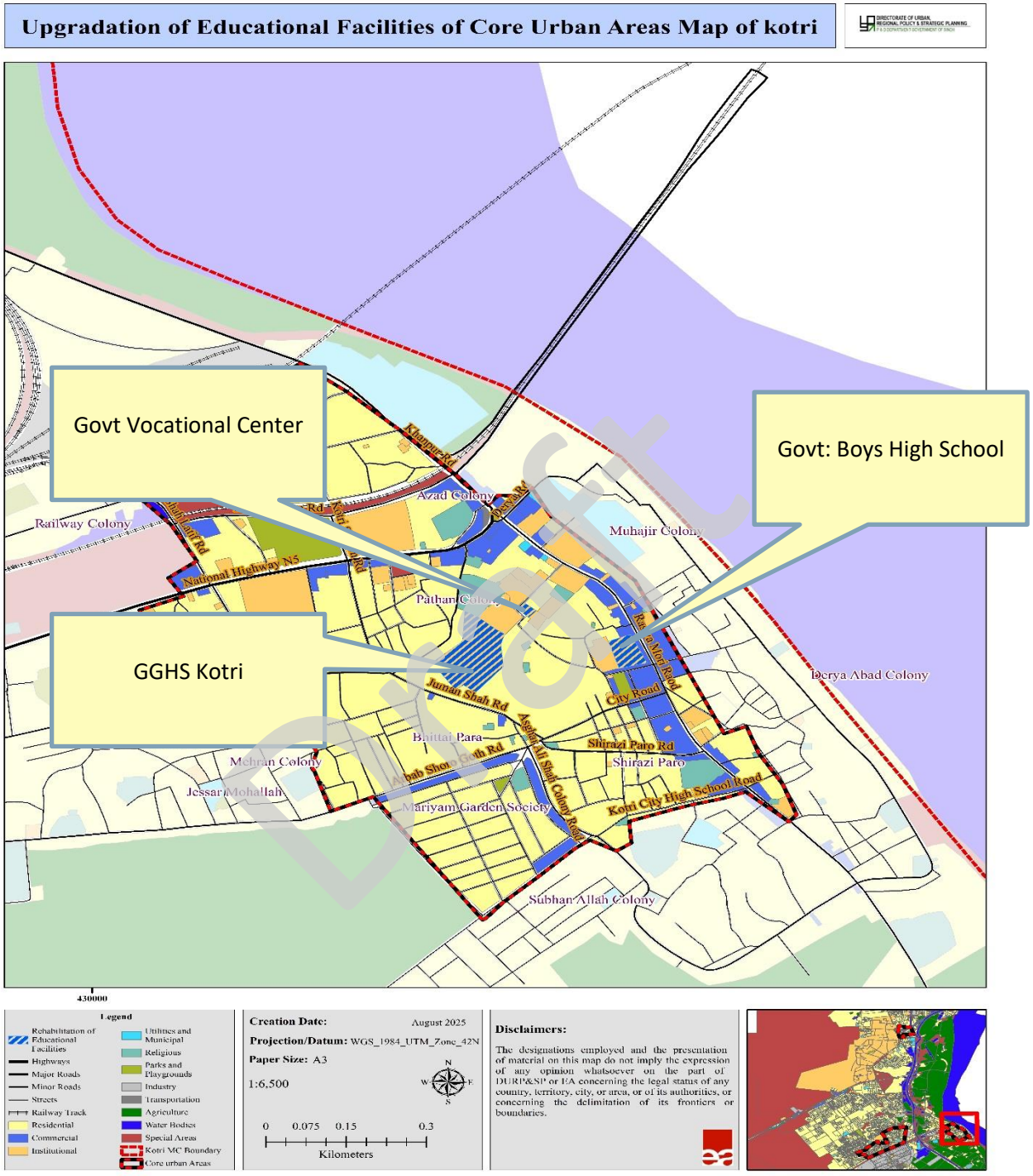
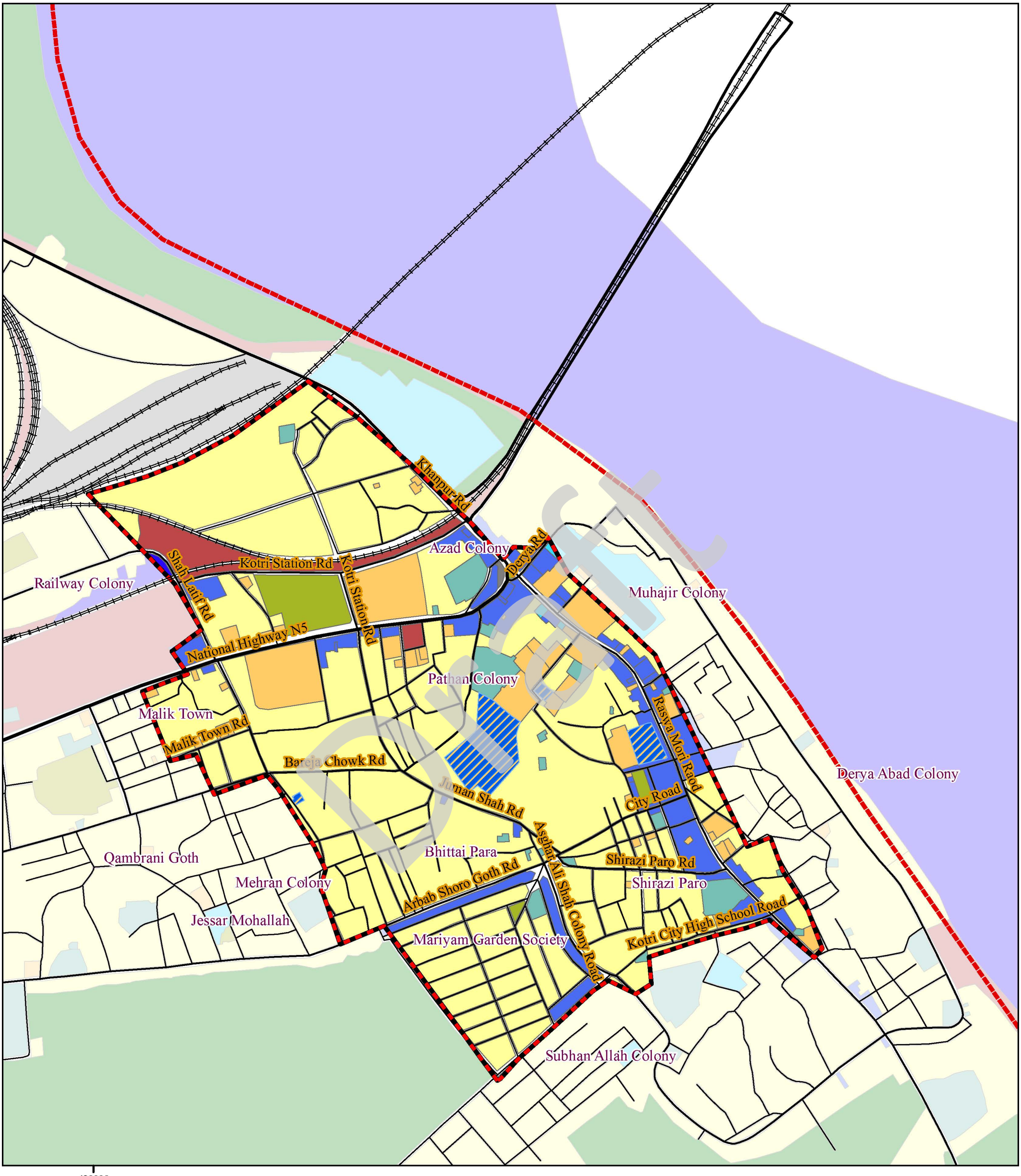


Figure 6-1: Upgradation of Educational facilities of Core Urban Areas Map of Kotri

Upgradation of Educational Facilities of Core Urban Areas Map of kotri

DIRECTORATE OF URBAN, REGIONAL POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Rehabilitation of Educational Facilities
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Kotri MC Boundary
- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:6,500

N W E S

0 0.075 0.15 0.3

Kilometers

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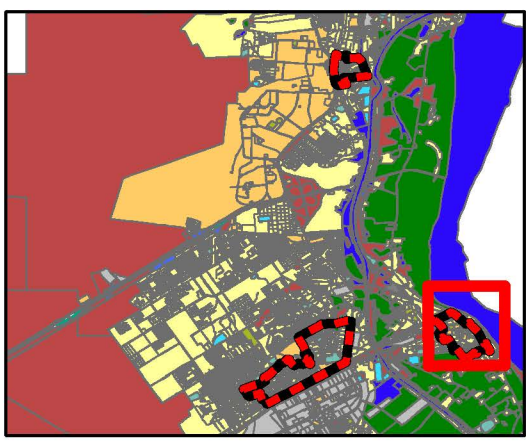

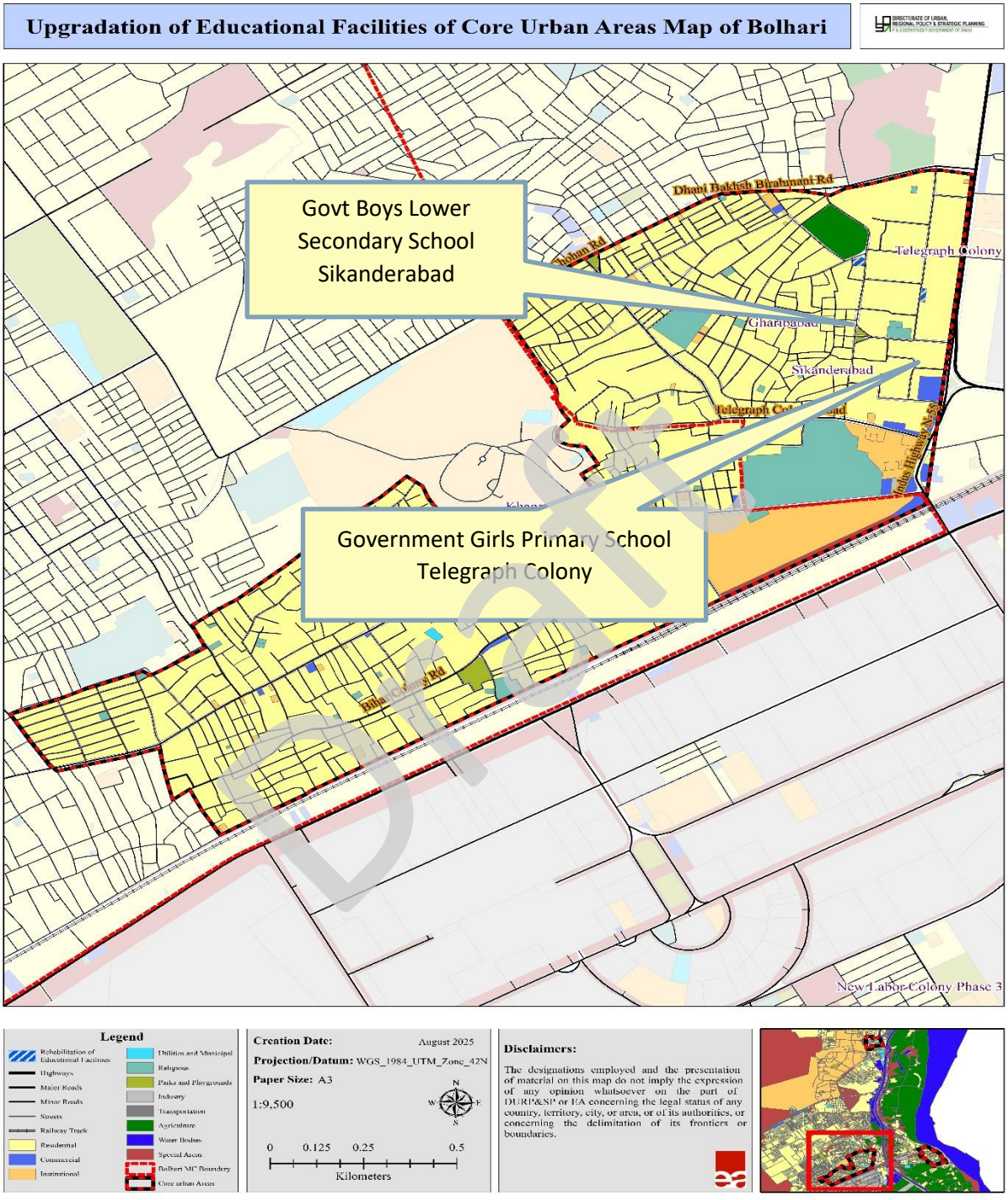

Figure 6-2: Upgradation of Educational facilities of Core Urban Areas Map of Bolhari

Upgradation of Educational Facilities of Core Urban Areas Map of Bolhari

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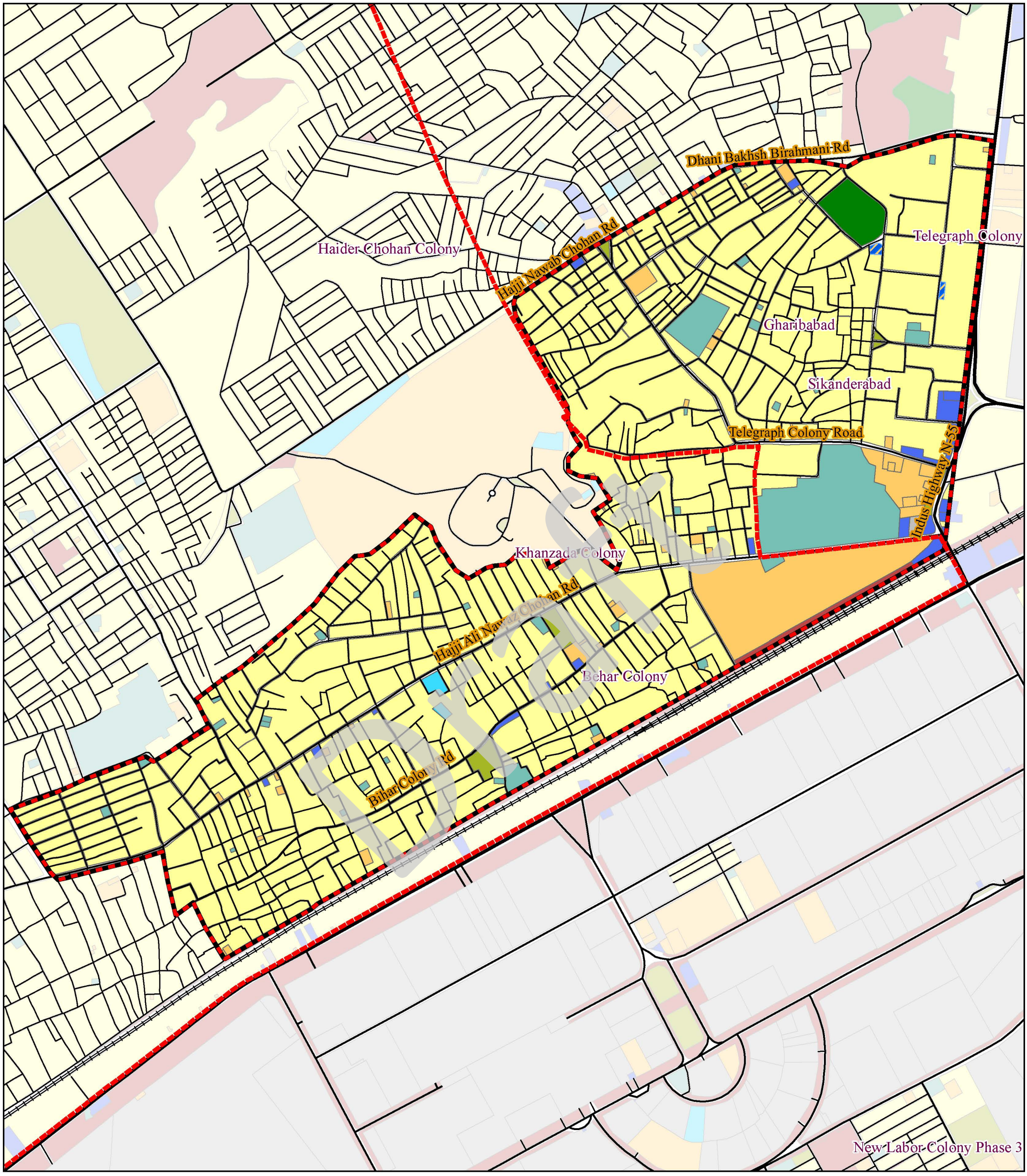
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Rehabilitation of Educational Facilities
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
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- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

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N W E S

0 0.125 0.25 0.5

Kilometers

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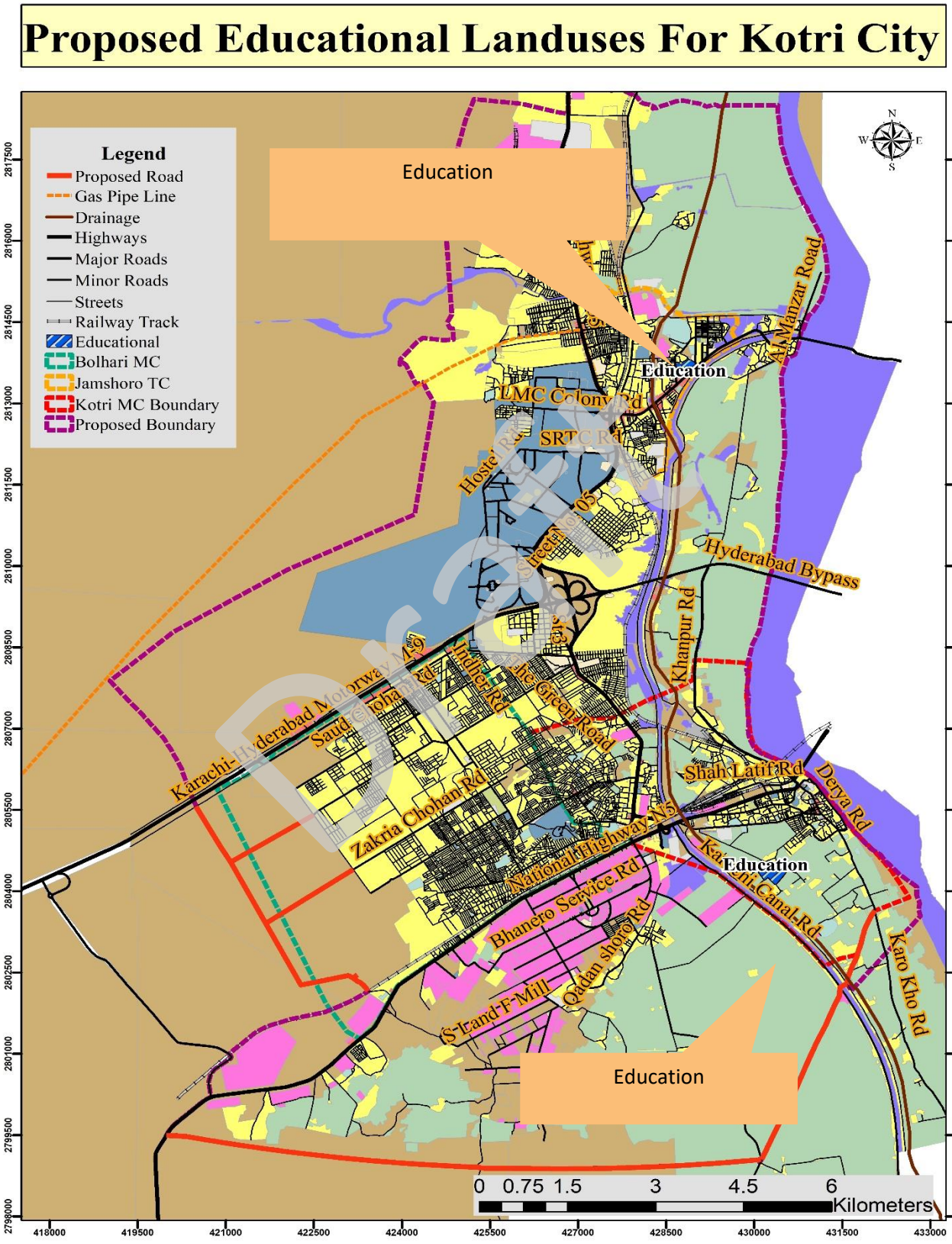
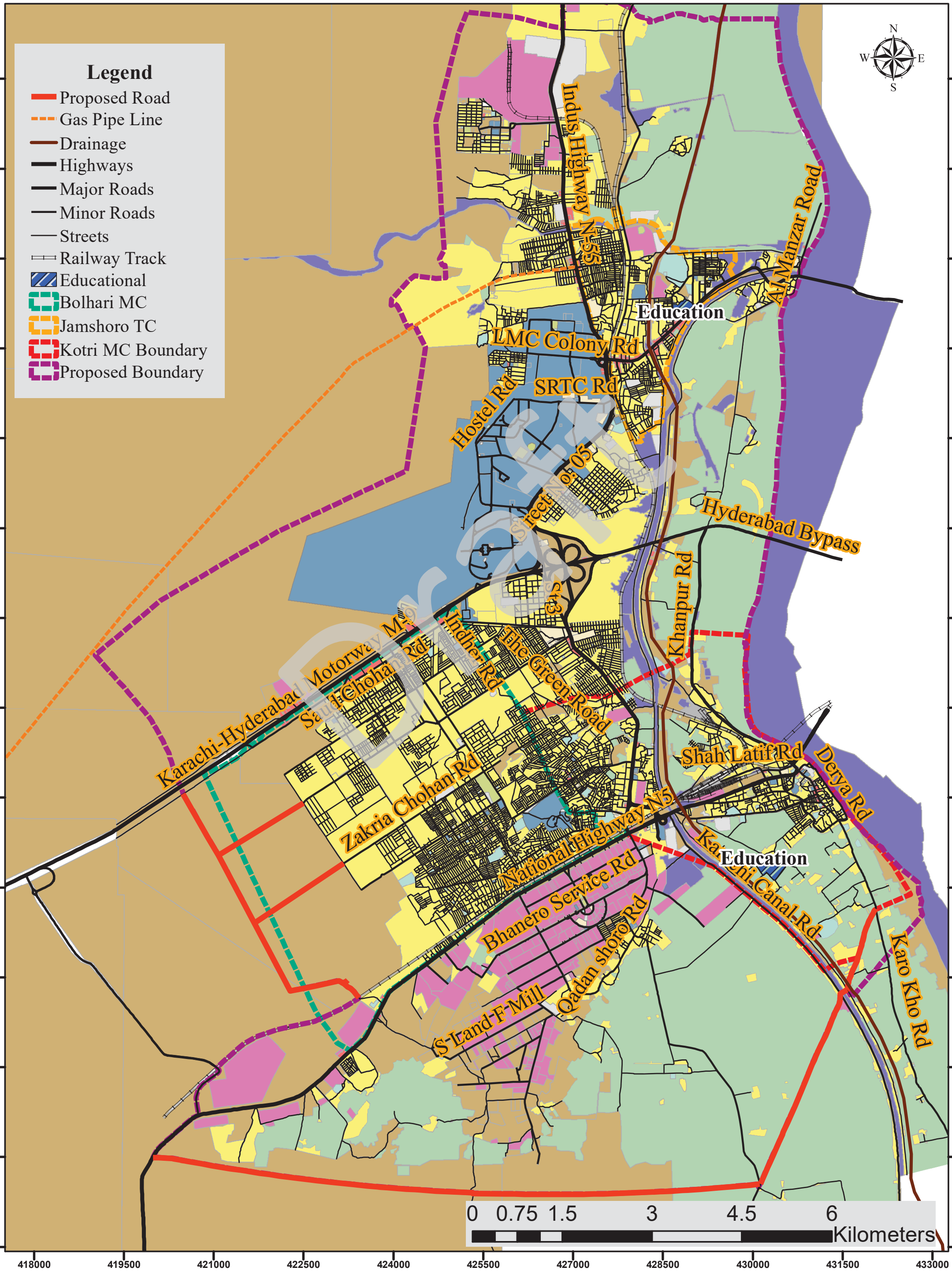


Figure 6-3: Proposal for Educational Facilities Landuse for Kotri City

Proposed Educational Landuses For Kotri City



6.2 Health

6.2.1 Existing Situation

Sindh, is home to a predominantly youthful population, with a growing percentage in the working-age bracket. While the region has shown some progress in child health and maternal healthcare indicators, there are notable disparities in access to healthcare services, depending on factors like district, economic status, education, and rural/urban residence. Low contraceptive usage, inadequate healthcare infrastructure and quality in rural areas, and obstacles faced by women when accessing healthcare, such as financial constraints and societal norms, are among the important challenges.

Moreover, the devastating floods in 2022 have inflicted significant damage on the health system in Sindh. Hundreds of healthcare facilities are damaged or inoperable, making healthcare inaccessible. As a result, diseases like malaria, dengue, diarrhoea, cholera, skin diseases, and malnutrition are on the rise, posing additional burdens on an already stretched healthcare system.[39]

6.2.2 Health Sector at District level

Jamshoro District, a region with a diverse urban and rural population, has a healthcare infrastructure that plays a crucial role in ensuring the well-being of its residents. The district's health facilities range from basic health units to specialized clinics, each serving different needs of the community. The available data on medical centres and their bed capacity provides insight into the healthcare services accessible to the people of Jamshoro.

Table 6-6: Health Sector at District Level

GOVERNMENT												Autonomous Body		Other		TOTAL	
TEACHIG		CIVIL		MAJOR		SPECIALIZED		TALUKA		DHQ Hospital							
NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS
0	0	0	0	0	0	1	204	2	60	1	30	1	250	65	342	70	886

Table 6-7: Dispensaries, MCHC and T. B. Clinics, with Bed Capacity

Sector	Dispensaries		M.C.H.C.		T.B. Clinics	
	No.	Beds	No.	Beds	No.	Beds
Govt.	24	16	2	0	11	204
Semi Govt.	0	0	0	0	0	0
Local Bodies	0	0	0	0	0	0
Private/Missionary	0	0	0	0	0	0
TOTAL	**24**	**16**	**2**	**0**	**11**	**204**

**Government Dispensaries also included with District Council Dispensary (DCD), Mobile Dispensary (M.D)*

[39] Factsheet: Sindh Integrated Health and Population Project (worldbank.org)

Table 6-8: Health Facilities, Number of Medical centres & Bed Capacity

Facilities	Medical Centers	Beds
BASIC HEALTH UNITS (BHUS)	**20**	**40**
RURAL HEALTH CENTRES (RHCS)	**5**	**100**
DISPENSARIES	**47**	**6**
Government	15	0
Semi Government	9	6
Local Bodies	23	0
Private	0	0
TB CLINICS	**9**	**0**
Government	9	0
Private	0	0
MOTHER AND CHILD HEALTH CENTRES (MCHC)	**2**	**0**
Government	1	0
Local Bodies	1	0
Private	0	0
MATERNITY HOMES (GOVERNMENT)	**0**	**0**

i. **Laboratories**

Currently, THQ/DHQ is facing a lot of problems due to the unavailability of Laboratories. The shortage of electricity, surgical instruments, and lack of machinery are major issues.

ii. **Drug Supplies**

The complete range of items was not available at the majority of the surveyed facilities. The most common reason for their non-availability was undersupplied or delayed supply or lack of procurement powers at the district level. The DHQ/THQ Hospital and other health facilities are facing a lot of problems regarding the shortage of medicines supply. Most of the patients have to purchase medicines from the local market. The presence of sub-standard medicines in local markets adds troubles for the patients.

iii. **Private Health Facilities**

Few private health facilities are working in Jamshoro. Like, Memon Hospital, Awami Clinic, Maternity Home, Bakhtawar General Hospital, Apna Clinic, Al Rehman Clinic, Qureshi Clinic, Maternity Home, Abbasi Clinic and Maternity Home.

6.2.3 Health facilities at Kotri level

Kotri, a significant urban center in Jamshoro District, is served by a range of health facilities, from major institutions such as the Liaquat University of Medical & Health Sciences Hospital and the District Headquarters (DHQ) Hospital to smaller government dispensaries located in areas including WAPDA Colony, Christian Colony, Sindh University, Bihar Colony, and Khursheed Colony. These facilities provide essential medical services, though their concentration in certain localities limits equitable access,

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particularly for residents in remote areas. Key challenges include the absence of functional laboratories, shortages of surgical instruments and equipment, and irregular drug supplies caused by procurement delays, which force many patients to rely on local markets where sub-standard medicines are common. In addition, a small number of private facilities, such as Memon Hospital, Bakhtawar General Hospital, Awami Clinic, and various maternity homes, supplement public services but cannot fully bridge service gaps. On the preventive side, the Sindh Health Department and Jamshoro District Administration remain active, regularly conducting campaigns for polio eradication, malaria control, tuberculosis treatment, and awareness programs on leprosy, leishmaniasis, and HIV/AIDS.

Despite this range of institutions, several systemic gaps persist. Key challenges include shortages of laboratories, irregular drug supplies due to procurement constraints, and reliance on local markets that often results in sub-standard medicines. Preventive healthcare campaigns, such as those targeting polio eradication, malaria control, and tuberculosis awareness, are actively supported by the provincial health department, but their reach is constrained by limited resources and uneven community engagement.

Survey findings highlight mixed community experiences. While 46% of respondents prefer government health services, 15% rely solely on private providers, and 39% use both. The DHQ remains the most widely accessed facility, serving two-thirds of the population. However, only 49% report regular doctor availability, while 46% note that doctors are only partially available. Levels of satisfaction are divided: 50% express contentment with existing services, whereas 35% remain dissatisfied, with half of the respondents believing they lack access to quality healthcare. These insights point to an urgent need for strengthening infrastructure, ensuring consistent medical supplies, and expanding equitable access so that Kotri's growing population can be served with reliable and quality health care.

Given the uneven service coverage, damaged and overstretched facilities, shortages of beds, laboratories, medicines, and medical equipment, and the heightened disease burden following the 2022 floods, the health strategy for Kotri must prioritize: I. rehabilitation and resilience upgrading of existing health facilities, including DHQ, THQ, BHUs, RHCs, and dispensaries, with a focus on flood protection, functional laboratories, reliable electricity, water, and sanitation; II. strengthening service capacity through targeted expansion of beds, diagnostic services, and essential medical equipment to address current deficits across primary, secondary, and tertiary care; III. ensuring uninterrupted availability of quality medicines and supplies through improved procurement, storage, and monitoring mechanisms; and IV. enhancing equitable access and preventive healthcare by improving outreach services, maternal and child health coverage, disease surveillance, and coordination with private providers. This integrated approach will support immediate service continuity, reduce vulnerability during public health shocks, and improve long term health outcomes for Kotri's growing urban population.

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*6.2.4 **Issues:***

The following are the major issues in the health sector:

- Large number of Vacant posts of doctors and medical staffs in health institutes of the district.
- Lack of training and housing facilities for LHW and paramedical staff
- Accessibility to health care facilities in remote rural areas is difficult.
- Lack of Health facilities such as wards, labs and OT facilities
- Lack of diagnostic and other Health equipment
- Deficiency of transferring serious cases from rural areas to hospitals

*6.2.5 **SWOT Analysis:***

Health			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Availability of specialized health facilities. 2. Currently, Kotri City has a surplus of hospital beds, exceeding the standard ratio. 3. Jamshoro district has a wide range of healthcare facilities, from Basic Health Units (BHUs) to specialized clinics, catering to the varied needs of its urban and rural population. 4. TB clinics.	1. Unawareness of health issues in community. 2. The city faces a significant deficit in the number of doctors, falling far below the WHO's recommended standard. 3. Relying solely on the current infrastructure may limit the city's ability to cope with the increasing demand. 4. Shortage of medicines supply.	1. More investment is required through PPP in health sector. 2. More job opportunities for doctors. 3. There is an opportunity for strategic investment in healthcare infrastructure to bridge the gaps in bed capacity and doctor availability. 4. Collaborations between the government and private sectors can enhance healthcare services and facilities.	1. Less emergency response to health incidents. 2. The rapid increase in population poses a threat to the ability of the healthcare system to meet future demands. 3. A significant threat identified is the severe loss of access to healthcare facilities and medicines caused by damaged or inaccessible roads.

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*6.2.6 **Need Assessment***

Need Assessment Kotri City 2025 (Population, Bed Ratio)

In Kotri City's 2025 healthcare needs assessment, a detailed analysis of the city's healthcare resources in relation to its population reveals both strengths and areas in need of improvement. The population of Kotri City stands at 376,207, for which the healthcare infrastructure includes several key facilities: Bilawal Medical College Hospital with 300 beds, Taluka Hospital with 30 beds, and Civil Hospital LUMHS in Jamshoro providing a substantial 700 beds. Collectively, these amount to 1,030 beds, significantly exceeding the estimated requirement based on the standard ratio of one bed per 500 people, which would necessitate only 265beds. This surplus of beds suggests that, in terms of hospital bed capacity, Kotri City is currently well-equipped to meet the healthcare needs of its population.

However, the situation contrasts sharply when it comes to medical staffing. With only 96 doctors available to serve the entire population, Kotri City falls short of the World Health Organization's recommended standard of one doctor per 1,000 people. Based on this standard, the city requires 386 doctors, indicating a deficit of 382 doctors. This shortfall in medical professionals is a critical concern, underscoring the need for strategic healthcare investments to address this gap.

Table 6-9: Present Need Assessment of Health Facilities (2025)

Present Population	Available Beds	Present need	Required Beds	Available Doctors	Present Need	Required Doctors
382,492	1030	765	265	96	286	382

Source: As per NRM (National Reference Manual) recommended 01 Doctor for 1,000 pops. And 02 Beds for 1,000 pop.

Future Need Assessment (Population, Bed Ratio) 2045

The future need assessment for Kotri City, looking ahead to 2045, presents a significant challenge in aligning healthcare resources with the expected population growth. By 2045, the population is projected to reach **714,441, a** substantial increase from current levels. Presently, the city has 1,030 hospital beds and 96 doctors. However, considering the projected population, the standard healthcare provision ratio of one bed per 500 people dictates a future requirement of 1429 beds. This suggests a looming shortfall of 399 beds, as the current capacity will no longer be sufficient to meet the healthcare needs of the significantly larger population.

Moreover, the gap in medical staffing is poised to become more pronounced. With the World Health Organization's recommendation of one doctor per 1,000 people, Kotri City will require 618 doctors to adequately serve its future population. This marks a substantial deficit of doctors, considering the current number of available medical professionals.

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Table 6-10: Future Assessment of Kotri City (2045)						
Future Population	**Available Beds**	**Future Need**	**Required Beds**	**Available Doctors**	**Future Need**	**Required Doctors**
714,441	1030	1429	399	96	618	714
Source: As per NRM (National Reference Manual) recommended 01 Doctor for 1,000 pops. and 02 Beds for 1,000 pops.						

The need assessment confirms that the health response in Kotri City cannot rely solely on existing infrastructure; it must adopt a dual approach: (i) rehabilitation and functional upgrading of current health facilities focusing on safety, diagnostic capabilities, medicine supply, and staffing; and (ii) targeted expansion of medical personnel and bed capacity to address the projected shortfalls driven by population growth. This phased strategy will support immediate service continuity while preparing the system to meet the long-term healthcare demands of Kotri's expanding population.

6.2.7 *Policy Guidelines*[40]

- Enhance basic health care by making it more accessible & affordable, efficient, effective and timely. This will be achieved by diversifying outlets through the involvement and support of other organizations that provide health or health related services.
- Regulate protection from disease and the quality of healthcare across the province.
- Protect people against pollutions of all forms and types, and infectious diseases by promoting public health and by upgrading curative care facilities.
- Enhance and improve existing emergency care facilities and trauma centers, including ambulatory services and paramedic forces.

6.2.8 *Strategic Development Plan*

I. Long Term

- Provision of Mobile Health Unit for the peripheral area of Town (under supervision of district Hospital)
- Up gradation of BHUs, RHCs and MCHCs.
- Health awareness programme for the deprived population
- Research and development programme for doctors and paramedics staff
- Provision of diagnostic facilities, ambulance, pharmacy in all hospitals
- Tertiary Level Specialized Hospitals to cater District
- Enhancement of Mobile Health Unit for far-flung areas of the district
- Accommodation facilities for Doctors and Paramedic Staff

II. Short Term

- Health is the fundamental need of the people. Currently health institutes of District are facing lot of problems due to unavailability of Laboratorial facilities. Shortage of

[40] Sindh Vision 2030

Specialized doctors, surgical instruments, and lack of machinery are the major issues. The condition of BHUs and RHCs are also very poor, there is need to rehabilitate these institutes to provide sufficient and high-quality health to the people of Kotri MC, Bolhari MC and Jamshoro TC.

- Improve access to healthcare facilities as due to long journeys to hospitals many patients die on the way.
- We can further improve the access through ambulance network
- Ensure availability of adequate and skilled workforce to fulfill population health needs,
- Improving functionality of equipment and availability of quality medicines.

Health interventions will be integrated with municipal infrastructure planning, focusing on improving accessibility, emergency response, reliable utility services, waste management, and public safety around healthcare facilities. This integration will enhance service delivery, reduce disruptions during emergencies or natural events, and ensure continuous, effective healthcare for the community.

6.2.9 Priority Projects

i. Repair / Rehabilitation and Provision of Missing Facilities at Bilawal Medical College Hospital

Health is a fundamental need of the people, yet existing health institutes in kotri face severe challenges. Major issues include the absence of modern diagnostic and laboratory facilities, shortage of specialist doctors (particularly female doctors and female staff), inadequate surgical instruments, and outdated machinery. The condition of the Bilawal Madical College Hospital is very poor, limiting its ability to deliver quality healthcare. To provide sufficient and high-quality medical services to the people of kotri, it is essential to rehabilitate existing health institutes and expand their capacity with modern diagnostic facilities and equipment.

To ensure that the people of Kotri City receive adequate and reliable healthcare, it is important to rehabilitate the existing health facilities and establish new, well-equipped institutions on both sides of the city. These new facilities should be supported with modern diagnostic services, updated medical equipment, and improved staffing to meet current and future healthcare needs.

➢ **Scope**

- Rehabilitation and expansion of Bilawal Medical College Hospital to improve healthcare delivery.
- Upgrading and provision of modern diagnostic facilities, laboratory equipment, surgical instruments, and ambulances.
- Expansion of specialized wards focusing on maternal, child health, and emergency services.
- Establishment of an in-house pharmacy providing free or subsidized medicines for vulnerable populations.
- Recruitment of additional healthcare staff, with emphasis on female doctors and paramedics for gender-sensitive care.

- Long-term capacity building through research and development programs for doctors and paramedical staff in collaboration with provincial health training institutes.

➢ **Size**

The proposed intervention aims to strengthen healthcare services across Kotri through targeted improvements centered on Bilawal Medical College Hospital. The program focuses on the rehabilitation and expansion of this major facility to enhance its capacity, efficiency, and quality of care for the city.

The initiative includes the development of multiple specialized wards such as maternal care, child health, and emergency units, along with upgraded diagnostic sections equipped with modern technologies. These improvements will allow the hospital to accommodate a significantly higher number of patients while ensuring faster and more accurate medical services.

In addition, the program introduces long term capacity building for the entire medical and paramedical workforce, ensuring sustained improvements in service delivery. Together, these interventions will elevate Bilawal Medical College Hospital into a high quality, modern healthcare institution capable of meeting the evolving needs of Kotri's growing population.

➢ **SDG'S Alignment**

I. **GOAL 3 – Good Health and well-Being Goal:** This is the most directly impacted goal. Rehabilitation of health facilities and provision of modern diagnostic equipment, surgical tools, and specialist services will improve access to essential healthcare. Addressing the shortage of female doctors and staff will ensure gender-sensitive care, particularly in maternal and child health. This supports SDG 3.1, 3.2, 3.8, and 3.c, which aim to reduce maternal and child mortality, achieve universal health coverage, and increase the health workforce.

II. **GOAL 8 – Decent work and economic growth:** Rehabilitating and expanding healthcare services will create direct employment opportunities in the health sector. In the long term, healthier populations contribute to higher productivity and economic growth. This supports SDG 8.3 and 8.5, which focus on job creation and equal access to decent work.

➢ **Project List and Location**

Bilawal Medical College Hospital

Bilawal Medical College Hospital – Short Term Priority Projects

1. **Extension of Bilawal Medical College Hospital for specialized wards and sections** – expansion of maternal, child health, and emergency wards.
2. **Provision of diagnostic facilities, ambulances, and pharmacy** – equipping Bilawal Medical College Hospital with laboratory, imaging, ambulances, and an in-house pharmacy.

Capacity Building (Long Term)

1. **Research and development programs –** for doctors and paramedical staff, linked with provincial health training institutes.

➢ **Implementing Authority:** Government of Sindh - Health Department.

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- **Preliminary cost estimate:** Estimated Cost: 400 million PKR Approx.

Table 6-11: Health Sectors Estimated Cost (Kotri City)

S. No.	Project Name	Estimated Cost In Millions	ADP	Non ADP	Status	
					Short Term	Long Term
	Health					
1	Extension of Bilawal Medical College Hospital for more specialized wards /sections	150	-	Non ADP	**Short Term**	-
2	Research and development programed for doctors and paramedics staff.	100	-	Non ADP	-	**Long Term**
3	Provision of diagnostic facilities, ambulance, pharmacy in Bilawal Medical College Hospital	150	-	Non ADP	**Short Term**	-

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6.2.10 Immediate Action Plan for Core Urban Area

➢ **Improvement of Health in Core Urban Areas**

Health facilities in kotri, Bolhari and Jamshoro core urban areas remain inadequate, with limited access to essential medical services. The core urban of Bolhari, Government Dispensary Sikanderabad, Government Dispensary Bihar Colony requires urgent rehabilitation, while the District Headquarter (DHQ) Hospital, located in the core area of kotri, also needs significant rehabilitation and upgrades to meet the growing healthcare demands of the population. To bridge these gaps, the proposed project takes a comprehensive approach focused on strengthening infrastructure, improving service delivery, and modernizing medical systems. Planned interventions include repair, rehabilitation and upgrading facilities, procuring advanced medical equipment, introducing electronic health records (EHR), and expanding telemedicine services to enhance access and diagnostic efficiency in the DHQ kotri.

These interventions will support the creation of integrated health networks, improving coordination among providers and leading to better patient outcomes. This program aligns with Sustainable Development Goal 3 (SDG 3), particularly SDG 3.d (capacity for emergency preparedness).

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I. Scope

The immediate action plan for improving health in the core urban areas of Kotri MC, Bolhari MC and Jamshoro TC Municipal Committee will include the following key measures:

- **Repair & Rehabilitation of Dispensaries & DHQ:** Comprehensive repair and rehabilitation of the Bolhari, Government Dispensary Sikanderabad, Government Dispensary Bihar Colony and DHQ kotri. This includes upgrading the DHQ Kotri hospital infrastructure, ensuring it is equipped with modern medical facilities, and addressing any existing structural issues. This will enhance the hospital's ability to provide quality healthcare services to the community.
- **Medical Equipment & Technology:** Diagnostic imaging, lab systems, electronic health records, and telemedicine.
- **Emergency Preparedness and Response:** Emergency response plans, staff training, and essential supplies for crises.
- **Capacity Building for Emergency Response:** Dedicated emergency units, trained professionals, and resilience measures.

II. Size:

The repair and rehabilitation efforts will focus on three priority health facilities: Government Dispensary Sikanderabad (0.1 acres), Government Dispensary Bihar Colony (0.05 acres) and DHQ Hospital Kotri (3.34 acres). Together, these facilities cover approximately 3.49 acres.

III. Preliminary cost estimate

Total Estimated Cost: 500 million approx.

Table 6-12: Repair & Rehabilitation of Dispensaries & DHQ Hospital			
S. No.	**Area / Locality / Address**	**Area (acre)**	**Cost in Millions**
1	**Government Dispensary Sikanderabad**	0.1	40
2	**Government Dispensary Bihar Colony**	0.05	20
3	**DHQ Hospital Kotri**	3.34	440
Total		**3.49**	**500**
Total PKR Rs. Million			**500**

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After Immediate Action Plan Modern Hospital Concept

Modern Operation Theater

IV. Implementation Framework

- **Funding:** Municipal budgets, provincial ADP allocations, and external health development funds (aligned with SDG 3).
- **Execution:** Phased implementation, prioritizing critical infrastructure and emergency preparedness.
- **Monitoring & Evaluation:** KPIs will include number of patients served, improved patient outcomes, operational readiness of equipment, and emergency preparedness indicators.

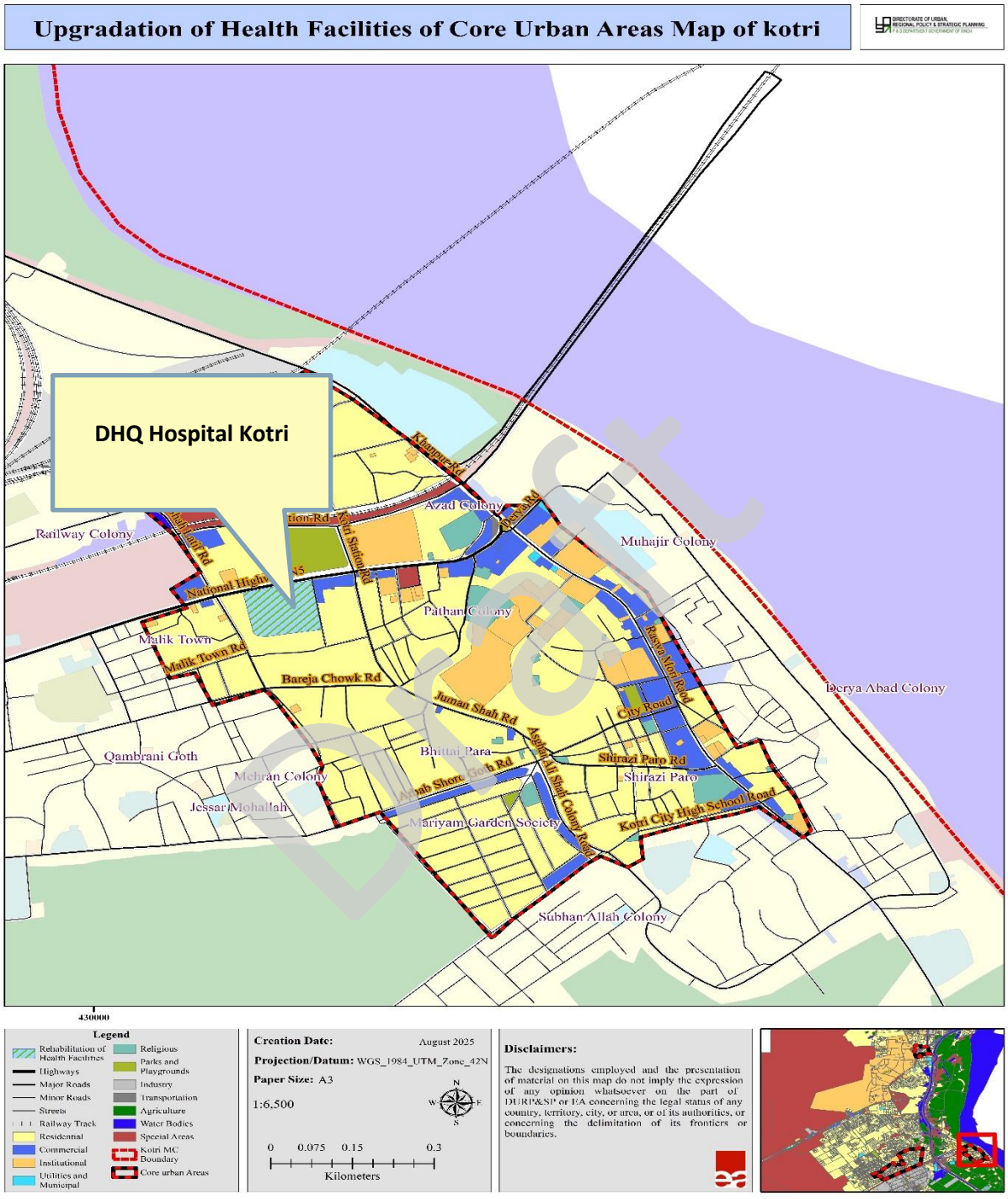

Figure 6-4: Upgradation of Health facilities of Core Urban Areas Map of Kotri

Upgradation of Health Facilities of Core Urban Areas Map of kotri

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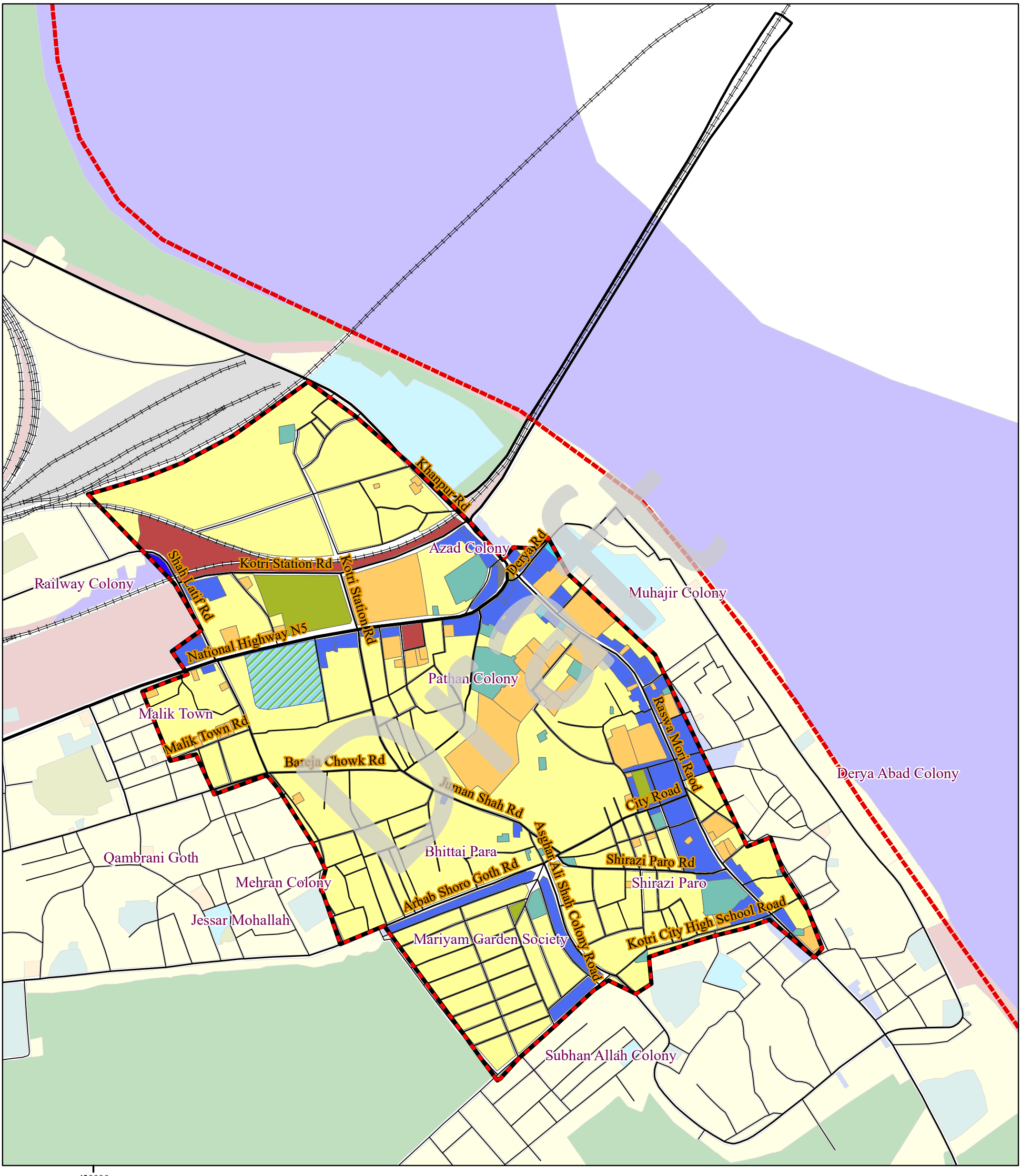

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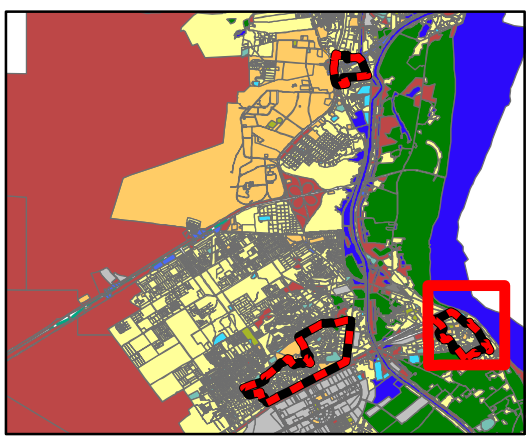


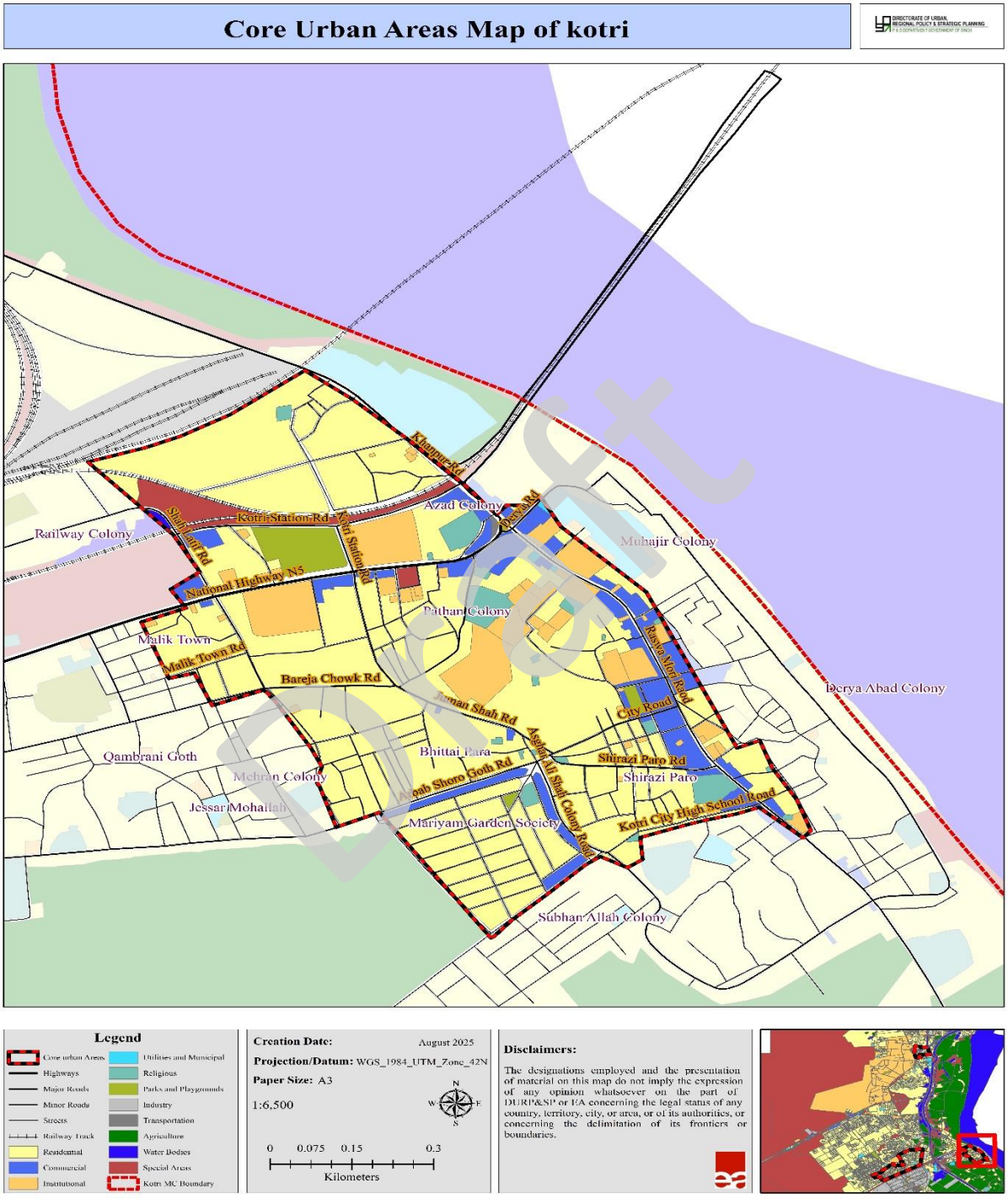


Figure 6-5: Upgradation of Health facilities of Core Urban Areas Map of Bolhari

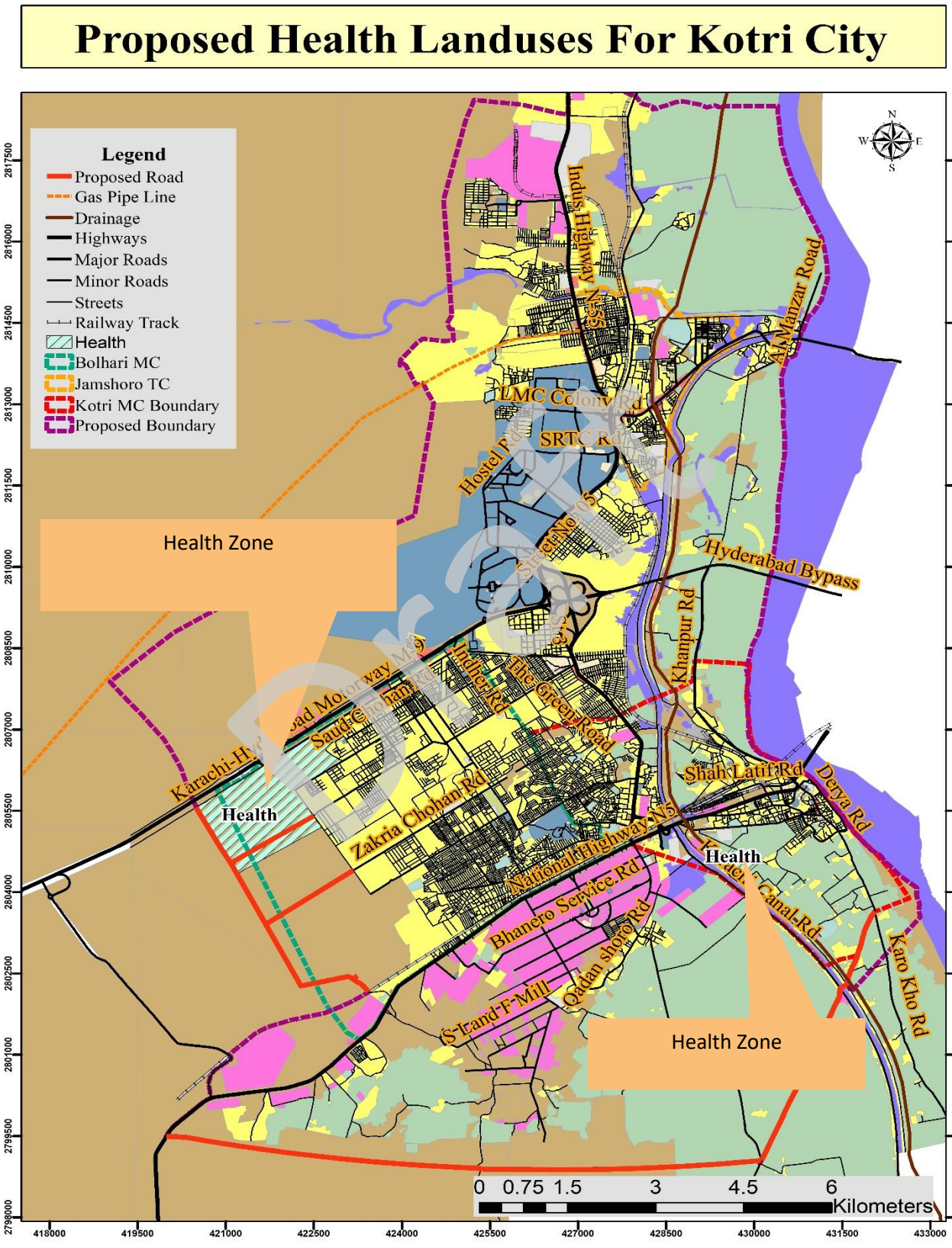
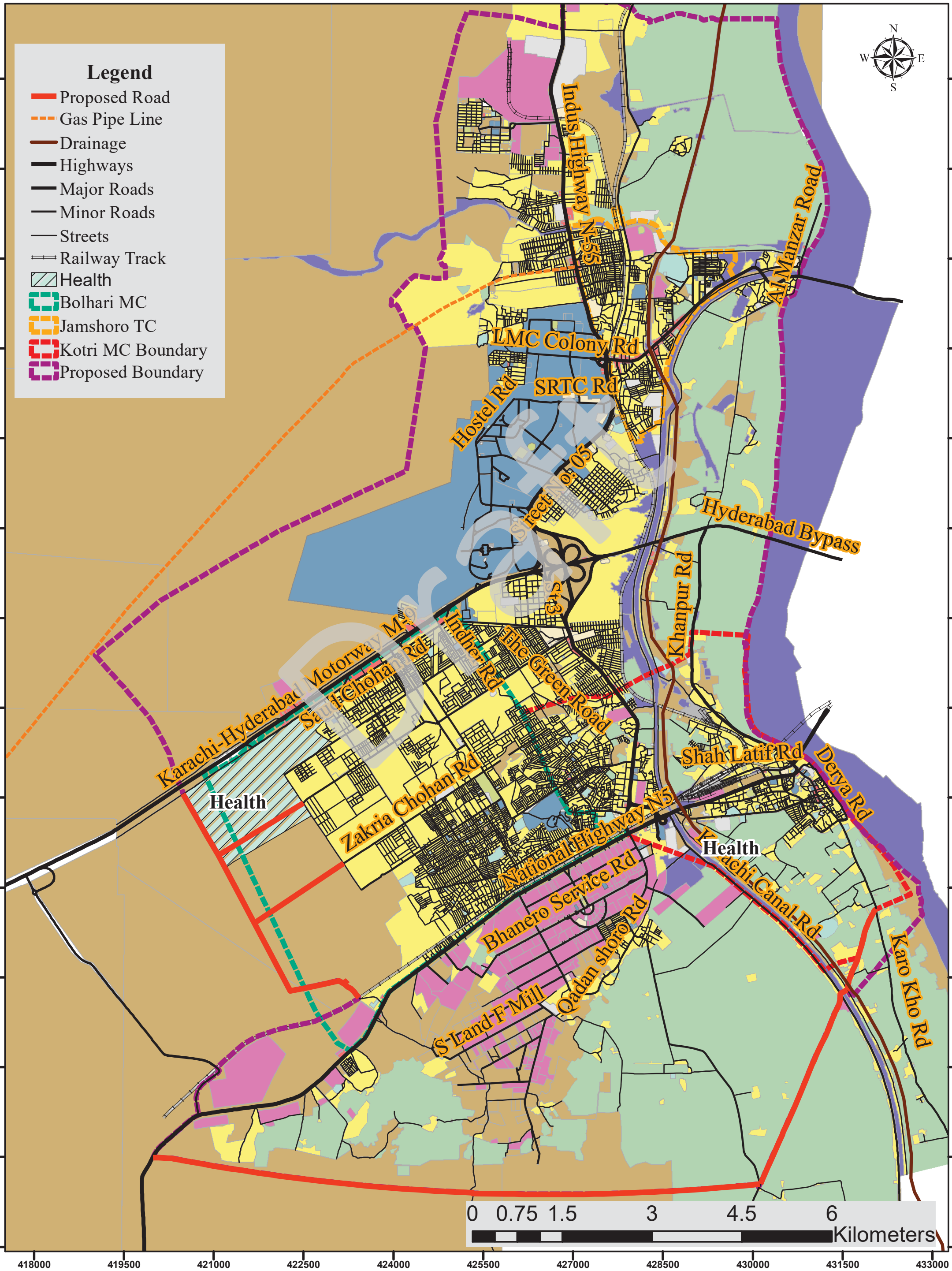


Figure 6-6: Proposal for Health Facilities Landuse for Kotri City

Proposed Health Landuses For Kotri City



6.3 Recreational/Tourism/Culture

*6.3.1 **Existing Situation***

Recreational and entertainment are necessary for the mental, physical and spiritual development of a community. Recreation can be active like organized sports or passive like breathing in fresh air or standing in a green landscaped park with friends and family. Amusement is both goal and subjective. The target amusement which has a place with and continues from the individual and is the declaration of his/her own particular impossible to miss, mental, enthusiastic and physical motivation. It is the work appearance of one's contemplations, emotions, and prisoner alongside learned capacities concerning the activity. Then again, the subjective amusement comprises of perception, thought, and reflection upon the entertainment of others. The bounteous life is the one which is expressive in the entertainment of the whole person's ability for activity, where some on a position of high expertise and as per great taste for the standard of refined society. Diversion is mental recognitions that can't be summed up. As such the meaning of diversion varies from man to man, as indicated by its mental and potential emotions.

The district is famous for its various recreational Spots, Thousands of people from all over the country come to visit these spots every year. The recreational spots include:

- Dargah of Hyder Shah Sanni, located at Taluka Manjhand.
- Shrine of Hazrat Makhdoom Usman Marvindi, popularly known as Hazrat Lal Shahbaz Qalandar.[41]
- Ranikot Fort is a historical fort near Sann
- The site was selected to be a university township away from the humdrum of Hyderabad city which lacked room to meet the ambitious expansion programs of the University.
    - University of Sindh
    - Liaquat University of Medical and Health Sciences
    - Mehran University of Engineering and Technology.[42]
- The site of Lakhmir-ji-Mari has a two-part layout a conically shaped hill and a lower town.
- Sehwan Fort, Jamshoro
- The Kotri Barrage, also known as the Ghulam Muhammad Barrage, was opened in 1955

I. Recreational Spaces in Kotri MC, Bolhari MC, and Jamshoro TC

According to the collected primary data, the recreational Spaces in DHQ town Includes:

- Jamshoro Sports Complex RBB Colony
- Jama Masjid ground Jamshoro TC
- Sachal Ground Kotri
- Railway hockey and Football Ground Kotri
- Malik Asad Sikandar Sports Ground Kotri
- Malik Mehrab Khan Park Kotri
- Family Park Kotri
- Other Notable Recreational Areas:
- Al-Manzar View Point at Kotri Barrage: Offers picturesque views of the river and barrage.

[41] Report on Tranche Condition (2006), Taluka Administration, District Government Jamshoro, Sindh Devolved Social Services Program (SDSSP), Government of Sindh
[42] https://en.wikipedia.org/wiki/Jamshoro

- Sindhology Museum Jamshoro: Showcases the cultural and historical heritage of Sindh.
- River view Resort Petaro Jamshoro: A resort providing leisure and recreational services.

II. Historical and religious Places in District Jamshoro

Historically, Jamshoro district was the part of dynasties such as the Soomras, the Summas, the Arghuns, the Kalhoras and the Talpurs at Sindh. Jamshoro district is famous for its unique culture and values. This region gave rise to a number of religious scholars, intellectuals and poets i.e. Shahbaz Qalandar (Usman Marvandi) and others spread the essence of their knowledge all over the subcontinent. Rani Kot, Sehwan Fort, Kai Valley, Manchar Lake, Darbar Usman Marvandi Lal Shahbaz Qalandar, Bodlo Bahar and Shrine of Laki Shah Sadar are the major attraction points for visitors.

III. Tourism

Jamshoro have a great potential to attract local and regional tourists for tourism. Availabilty of basic facilities for tourists could increase tourism activities. More tourism activities could strengthen local economy. Historical and religious tourism Potential areas in Jamshoro District are based on both religious and historical places.

i. Darbar Usman Marvandi Lal Shahbaz Qalandar

Syed Usman Marvandi lived from about 1177 – 1274, popularly known as Lal Shahbaz Qalandar was a Sufi saint and religious-poet of present-day Pakistan and Afghanistan. He is highly regarded and respected by people of all religions because he preached religious tolerance among Muslims and Hindus. He was called Lal ("ruby-colored") after his usual red attire and "Shahbaz" to denote a noble and divine spirit and "Qalandar" as he was a wandering holy man. The spiritual song "Dama Dam Mast Qalandar" glorifies Lal Shahbaz Qalandar's teachings, and the song is widely used in Pakistan, India, Afghanistan and Bangladesh. Originally written in the 13th century, the song has been sung by various singer since than, and is widely popular in the sub-continent.

ii. Rani Kot -Sehwan Fort

Ranikot Fort (also known as Rannikot) is a historical mysterious fort located near Sann, Jamshoro District. Ranikot Fort is also known as The Great Wall of Sindh and is believed to be the world's largest fort, with a circumference of approximately 32 kilometres (20 mi). The fort's ramparts have been compared to the Great Wall of China. The site was nominated in 1993 by the Pakistan National Commission for UNESCO world heritage status, and has since been on the tentative list of UNESCO World Heritage Sites. The fort is listed as a historical site under the Antiquities Act, 1975 and its subsequent amendments, and is provided protection.

iii. Bodlo Bahar

Bodla Bahar was a faithful partisan and devotee of Lal Shahbaz Qalandar. His mausoleum is in Sehwan Sharif, Sindh, Pakistan. His original name was Sikander. According to legends Bodla Bahar was already resident of Sehwan Sharif before coming of Qalandar Lal Shahbaz. Later, he turned to the circle of affectionate believers of the saint. He was the most reliable and trustworthy servant of Qalandar. Several myths have been related to Bodla Bahar concerning Qalandar

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Shahbaz. It is believed that Bodla Bahar was killed and his flesh was sold in market by butcher Annud. When Qalandar knew he called Bodla three times. After calling, the pieces of flesh of Bodla came to Qalandar and he was restored into life by Qalandar.

iv. Kai Valley

Kai Valley is situated at a distance of 40 kms from Sehwan Sharif. District Jamshoro.The Kai valley is towards the southern part of the Sehwan Sharif in Kirthar Mountain Range. Kai valley presents a picturesque panorama on both sides of the road. Kai Valley is one of the rare solitary landscape, which sees majority of tourist. It gives the impression as if the hills were once underneath sea level because there are noticeable signs of erosion from the water waves. The track leading to these caves is a bit narrow but apparent, with the help of signs available there. The lower site frequently called as "Satt Ghariyoon" (Seven Caves), is towards the east of the village Muhammad Khan Noohani, situated near a mountainous water stream. However the upper site stretches out towards the southern part of the village. At its apex the upper part is enveloped by an ancient compound wall of stones. The remains of ancient hamlets and terracotta pottery have been discovered from this hilly part. The pottery belonged to the olden Indus Valley Civilization and the caves to the Stone Age. There are 4 prominent and prehistoric sites here at Kai Valley, namely: Bulo –ji –Buthi, Nuku- Buthi , Kai-Buthi and Naing (a charismatic small oasis in Sindh Province).

v. Shrine of Laki Shah Sadar

The shrine of Saint Shah Saduruddin Lakyari, known as Laki Shah Sadar is at 20 kms from south of Sehwan. The shrine is beautifully covered into the lap of huge mountains. The shrine's dome is majestically designed with tiles and colourful precious stones. Adjacent the shrine there is stream flowing from these mountains; it is believed that the warm water of the stream cure the skin related problems of the devotees of this saint. Since the flow of the water is always continues that's why it is called "Dhara Tirath". The serene surroundings of this mountainous area, with stream flowing beside relax the mind and soul of the visitor. For the visitors' coming from far off areas, a beautiful motel has been constructed there, where they are provided with spacious rooms to rest and delicious food to enjoy.

vi. Manchar Lake

Manchar is the largest shallow fresh water Lake in Pakistan. It is situated at a distance of 18 kms from Sehwan Sharif on west side of the River Indus, in district Jamshoro. The area of the lake rise and fall with the change if seasons from little as 350 km to as much as 520 km. The lake accumulates water from numerous brooks in the Kirthar Mountains and empties them into the Indus River. Manchar is synthetic Lake, created in 1930, when the Sukkur barrage was constructed on River Indus. The lake is sustained by two canals, the Aral and the Danister from the river Indus.

Given the wide array of recreational, cultural, and historical assets alongside existing facilities, the recreational strategy must prioritize: I. preservation and enhancement of key heritage and natural sites to boost tourism and community engagement; II. upgrading and maintaining recreational spaces within urban

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areas to provide safe, accessible venues for physical and social activities; III. development of inclusive public amenities that cater to diverse age groups and abilities; and IV. strengthening linkages between tourism, culture, and local economy through sustainable infrastructure and community participation.

*6.3.2 **Issues/Problems***

- Many historical and cultural sites may lack proper infrastructure, making them less accessible and potentially less appealing to potential visitors.
- Ongoing maintenance and preservation efforts for historical sites and recreational areas are crucial.
- There may be a lack of awareness among local residents and potential tourists about the value and significance of these sites.
- The maintenance of parks, lakes, and other natural sites poses environmental challenges.
- Harnessing the full economic potential of these recreational and historical sites is a challenge.

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6.3.3 ***SWOT Analysis:***

Sports & Recreation			
Strength	**Weakness**	**Opportunity**	**Threats**
1. There are several recreational and tourist attractions contributing to the cultural richness and community well-being. 2. Diverse recreational options, including parks and playgrounds. 3. Sports and games are encouraged at a high level. 4. Local environment of town supports green urbanism. 5. Malik Asad Sikandar Sports Ground Kotri. 6. Sachal Ground Kotri. Malik Mehrab Khan Park Kotri.	1. Poor maintenance of recreational facilities. 2. Lack of funding to maintain the recreational sites. 3. lack of proper infrastructure. 4. Shortage of water facility to maintain green spaces, green belts and trees plantation. 5. Poor Maintenance of sports complex. 6. Insufficient infrastructure.	1. Healthy environment. 2. Air quality will improve. 3. Health of communities will be improved. 4. Natural habitat will be protected. 5. If playgrounds and sport complexes are maintained properly then it will create many opportunities for locals to participate in sports activities and represent the country on national and international levels. 6. Utilization of Public-Private Partnerships for the development of recreational amenities.	1. Continued environmental degradation impacting recreational spaces. 2. The full economic potential of recreational and historical sites remains underutilized, presenting a risk of diminished economic benefits and missed opportunities for local and regional development. 3. Safety and security issues.
Culture			
1. Rich historical and cultural sites contribute to the city's unique identity. 2. The indigenous cultural activities of various social groups and minorities comprise many events that attract people from their	1. Lack of proper infrastructure in many historical and cultural sites which actually make them less accessible and potentially less appealing to the visitors. 2. Lack of funding. 3. Low awareness among locals and tourists about the significance of historical and cultural sites.	1. If cultural and historical sites will be preserved and maintained according to international standards then there are many chances that our tourism industry will boom. 2. It will generate good amount of revenues with many benefits. 3. Job creation. 4. Cultural goods will be commercialized in this	1. Security issues. 2. Poor maintenance. 3. If cultural and historical sites will not be conserved/ preserved then individuals will start occupying the land. 4. Lack of funding for infrastructure and preservation efforts.

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Sports & Recreation			
Strength	**Weakness**	**Opportunity**	**Threats**
surrounding localities. 3. Sindhology Museum Jamshoro.	4. Poor Management for organizing cultural events. 5. Lack of infrastructure to accommodate visitors into such events.	way local markets will grow. 5. Educational initiatives to raise awareness about the cultural and historical significance.	
Tourism			
1. Jamshoro district is famous for its unique culture and values. 2. Jamshoro district has a wealth of historical and religious sites which providing a diverse range of attractions for tourists. 3. Kotri has a growing tourism industry, which is focused on its cultural and historical significance. 4. Popular tourist attractions of city including the Kotri Barrage, the Kotri Railway Station, and the Kotri Bridge. The city has tremendous potential for economic growth and development, and its cultural significance and landmarks make it a must-visit destination for tourists.	1. Many historical and cultural sites may lack proper infrastructure, including roads, signage, and basic amenities, hindering accessibility and visitor experience. 2. Heritage preservation issues. 3. Lack of awareness of value and significance these historical sites among locals and tourists. 4. Less commercialization from tourism point of view.	1. Investing in improved infrastructure, such as better roads and amenities, can enhance the overall tourist experience and accessibility. 2. Tourist attraction. 3. Revenue generation through tourism planning. 4. Promotion of rich heritage to increase historical importance of City.	1. Security concerns. 2. Lack of funding for infrastructure and preservation efforts. 3. Less government interest in preservation of tourist sites. 4. Economic challenges may hinder the development of necessary infrastructure and promotional activities, limiting the region's ability to fully leverage its tourism potential.

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The SWOT analysis confirms that the recreational response cannot rely solely on new developments; it must be delivered through a multi-faceted approach: (i) rehabilitation and functional upgrading of existing recreational sites and historical landmarks, including safety, accessibility, and basic amenities; (ii) targeted infrastructure improvements to enhance visitor experience and support environmental sustainability; and (iii) community engagement and partnerships to promote cultural awareness and tourism potential. This phased approach ensures the preservation of heritage, improved public access, and sustainable growth of recreational and tourism activities in Kotri.

*6.3.4 **Policy Guidelines**[43]*

- Federally-managed lands and waters afford critically needed opportunities for outdoor recreation,
- Diverse recreation opportunities on Federally-managed lands and waters are an important complement to recreation opportunities on state and adjacent lands,
- Providing enhanced and expanded opportunities for outdoor recreation can be done within the provisions of existing, multiple-use;
- Jamshoro needs infrastructure and programmes for sports activities, sport confectitions, gymnasium and family parks, and children play area and gardens.
- Preservation and conservation measures for historic places.
- Formulation of comprehensive plan for promotion of tourism.

*6.3.5 **Strategic Development Plan***

Canal Beautification:

For the beautification of canal (KB feeder Upper) passing through the city, footpaths and walk ways should be constructed and benches should be fixed on the banks of canals to turn them into recreation spots for the locals and to this effect design should be prepared in collaboration with the irrigation department.

Similarly, food courts will be set up in various places along the canal bank, while spots should be identified for the purpose. Green belt should also be provided for the purpose of facilitating pedestrian movement. Moreover, embankments should be reinforced.

For the beautification of canal passing through the city wondrous pathways and vistas can be created along the bank of the canal. Providing Soothing distant tourism opportunity to capture the beauty but not destroy it through increased impact on ecosystem, this can be done by creating a buffer area

i. Long Term Plan

- Provide recreational infrastructure of international standards at district level, Protect and conserve the cultural heritage, promote language, art and culture of District and dissemination of information through media.

[43] NOPRA 2005

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- Youth development programme for sports and recreation
- Promote tourism through provision of support facilities
- Establishment of new open spaces as well as establishment of indoor and outdoor game facilities.

ii. Short Term Plan

- Existing open spaces in core urban area should be restored and maintained. New open spaces should be identified and created.
- The old houses marked for demolition by Municipal Committee due to danger may be purchased by MC or Local CBO. They may purchase these old houses which have out lived its age and these houses can be converted into small parks
- Development and preservation of cultural heritage
- Rehabilitation and construction of family parks and playground near residential areas
- Construction/Rehabilitation of Recreational Facilities'
- Construct more parks and rehabilitate the available parks to facilitate the people Of Jamshoro District.
- Construction of auditoriums and up-gradations for art councils
- Establishment of synthetic grounds, playing turf (for hockey, football) and indoor gym facility.

Recreational and tourism initiatives will be integrated with municipal infrastructure planning, focusing on drainage access, road connectivity, WASH services, solid waste management, energy reliability, and public safety around recreational sites and cultural heritage areas. This integration will enhance resilience against flood and rain disruptions, ensure continuous accessibility, and support the sustainable development of vibrant, safe, and well-maintained public spaces for community engagement and tourism growth.

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6.3.6 Priority Projects

i. Construction Of Recreational Facilities at Kotri Mc, Bolhari Mc, Jamshoro Tc and Allied Facilities

The construction of recreational facilities at Kotri MC, Bolhari MC, Jamshoro TC, and allied facilities is justified due to the increasing population and the acute shortage of public amenities in these towns. Presently, residents, particularly children, women, and youth, face limited opportunities for safe leisure, sports, and social interaction, resulting in negative social and health outcomes. The proposed project will provide inclusive and accessible spaces that promote physical and mental well-being, support youth development, foster community cohesion, and enhance the overall livability and image of the towns. In line with national and provincial priorities as well as Sustainable Development Goals (SDGs), the project directly contributes to sustainable urban development, improved quality of life, and balanced socio-economic growth.

From a technical standpoint, the project is feasible and sustainable. The selected sites are within municipal jurisdictions, free from major encumbrances, and have access to utilities and road networks. Facilities such as parks, playgrounds, sports grounds, walking tracks, sanitation blocks, seating areas, and lighting will be constructed using durable and cost-effective materials, ensuring long service life and minimal

maintenance. Energy-efficient systems, including solar-powered lighting, and water-efficient landscaping techniques will reduce operational costs and support environmental sustainability. The modular design allows scalability for future expansion, while allied infrastructure such as washrooms, green belts, and security features will enhance safety and usability. Overall, the project is technically sound and aligned with modern engineering and planning standards.

- **Scope**

- Construction of inclusive and accessible recreational facilities including parks, playgrounds, sports grounds, walking tracks, and seating areas across Kotri MC, Bolhari MC, and Jamshoro TC.
- Installation of sanitation blocks, washrooms, green belts, and security features such as fencing and controlled access points to enhance safety and usability. small commercial kiosks, and adequate parking to improve accessibility and user comfort.
- Use of durable, cost-effective materials and implementation of energy-efficient systems like solar-powered lighting and water-efficient landscaping to ensure sustainability and reduce operating costs.
- Modular design allowing phased development and future scalability.
- Integration with existing utilities and road networks within municipal jurisdictions.

- **Size**

- Development across multiple sites in Kotri MC, Bolhari MC, and Jamshoro TC targeting diverse population groups including children, women, and youth.
- Facilities designed to accommodate varying recreational activities and promote physical, social, and mental well-being.
- Installation of solar-powered lighting systems and other infrastructure aimed at minimizing operational expenditures.
- Project expected to serve the increasing population with ample open space and leisure options, enhancing overall urban livability and aesthetics.

- **SDG'S Alignment**

I. **GOAL 3 – Good Health and well-Being Goal:** Access to recreational facilities directly contributes to improved physical and mental health. Parks and open spaces encourage physical activity, reduce stress, and promote social well-being. These facilities are preventive health infrastructure, supporting SDG 3.4, which targets reducing non-communicable diseases and promoting mental health.

II. **GOAL 11 – Make cities and human settlements inclusive, safe, resilient and sustainable:** Recreational spaces are a core component of inclusive and sustainable urban planning. They enhance urban resilience, promote community cohesion, and improve the overall quality of urban

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life. This supports SDG 11.7, which aims to provide universal access to safe, inclusive, and accessible green and public spaces, particularly for women, children, older persons, and persons with disabilities.

- **Implementing Authority:** Sindh Government, Local Government and private investors
- **Estimated Cost: 900 million PKR Approx.**

ii. Beautification of Canals at Kotri City

The canals in Kotri city, the kb feeder though vital for irrigation and drinking purpose, have suffered from neglect, resulting in environmental degradation and poor aesthetics. Beautifying this canal will enhance the urban landscape, improve water quality, and promote environmental sustainability.

- **Scope**

The canals in Kotri City, particularly the KB Feeder, though vital for irrigation and drinking purposes, have suffered from neglect, resulting in environmental degradation and poor aesthetics. The project aims to undertake comprehensive canal beautification and rehabilitation works, including cleaning, embankment stabilization, landscaping, pedestrian pathways, lighting, and recreational areas. These interventions will enhance the urban landscape, improve water quality, and promote environmental sustainability.

- **Size**

- The KB Feeder Urban canal sections prioritized for beautification based on population density and condition assessments.
- The proposed intervention will directly benefit several densely populated communities of Kotri MC and Bolhari MC.
- The buffer the Fb Feeder will help to reduce the pollution from S.I.T.E Area to the KB Feeder.

- **SDG'S Alignment**

I. **GOAL 3 – Good Health and well-Being Goal:** Improving the aesthetic quality and cleanliness of the canals will create healthier public spaces, reduce environmental pollution and encourage outdoor activities. This supports SDG 3.9, which aims to reduce the number of deaths and illnesses from pollution, and enhances the overall well-being of the community.

II. **GOAL 11– Make cities and human settlements inclusive, safe, resilient and sustainable:** The transformation of the canals into aesthetically pleasing and functional spaces will enhance urban resilience, foster community engagement, and create a more sustainable living environment for Kotri's residents.

- **Implementing Authority:** Government of Sindh, MC Kotri, MC Bolhari TC Jamshoro, District Government.
- **Preliminary cost estimate: Estimated Cost: 250 million PKR Approx.**

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Table 6-13 Recreational Facilities Estimated Cost (Kotri City)

S. No.	Project Name	Estimated Cost in Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Recreational Areas						
1.	Feasibility study for Recreational Facilities at Kotri MC, Bolhari MC and Jamshoro TC	400	-	Non ADP	**Short Term**	-
2.	Procurement for land acquisition process for at Kotri MC, Bolhari MC and Jamshoro TC	500	-	Non ADP	-	**Long Term**
3.	Beautification of canals (landscaping, walkways, seating, lighting)	250	-	Non ADP	**Short Term**	-

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iii. Tourism Development: Baba salahuddin and Al- Manzar Tourism in kotri MC, Jamshoro TC

Kotri City holds significant but underutilized potential for cultural and tourism. The Tomb of Baba Salahuddin, a historic site of religious and cultural value, remains neglected and inaccessible as a formal tourism destination. Its conservation and adaptive reuse could transform it into a religious heritage and cultural hub, attracting both local and regional visitors.

In addition, Jamshoro TC is nationally renowned for Al-Manzar, and its famous Palla fish which is also known as Hilsa fish, a coal-roasted meat delicacy that already attracts visitors informally but lacks a structured tourism framework. The absence of hygienic food courts, seating facilities, Parking Facilities shades, branding, and tourism facilities reduces the city's ability to capture the economic benefits of its culinary heritage.

By investing in religious site conservation and culinary tourism promotion, Kotri MC and Jamshoro TC can diversify its recreational landscape, create jobs, and strengthen its identity as a Religious, cultural and tourism hub within Sindh.

- **Scope**

i. Conservation and Adaptive Reuse of the Tomb of Baba Salahuddin Kotri City

- Restoration of the Tomb of Bab Salahuddin.
- Landscaping, lighting, signage, and interpretation panels to enhance visitor experience.
- Adaptive reuse of the site as a religious and cultural center that promotes heritage preservation and community engagement.

ii. Development of Culinary Tourism Infrastructure at Al-Manzar, Jamshoro TC

- Establishment of hygienic and well-designed food courts featuring local delicacies, especially Palla (Hilsa) fish.
- Construction of visitor amenities, including shaded seating areas, restrooms, parking spaces, and pedestrian-friendly pathways.
- Installation of branding and wayfinding signage to create a cohesive tourism identity.

iii. Promotion and Branding Campaign

- Local and provincial-level marketing to position Kotri MC and Jamshoro TC as emerging cultural and culinary tourism hubs.
- Collaboration with tourism departments, local artisans, and hospitality businesses to ensure inclusive growth.

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- **Size**

i. **Geographical Coverage:**

The project spans two primary locations:

- The Tomb of Baba Salahuddin.
- The Al-Manzar food tourism corridor along the Indus River in Jamshoro TC.

ii. **Physical Development Area:**

- Culinary tourism zone: approximately 5–7 acres in Jamshoro, including parking, seating, and food court facilities.

iii. **Target Beneficiaries:**

- local and regional visitors annually.
- Local artisans, food vendors, and tourism service providers benefiting from increased footfall and economic activity.

iv. **Socio-Economic Impact:**

- Job creation in tourism, hospitality, and small-scale enterprises.
- Diversification of the local economy through tourism-based income streams.
- Enhanced city identity and contribution to Sindh's growing tourism potential.

- **SDGs Alignment**

I. **Goal 8 – Decent Work and Economic Growth (8.3, 8.9):** Promote sustainable tourism that creates jobs and promotes local culture and products.

II. **Goal 11 – Sustainable Cities and Communities (11.4, 11.7):** Strengthen efforts to protect cultural and natural heritage; ensure access to inclusive and safe public spaces.

III. **Goal 12 – Responsible Consumption and Production (12.b):** Develop and implement tools to monitor the impacts of sustainable tourism that creates jobs and promotes local culture.

- **Project List and Location**

1. **Conservation and Adaptive Reuse of Tomb of Baba Salahuddin**– Kotri City (heritage restoration, landscaping, signage, adaptive reuse as Religious /cultural center).
2. **Tourism Infrastructure for Culinary Tourism (Jamshoro's Al-Manzar and Palla fish)** – Developing Infrastructure at Al Manzar in Jamshoro TC with hygienic food courts, branding, and visitor amenities.

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3. **Promotion and Branding Campaign** – Local and provincial tourism campaigns showcasing kotri MC Religious, cultural and Jamshoro TC culinary Tourism identity.

➢ **Implementing Authority**

- Sindh Department of Culture, Tourism & Antiquities.
- Municipal Committee Kotri and Town Committee Jamshoro.
- Local restaurant associations / private sector (PPP model for food courts).

➢ **Preliminary cost:** 300 million PKR Approx.

Table 6-14 Tourism Development Estimated Cost (Kotri City)

S. No.	Project Name	Estimated Cost in Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Tourism Development						
1.	Conservation and Adaptive Reuse of Tomb of Baba Salahuddin	**50**	**-**	**Non ADP**	**Short Term**	**-**
2.	Tourism Infrastructure for Culinary Tourism (Jamshoro's Al-Manzar and Palla fish)	**200**	**-**	**Non ADP**	**-**	**-**
3.	Branding & Tourism Promotion Campaign	**50**	**-**	**Non ADP**	**Short Term**	**-**

6.3.7 Immediate Action Plan for Core Urban Area

➢ **Improvement of Open Spaces and Parks**

The core urban areas of Kotri, Bolhari and Jamshoro needed upgradation and improvement. Developing safe, accessible, and well-maintained recreational spaces is essential to promote healthier lifestyles and strengthen community well-being. Incorporating native plants and drought-resistant landscaping will also help create environmentally friendly green spaces that require less water and maintenance.

Malik Mehrab Khan Park

Park

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I. Scope

The improvement of open spaces and parks will involve the following actions:

- Shade Structures: Arches, shade sails, and shelters to provide sun protection.
- Seating Options: Benches, picnic tables, and shaded sitting areas.
- Aesthetic Enhancements: Decorative elements such as fountains or small water features.
- Accessibility: Well-maintained, wheelchair-accessible pathways and ramps.
- Energy-Efficient Lighting: LED lighting for safety and reduced energy use.
- Stormwater Management: Rain gardens, permeable pavements, and bioswales.
- Cultural and Visual Interest: Sculptures, art installations, and cultural motifs reflecting local heritage.

II. Size:

The program will rehabilitate and improve four priority recreational facilities in the core urban area of Kotri City. The total area covered under this initiative is 6.32 acres, with site-specific intervention areas ranging from 0.37 to 3.4 acres.

III. Preliminary cost estimate

Total Estimated Cost: 500 million approx.

Table 6-15: Recreational Facilities Preservation

S. No	Recreational Preservation Site Name	Area / Locality /Address (acre)	Area (acre)	cost in Million
1	Malik Mehrab Khan Park	6.32	0.37	26
2	Brohi Chowk Park		0.18	13
3	Khanzada Ground		1.05	73
4	Garho Ghot Ground		1.29	120
5	Malik Sikandar Khan Sports Complex		3.4	268
	Total		**6.32**	500
		Total PKR Rs. Million	**500**	

Note:

- ✓ Rehabilitation of lanes, streets and connection minor and major roads.
- ✓ Utility Infrastructure rehabilitation includes basic services of water supply, electricity and gas supply.
- ✓ Public facilities include rehabilitation and provisioning of public toilets, proper seating arrangements.
- ✓ As per the law-and-order situation security concerns make the overall impact to uplift the society life with respect to secured environment.
- ✓ All these basic services in MC core areas need to be rehab for quick revitalization of people's life.

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Model of Playground

IV. Implementation Framework

- Funding: To be mobilized through ADP allocations, municipal budgets, and possible PPP/CSR contributions (e.g., local industries adopting parks).
- Execution: Rehabilitation will be phased, starting with Malik Mehrab Khan Park and Khanzada Ground as pilot projects.
- Monitoring: KPIs will include area rehabilitated (acres), number of parks made functional, user satisfaction, and reduction in encroachment/misuse.

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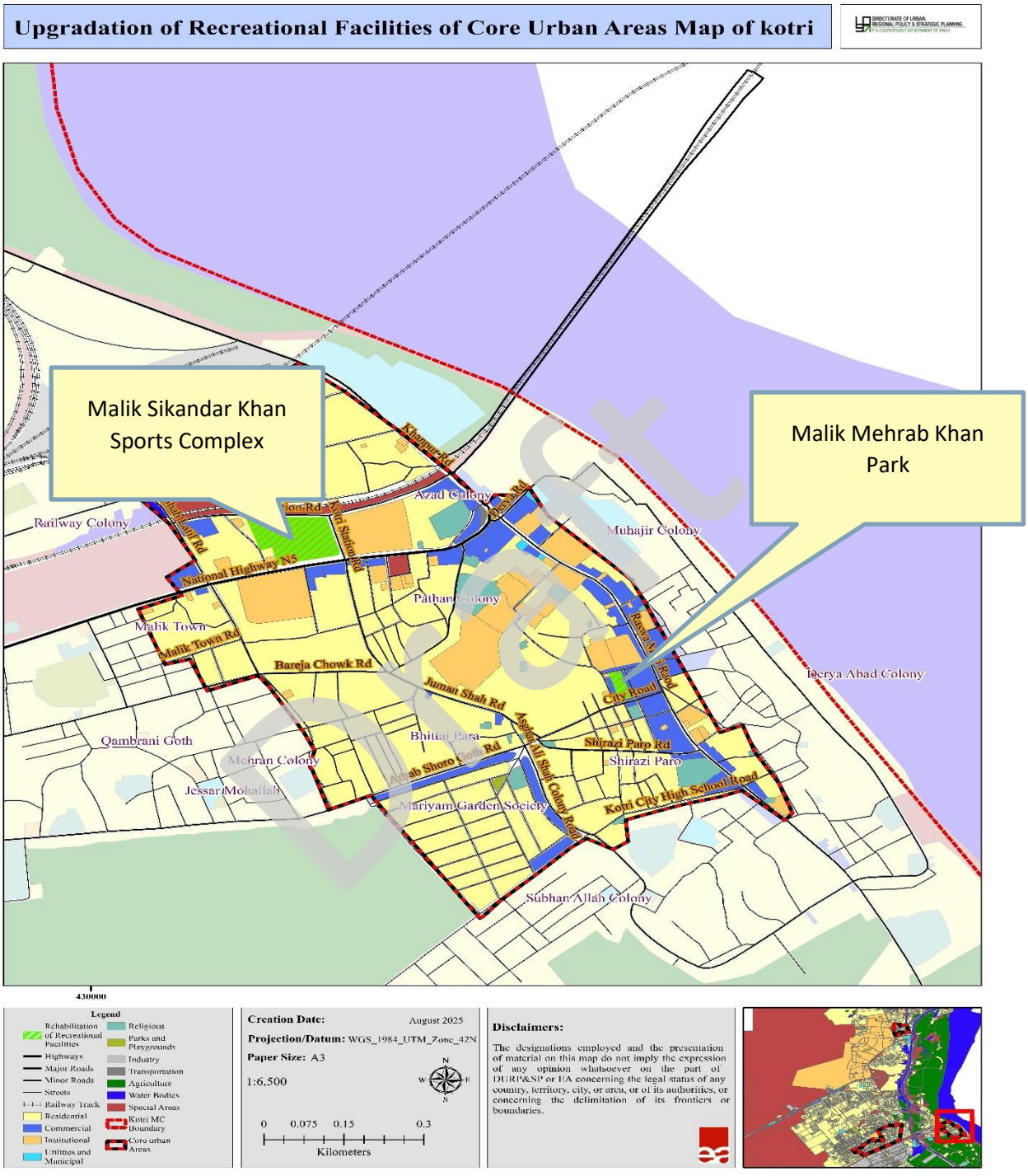
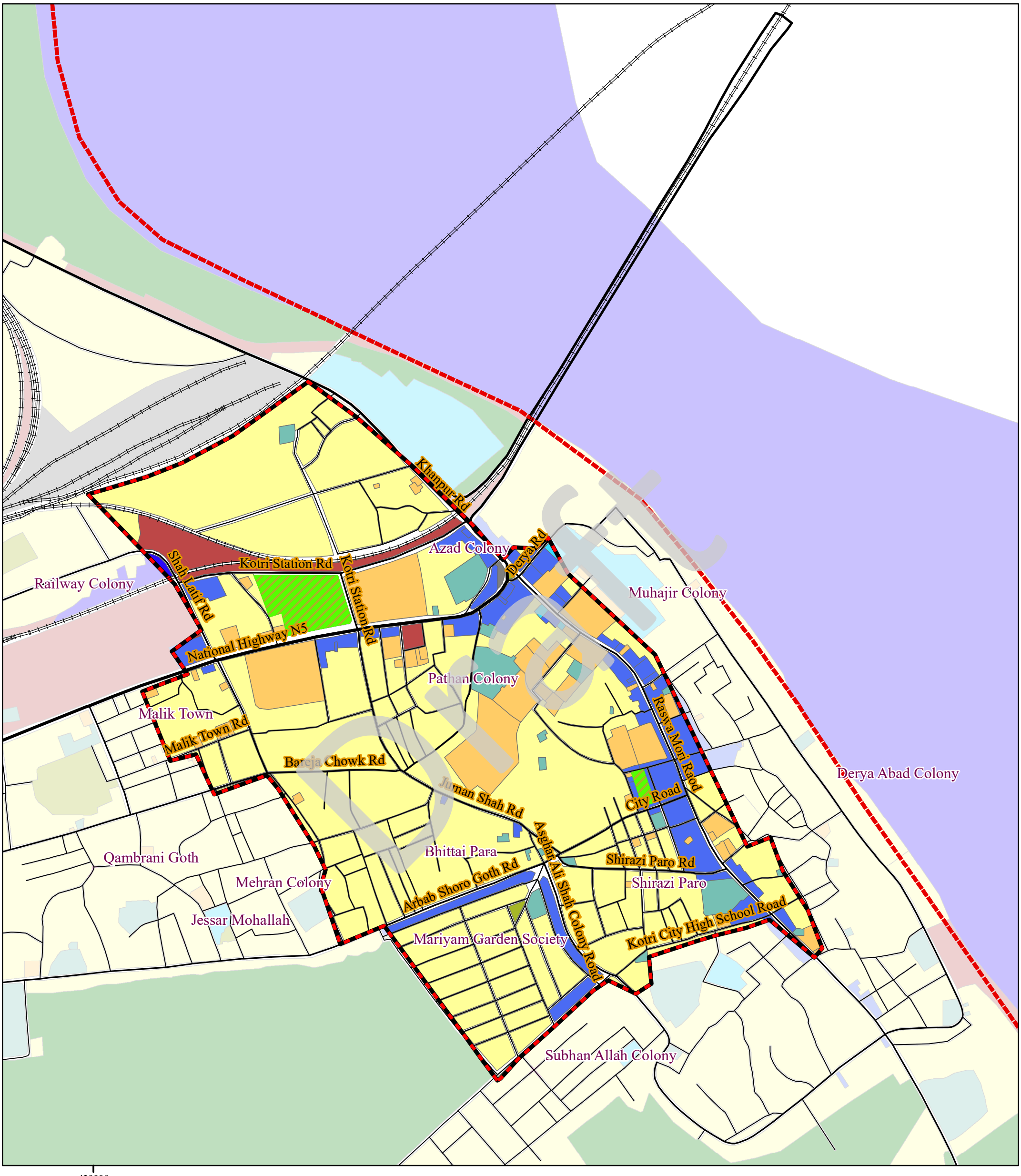


Figure 6-7: Upgradation of Recreational facilities of Core Urban Areas Map of Kotri

Upgradation of Recreational Facilities of Core Urban Areas Map of kotri

DIRECTORATE OF URBAN, REGIONAL POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Rehabilitation of Recreational Facilities
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Kotri MC Boundary
- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

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Kilometers

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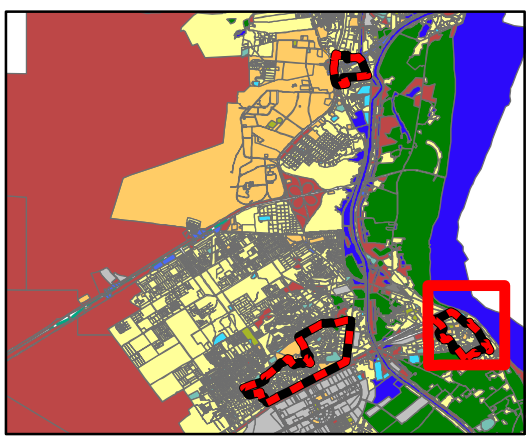

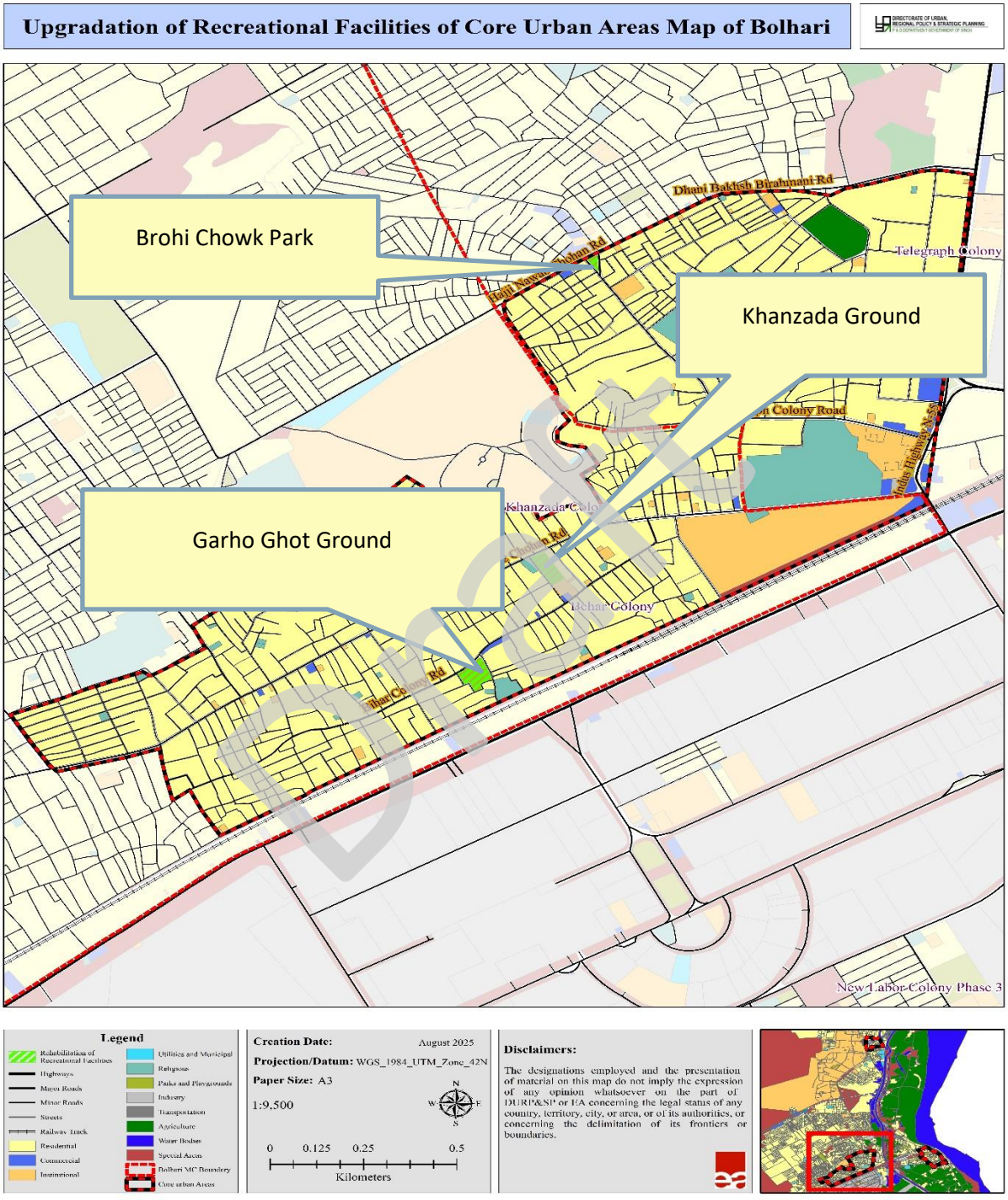

Figure 6-8 : Proposal for Recreational Landuse for Kotri City

Upgradation of Recreational Facilities of Core Urban Areas Map of Bolhari

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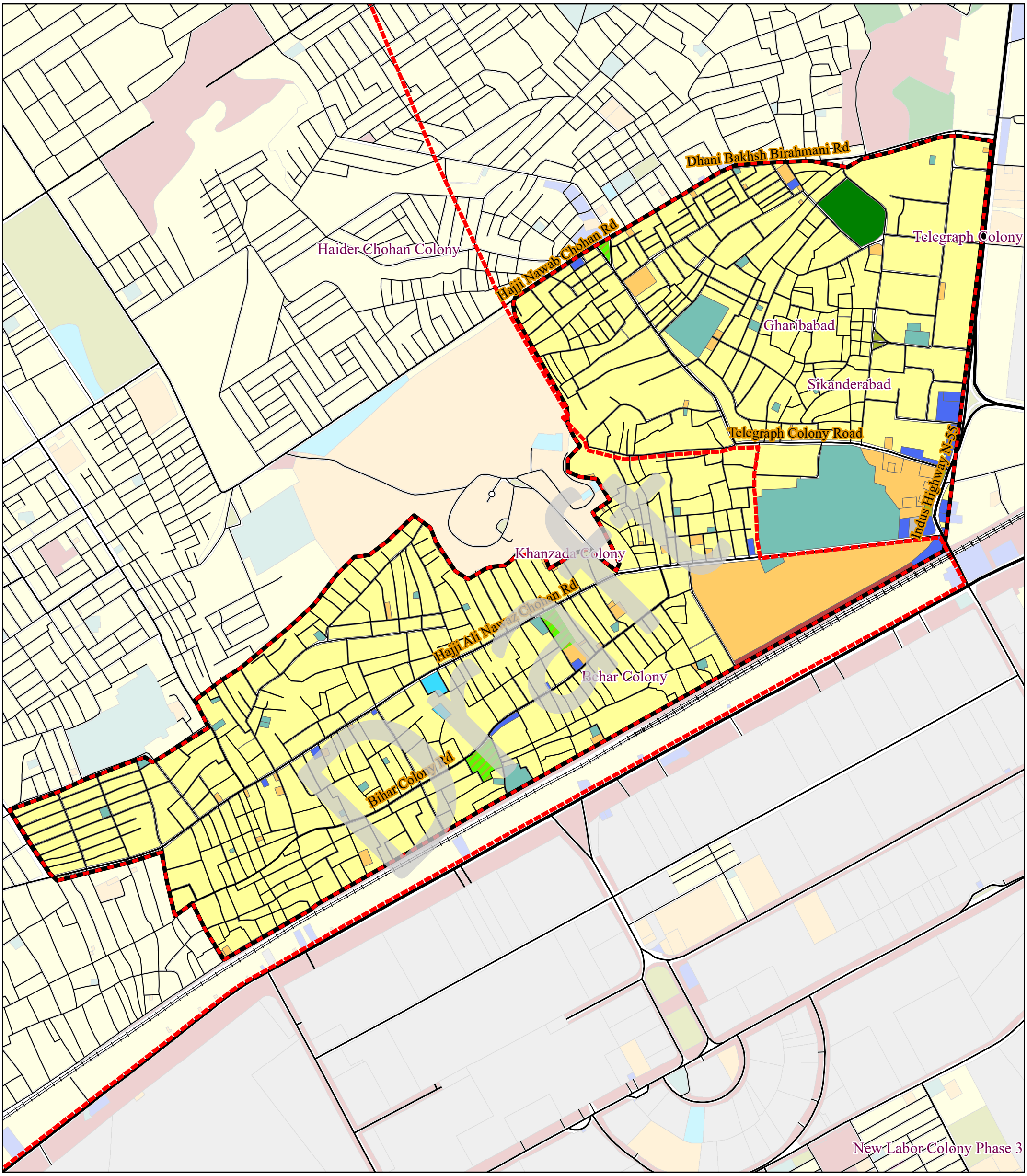
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Rehabilitation of Recreational Facilities
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
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- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:9,500

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Kilometers

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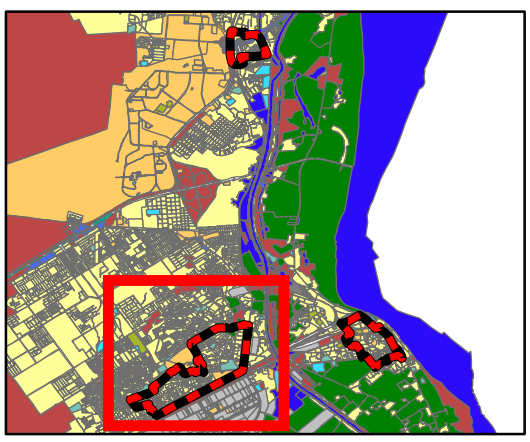


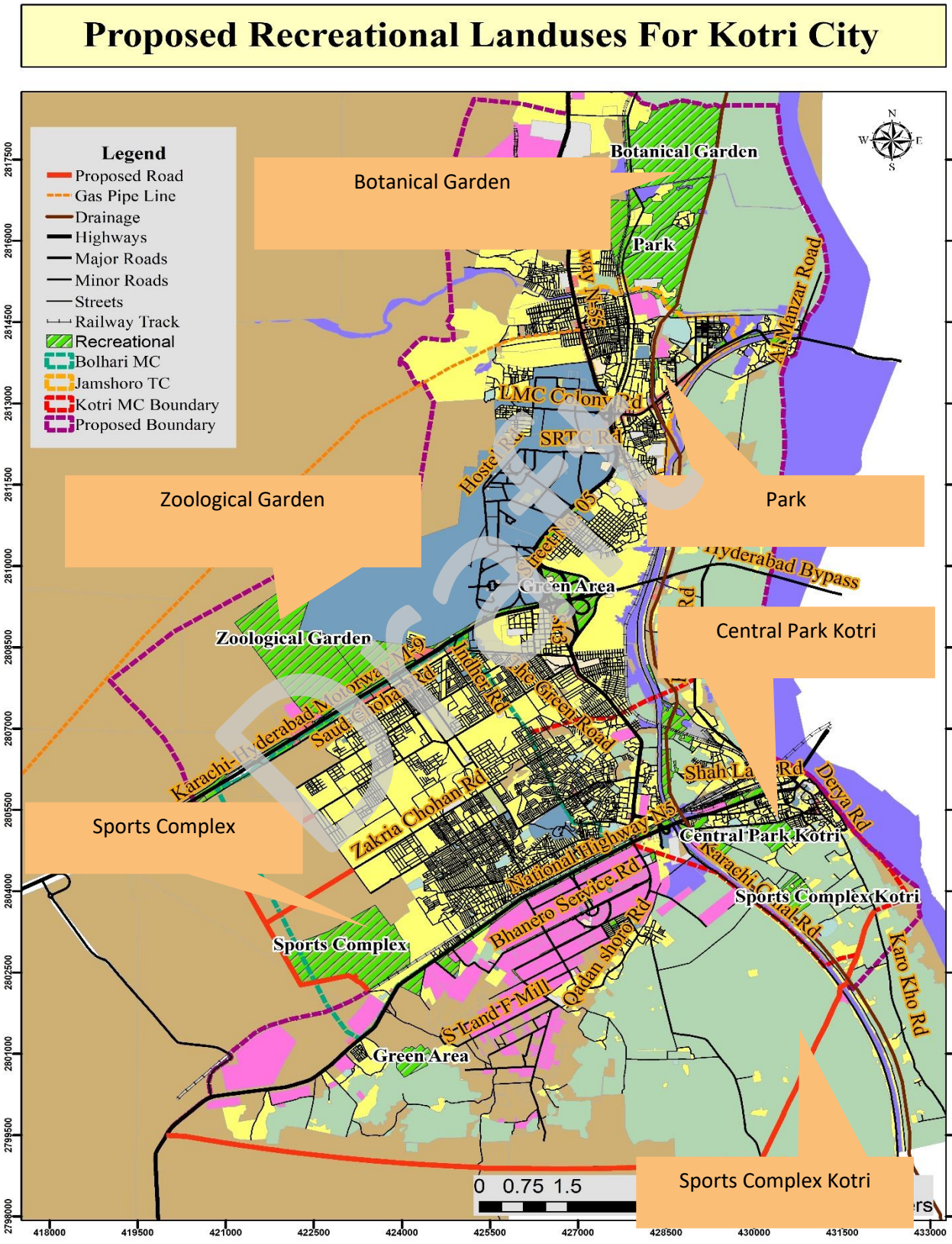
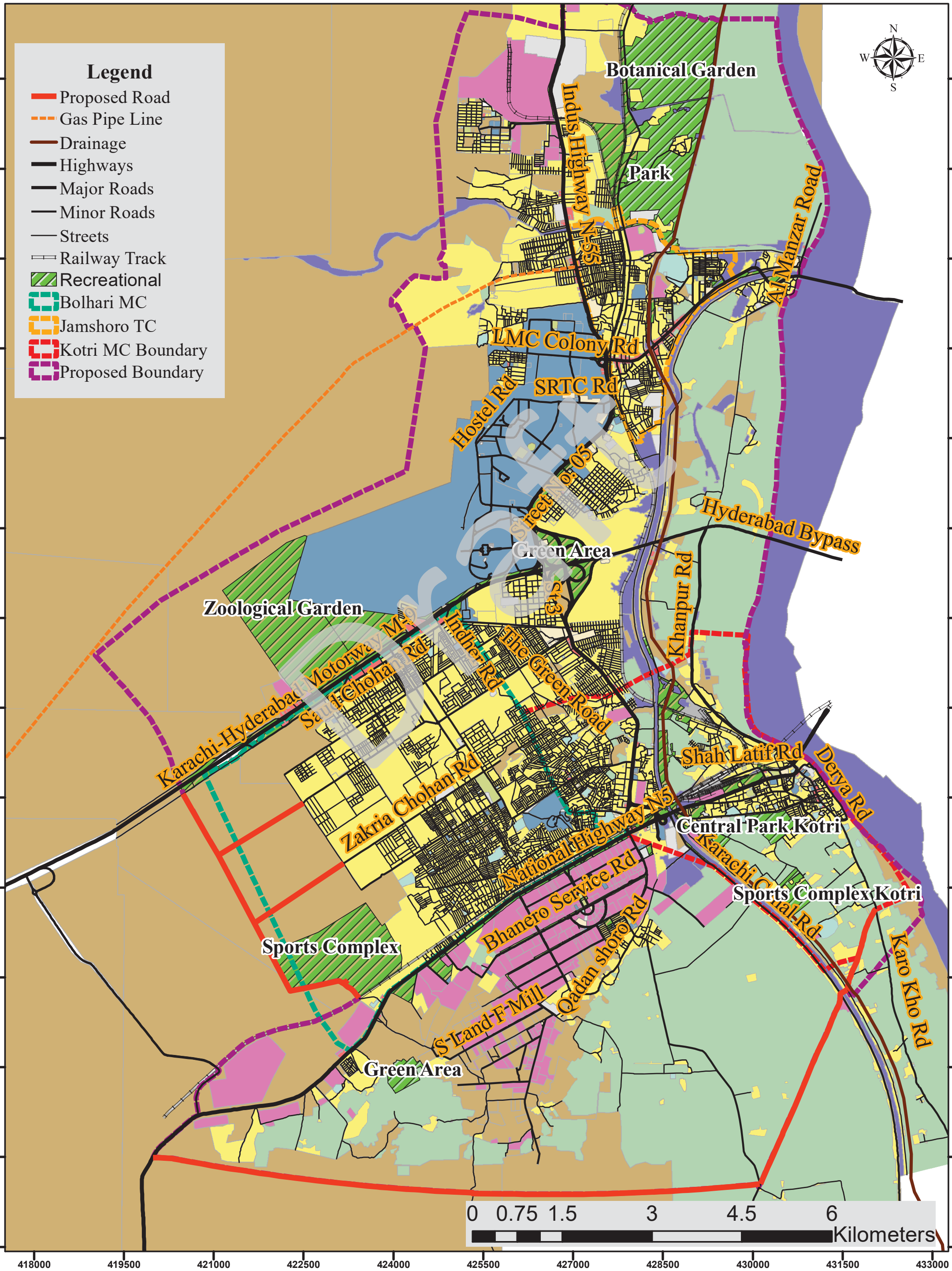


Figure 6-9 : Proposal for Recreational Landuse for Kotri City

Proposed Recreational Landuses For Kotri City



7. BASIC UTILITIES

7.1 Water Supply

7.1.1 ***Existing Situation***

The KB feeder is also known as Karachi canal off-takes, from right side of Kotri Barrage from Indus River is the major source of supply for Kotri at Jamshoro. The designed water supply of the canal was 257 cusecs. At present the maximum discharge capacity is less than 241 cusecs. The canal has insufficient capacity to meet present and future needs and deteriorated in condition such that the security of supply has been severely affected. The shortage of irrigation water supplies and reduced water carrying capacity of KB (Kalri Baghar) Feeder require remodeling of the canal (an off-taking canal from right bank of Indus River at Kotri Barrage).

Over time, Kotri's water supply system has evolved through several phases to address the growing needs of its population. Phase I (1964–1967) introduced the first formal scheme at a cost of 1.163 million PKR, designed to supply 0.60 MGD of potable water at 20 gallons per head per day for 29,000 persons. Phase II (1980–1984) expanded capacity with a 2.779 million PKR project, delivering 1.20 MGD of filtered water for a designed population of 55,000 persons up to 1992 at 20 GPH/day. Phase III (1985–1986) established a new scheme at Sikandarabad Colony, including Khaskheli Village, Manjhi Shoro, Gopang Goth, and Baba Mehmood Shah Colony, with a supply of 276,000 gallons per day for 9,200 persons at 30 GPH/day, supported by a 100,000-gallon high service reservoir and system improvements for main Kotri city. Phase IV (1992–2002) divided the city into two service zones: Zone A, designed for 38,500 persons up to 2002 with 1.20 MGD at 30 GPH/day, and Zone B, designed for 25,200 persons with 0.750 MGD at 30 GPH/day, together targeting 2.732 MGD for 84,335 persons up to 2020.

Currently, Kotri draws raw water from two points—0.750 MGD from the K.B. Feeder and 1.20 MGD from the Indus River, with an alternate 1.20 MGD source available at the K.B. Feeder. Within Kotri Municipal Corporation, two main schemes operate: the Main Kotri Water Supply (Marvi Cinema Scheme) and the Kotri Water Supply Scheme near the Christian Graveyard, both supplied by the K.B. Feeder and the Indus River. Additional schemes include three under Bolhari Municipal Committee (Muslim Town, Degree College Asadabad, and the K.B. Feeder Pumping Station), one under Jamshoro Town Committee (Jamshoro Colony Scheme), and a treatment plant serving the S.I.T.E. area, which also draws from the K.B. Feeder.

Kotri City's water distribution network includes various components across multiple phases, from floating pontoons and treatment plants to storage tanks and slow sand filters. The improvement and extension of the water supply scheme, currently under execution, include significant upgrades to the rising mains, solar systems, trunk mains, and pumping machinery.

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Table 7-1: Major Existing Components Of The Scheme of Kotri City

S. No.	Components	Phase-I	Phase-II	Phase-III	Phase-IV	Phase-V
1	Floating pantoon	1 No: (out of order)	------	----	----	----
2	Treatment plant.					18,636,000 18.630 Gal:
3	12” dia R. Main		------	5366 Rft 8"dia to 6" dia	10" dia 2850 Rft 12",8" 1900 Rft	28500 Rft 16"dia1000Rft 12n dia 2570rft 10"dia 1050rft
4	Storage tank	4 Nos: 1.80 MG	------	2 Nos: (200x100) Sikandarabad		
5	Slow sand filter	4 Nos: (100 x50)	2 Nos:	------	------	Filter bed i/c clarify filter
6	Clear W. Tank	2 Nos:(45'dia)	------	------	------	
7	H.S.R	1 No: (60000) Gallons capacity	------	1 No: 1 Lack	------	
8	Distribution about 12" to 3" dia	20000 Rft	18000.0 Rft 8" to 3"dia	Kotri 14200 6" & 3" dia 11465 Rft 8" to 3" dia Sikandarabad	11 045 Rft 6" to 3" dia	8” dia 4730 Rft 6" dia 1680 Rft 4” dia 4363 Rft 3" dia 4460 Rft
10	Pumping Mach:	6 sets	50 BHP 2 sets	30 BHP 2 sets 10 HP 2 sets Sikandarabad	20 BHP 2 sets 60 HP 2 sets 40 BHP 2 Sets 50 HP 3 Sets	30 BHP 2 sets 60 BHP 2 sets 50 BHP 1 set 20 BHP 3 Sets 15 BHP 3 Sets

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Improvement and Extension of Water Supply Scheme for Kotri city is approved by Government of Sindh in 2017 for Rs: 160.090 million and same is under execution now in this scheme up gradation and extensions was proposed for both zone i.e 'A' and 'B'. But due to non-availability of land the additional storage for zone 'A' was not proposed.

The work on the scheme is under progress with following components:

Zone A		Zone B	
Rising Main 12" dia P.E Pipe.	1000.00 Rft	Storage Tank 295 x 150	1000.00 Rft
Rising main KB. Feeder to main water		Rising Main 8" dia P.E Pipe.	2850.00 Rft
Supply 16" dia P.E. Pipe.	4200.00 Rft	Supply 16" dia P.E. Pipe.	4200.00 Rft
Solar System	218205 Watt	Solar System	252148 Watt
Trunk main 12" dia	2500.00 Rft(For Godro Para)	Trunk main P.E. Pipe 10" dia	2200.00 Rft
Pumping Machinery at River Indus	20 BHP 2 Sets	Pumping Machinery at Storage Tank	50 BHP 2 Sets
Pumping Machinery at K.B.Feeder	25 BHP 2 Sets	Pumping Machinery at K.B. Feeder	10 BHP 2 Sets
Pumping Machinery at Water Works Main Water Supply	50 BHP 4 Sets	Pumping Machinery at Water Works Main Water Supply	4",6",8",10"&12" Dia

Following of details of schemes of Bolhari MC

1. **Muslim Town Scheme**
    - **Source:** KB Feeder
    - **Areas Served:** Muslim Town and Khuda Ki Basti
    - **Pump:** 60 HP
    - **Main Rising Pipe:** 6-inch PE pipe

2. **Water Supply Scheme Near Degree College Asadabad**
    - **Source:** KB Feeder
    - **Areas Served:** Asadabad: Area parallel to National Highway N-5 towards Thatta and the railway line
    - **Pump:** 40 HP
    - **Main Rising Pipe:** 6-inch AC pipe

3. **Water Supply Pumping Station Scheme at KB Feeder**
    - **Source:** KB Feeder
    - **Areas Served:** Khanzada Colony, Bihar Colony, Sikanderabad Colony, and surrounding areas
    - **Pumps:** 40 HP, 60 HP, 60 HP, 40 HP, 50 HP, 100 HP
    - **Main Rising Pipes:** 6 inches, 10 inches, and 18 inches

Draft

Pumping Stations:

Pumping Stations: There is a total of 20 pumping stations, which are instrumental in pumping water from the KB feeder and reservoirs. These stations are strategically located across different zones and areas to optimize water distribution.

- Main water supplies main Zone A
- Godhra Para Pump House Zone A
- Ground Tank, River Indus
- Irani Peer main scheme
- KB Feeder I
- KB Feeder II
- Baba Salahuddin Feeder
- Slee Per KB Feeder
- Bihar Colony
- Ghareebabad Talap
- Khanpur main
- Khanpur KB Feeder
- Sikandarabad KB Feeder
- Allah Dino Shah KB Feeder
- Sanwal KB Feeder
- Ghareebabad
- Ghareebabad (Stand by)
- Khanzada Colony
- Khanzada Colony II
- Water supply asadabad

These pumping stations are crucial for the effective distribution of water, especially considering the challenges of the canal's reduced capacity and the growing demand. The strategic location of these stations is designed to ensure that water is adequately pumped and distributed throughout Kotri MC, Bolhari MC, and Jamshoro TC.

Efficient management of these pumping stations and reservoirs is essential to ensure a consistent and reliable water supply. This includes regular maintenance, upgrades to handle increased capacity, and contingency plans for any disruptions in service. Given the critical role of water in the daily lives of residents and in local agriculture, ongoing investment and management in this water intake works are vital for the sustained growth and well-being of the communities in and around Kotri City.

Capacity: 01 Lac Gallons capacity of one overhead reservoir which is in functional and others are non-functional.

Residents experience a limited daily water supply, receiving water for only about 2-3 hours per day. This severe restriction impacts daily life and underscores the urgent need for enhancing the capacity and reliability of the water supply system. However, the residents of Muslim town receiving daily water supply about 7-8 hours per day.

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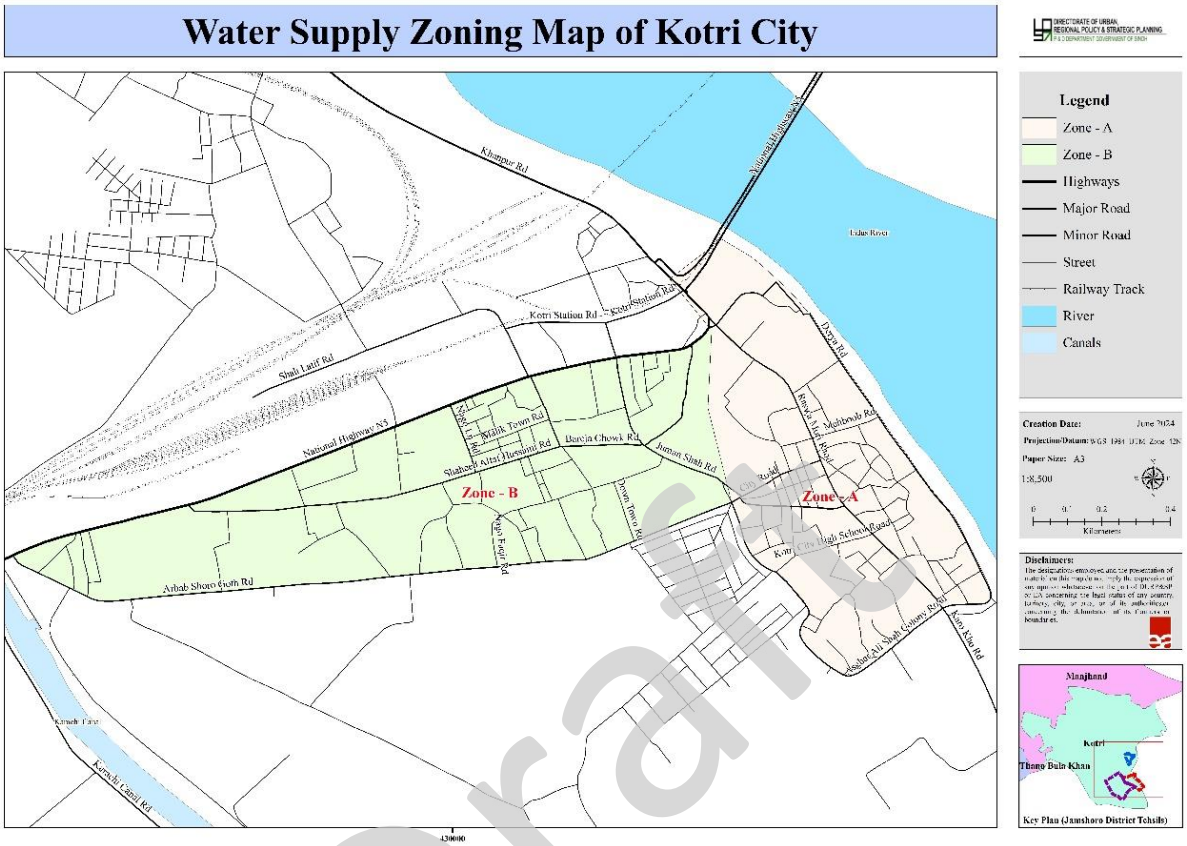

Figure 7-1: Water Supply Zoning Map of Kotri City

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Water Supply Zoning Map of Kotri City

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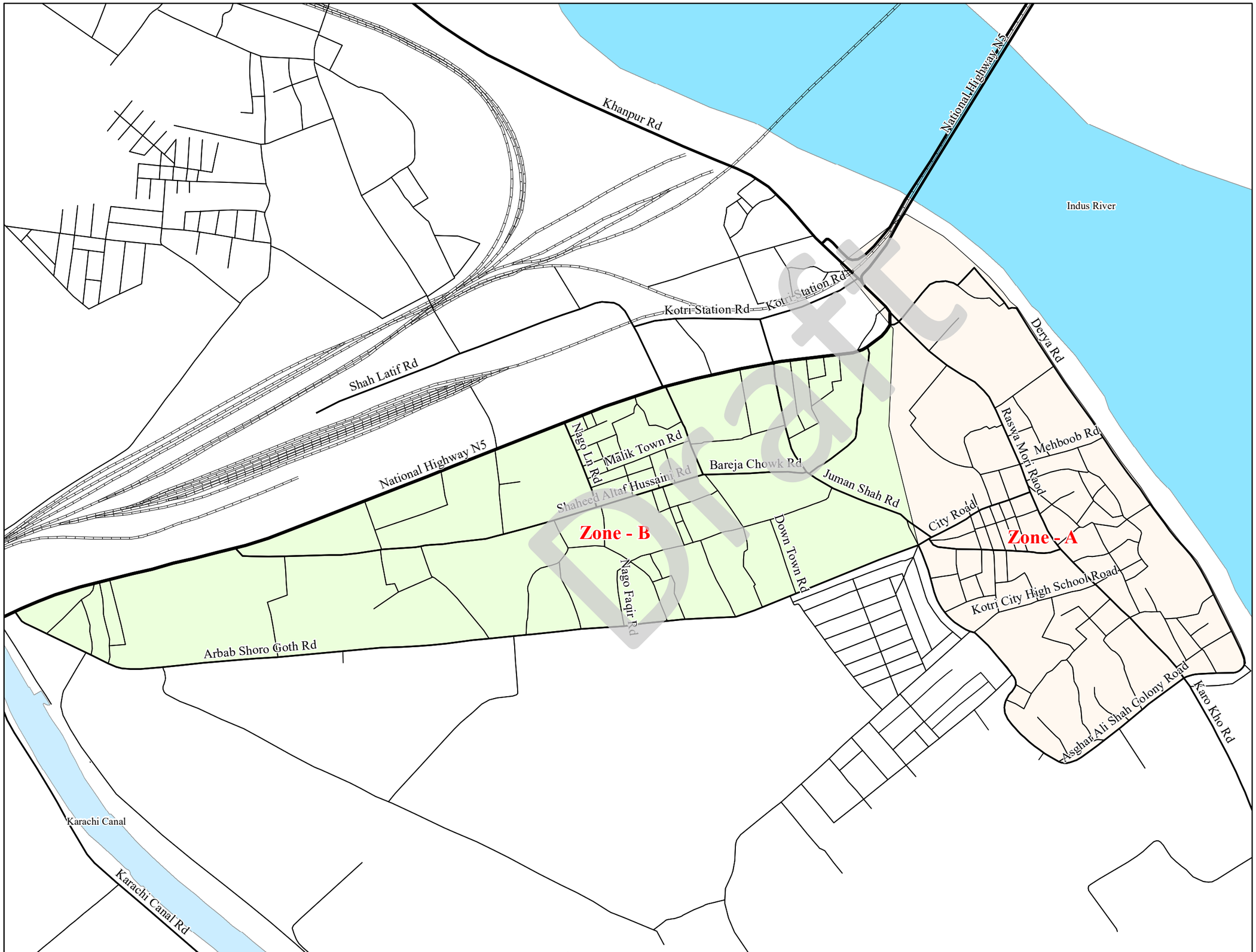
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Zone - A
- Zone - B
- Highways
- Major Road
- Minor Road
- Street
- Railway Track
- River
- Canals

Creation Date: June 2024

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:8,500

N W E S

0 0.1 0.2 0.4

Kilometers

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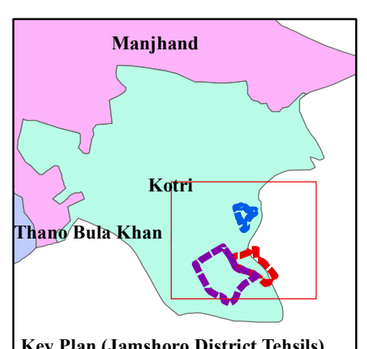

Key Plan (Jamshoro District Tehsils)

Storage Capacities of Water Supply Schemes in Kotri, Bolhari, and Jamshoro

Kotri Water Supply Schemes

The following storage capacities for various schemes in Kotri have been calculated using GIS mapping, assuming an average storage depth of 8 feet. These are approximate storage capacities for each scheme:

Table 7-2: Kotri Water Supply Schemes

Kotri Water Supply Schemes		Bolhari Water Supply Schemes		Jamshoro Water Supply Schemes	
Location	**Capacity (MGD)**	**Location**	**Capacity (MGD)**	**Location**	**Capacity (MGD)**
Abdullah Khan Shoro Water Supply Scheme	4.4	Storage Tank near Malik Shah Nawaz Rd	6.5	Sindh University Water Treatment Plant	41.8
Main Kotri City Water Supply (Marvi Cinema Scheme)	11.0	Khanzada Colony Water Tank	1.7	WAPDA Colony Water Supply Scheme	1.9
Filtration of Water Supply Scheme Kotri	35.8	Bihar Colony	0.7	Lower Sindh Mechanical Sub-Division	0.6
KB Feeder I Water Filtration Plant	4.4	Ghareebabad	2.1	Abdul Chawero Water Supply Scheme	0.3
Asadabad Water Supply Scheme	0.4	Ghareebabad Talap	0.3	Jamshoro Colony Water Treatment Plant	5.0
Water Tank near Haider Chohan Colony	0.7	Ghareebabad (Standby)	0.3	Storage Tank near Jaey Shah Cemetery	0.5
		Water Supply Treatment Plant	12.1		
		Water Tank	0.4		
Total	**56.7**	**Total**	**24.1**	**Total**	**50.1**

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Water Supply Schemes outside MCs & TC Boundaries

The following are the storage capacities for water supply schemes not within the municipal committee (MC) and town committee (TC) boundaries:

Table 7-3: Water Supply Schemes outside MCs & TC Boundaries

Location	Capacity (MGD)
RBB Colony Storage Tank	1.2
Sain Bux Mallah Water Supply Scheme	4.8
Water Supply SUECHS Jamshoro	3.8
Storage Tank near Society Water Supply Scheme	1.2
LUMHS Water Supply Scheme	10.8
Storage Tanks in LUMHS	2.3
Mehran Water Treatment Plant	24.4
Storage Tank near MUET Water Treatment Plant	0.7
Chakar Khan Rajar Water Supply Scheme	0.4
Total	**49.6**

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Summary of Total Storage Capacities:

- **Kotri**: 56.7 MGD
- **Bolhari**: 24.1 MGD
- **Jamshoro**: 50.1 MGD
- **Outside MCs & TC Boundaries**: 49.6 MGD

Grand Total: 180.5 MGD

These storage capacities reflect the potential water supply available through various schemes across Kotri, Bolhari, Jamshoro, and surrounding areas, contributing to the overall water management strategy in these regions.

Kotri employs the Rapid Gravity System (RGS) for water treatment, a method known for its efficiency and effectiveness in purifying water for consumption. This system consists of four filter beds, each measuring 35 feet by 18 feet. The RGS operates on the principle of gravity, utilizing the force to facilitate the filtration process. Water passes through these filter beds, filled with layers of different materials such as sand, gravel, and activated carbon. As water flows downward through the filter beds, impurities and contaminants are trapped within the filtration media, resulting in cleaner and safer drinking water. The use of multiple filter beds enhances the system's capacity and ensures thorough purification, making it a preferred choice for many water treatment facilities, however for other filtration information was not available with line department.

Technical Specifications of the Rapid Gravity Filter

- **Total Daily Discharge:** 1.411 MGD (say 1.5 MGD)
- **Number of Filters Proposed:** 4
- **Filtration Rate Adopted:** 1.50 Gallons/minute/sq. ft
- **Flow Per Filter:** 2.6667 MGD
- **Area of Each Filter Bed (including 5% provision for backwash):** 600 sq. ft
- **Size of Each Filter Bed:** 35 feet by 18 feet

The water supply system in Kotri faces multiple challenges including limited canal capacity, aging infrastructure, and uneven service distribution across zones. Despite various phases of expansion, demand continues to outpace supply, causing intermittent access for residents in many areas. Critical components such as pumping stations, storage tanks, and treatment plants require ongoing maintenance and upgrades to improve reliability and meet growing population needs. The current storage capacity of approximately 180 million gallons per day (MGD) across Kotri, Bolhari, Jamshoro, and adjacent areas underscores the potential supply; however, gaps in distribution and infrastructure efficiency persist. Addressing these issues demands a coordinated approach focusing on (i) rehabilitation and modernization of existing water treatment and distribution facilities, (ii) extension of network coverage to underserved communities, (iii) enhancement of storage and pumping capacity to ensure consistent supply, and (iv) integration with municipal infrastructure planning for sustainable water management. This phased strategy will support improved water access, reduce service disruptions, and contribute to the overall health and well-being of Kotri's residents.

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*7.1.2 **Issues:***

In Kotri City, the water supply faces several issues and challenges that need comprehensive strategies for sustainable management:

- The KB Feeder, the primary water source, has a reduced capacity due to structural damage and silt accumulation.
- Its inability to meet current and future demands highlights the urgent need for remodeling and rehabilitation.
- The absence of zoning in the supply network leads to inefficiencies, and there's a significant need for infrastructural upgrades.
- Residents rely on a mix of water supply methods, with significant use of tankers and piped connections.
- Nearly half of the population is concerned about water quality, indicating issues with cleanliness and suitability for consumption.
- Health issues like diarrhea, gastrointestinal problems, and typhoid fever are prevalent, pointing to the severe impact of water quality on public health
- This gap between supply and demand necessitates urgent and strategic planning to prevent a water crisis.
- Water quality assessments reveal issues with organic contamination, bacterial presence, and deviations in chemical parameters like pH and chloride levels.

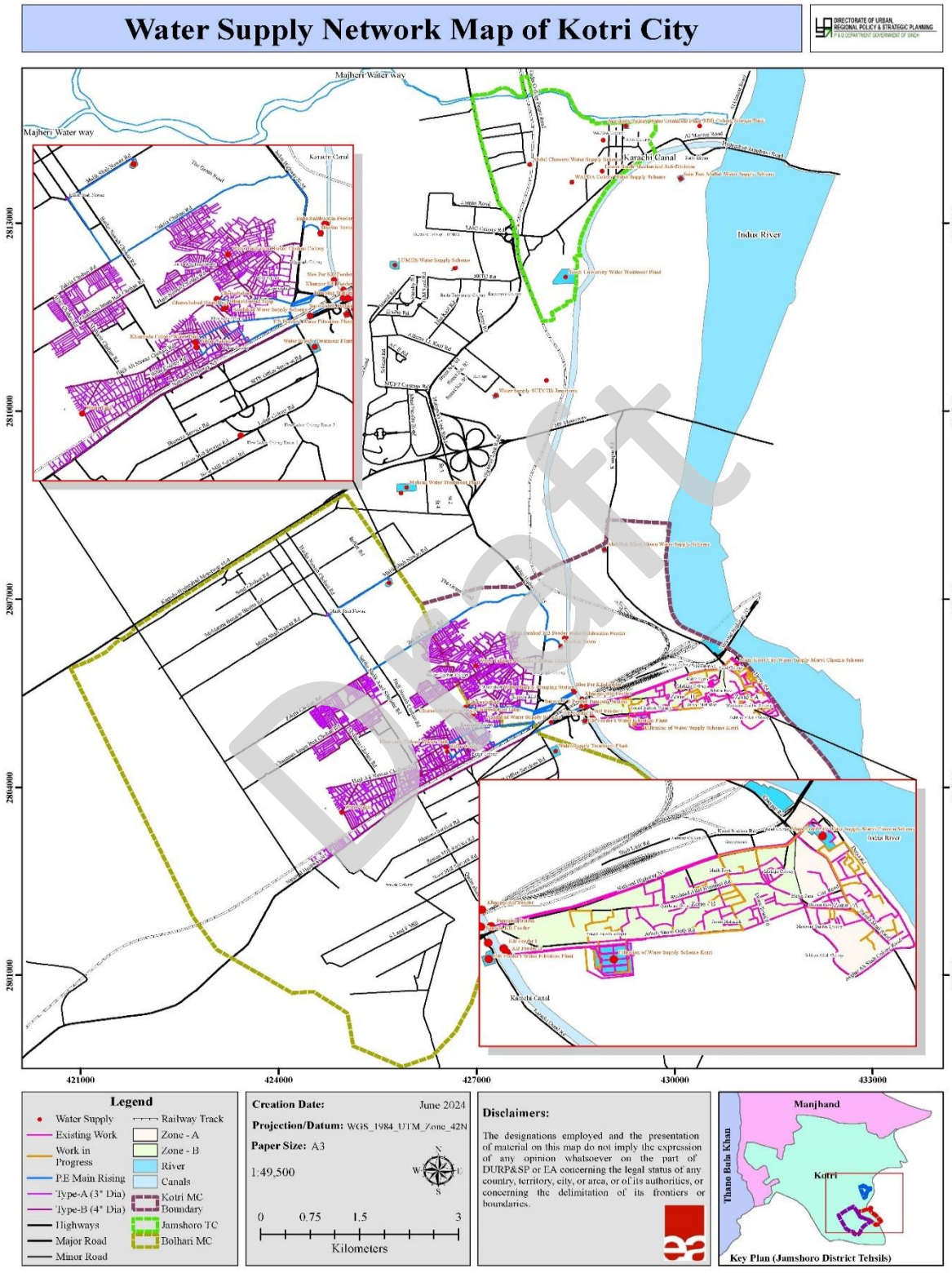

Figure 7-2: Existing Water Supply Map of DHQ Town

Water Supply Network Map of Kotri City

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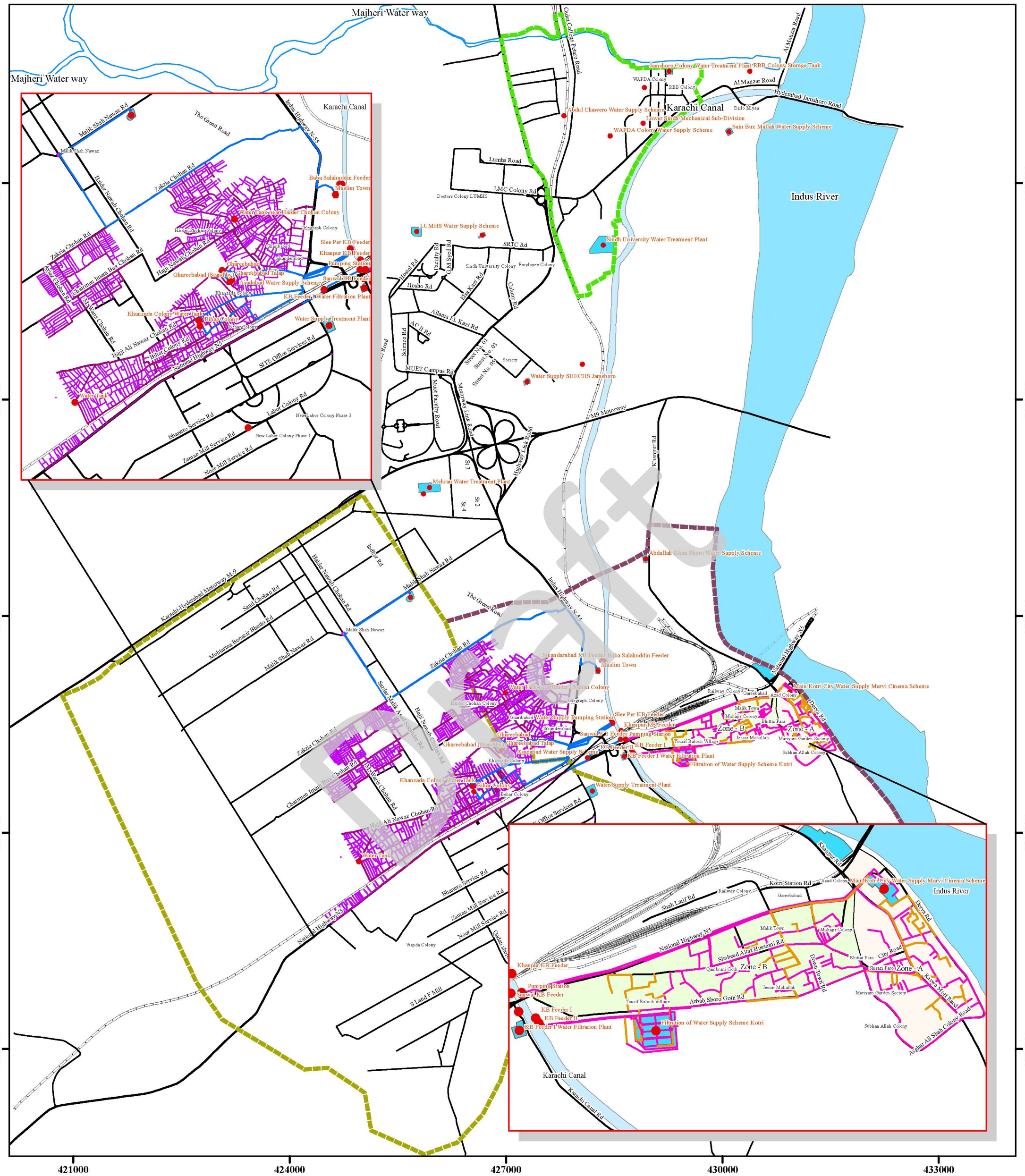

Legend

- Water Supply
- Existing Work
- Work in Progress
- P.E Main Rising
- Type-A (3" Dia)
- Type-B (4" Dia)
- Highways
- Major Road
- Minor Road
- Railway Track
- Zone - A
- Zone - B
- River
- Canals
- Kotri MC Boundary
- Jamshoro TC
- Bolhari MC

Creation Date: June 2024

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:49,500

0 0.75 1.5 3

Kilometers

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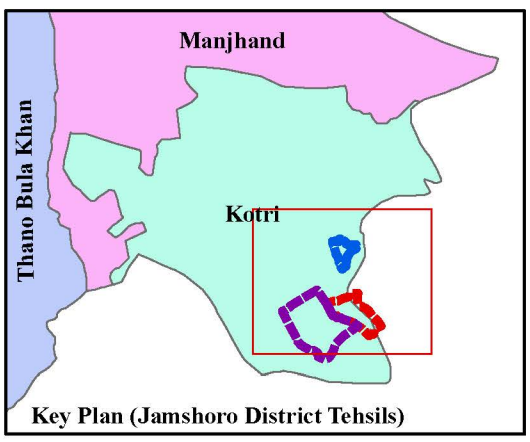

*7.1.3 **SWOT Analysis:***

BASIC UTILITIES			
Water Supply & Distribution			
Strength	**Weakness**	**Opportunities**	**Threats**
1. Intake sources available 2. Most of the town is covered by piped water supply network.	1. Absence of systematic water supply system and treatment plant. 2. Functional water supply overhead tank. 3. Poor administrative setup for water supply management and distribution.	1. Indus River is the best water resource available for water supply system development.	1. Depletion of water quality due to drought situation 2. People drink unsafe and contaminated water which gets vulnerable to hepatitis and other water born disease.

*7.1.4 **Need Assessment***

As per the secondary data from PHED Jamshoro, the present supply of the water is 2.53 mgd for Kotri MC, 3.39mgd for Bolhari MC and 0.86 mgd for Jamshoro. As per PHED standards, the estimated water demand of Kotri MC, Bolhari MC, and Jamshoro TC for the period up to 2045 is shown below:

Table 7-4: Need Assessment

Location	Present Supply	Year	2025	2030	2035	2040	2045
		Population	382,492	436,114	505,205	595,393	714,441
	6.78 MGD	Water Demand @30 gpcd	11.5 (MGD)	13.1 (MGD)	15.2 (MGD)	17.9 (MGD)	21.4 (MGD)

Source: Consultant Estimation

The need assessment confirms that the water supply response cannot depend solely on existing infrastructure; it requires a two-pronged approach: (i) urgent rehabilitation and upgrading of current water sources, treatment plants, and distribution networks to address capacity limitations, water quality issues, and operational inefficiencies; and (ii) targeted expansion of storage and supply systems to meet the growing demand driven by population increase. According to PHED data, the current combined water supply of Kotri MC, Bolhari MC, and Jamshoro TC is 6.78 million gallons per day (MGD), while projected demand is expected to rise from 11.5 MGD in 2025 to 21.4 MGD by 2045. This phased strategy will ensure reliable, safe, and sustainable water access for the region's communities over the long term.

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7.1.5 Sindh Drinking Water Policy 2017 [44]

Principles:

- Population should be using an improved drinking water source which is accessible i.e. located on premises, available when needed and safe that is free of fecal and priority chemical contamination.
- Access to safely managed drinking water is a fundamental right of every citizen and that it is the responsibility of the Government to ensure its provision to all citizens.
- Water allocation for drinking purposes shall be given priority over other uses.
- In order to ensure equitable access, special attention shall be given to removing the existing disparities in coverage of safe drinking and for addressing the needs of the poor and the vulnerable.
- A supportive policy framework shall be developed that encourages alternate options through private provision, public-private partnerships, the role of NGOs and community organizations.
- Low-cost technologies in water and sanitation, that are easy and cost-effective to maintain shall be developed and used.

Objectives:

- Develop criteria for installation of new drinking water supply schemes and ensure that all new schemes are safely managed, rationalized and constructed through need-based criteria so that all areas and communities are served.
- Develop standardized service delivery models for both urban and rural drinking water supply schemes to improve efficiency, cost-effectiveness, improve monitoring and sustainability.
- Develop mechanisms for reuse, recycle and recharge of wastewater for other municipal and productive uses.
- Ensure that all drinking water supply systems are designed and constructed in line with the national drinking water quality standards and all municipal discharges comply with National Environment Quality Standards (NEQS).
- Install water treatment plants at existing drinking water supply schemes where required and incorporate water treatment facilities in all new drinking water supply schemes.
- Ensure development of water safety plans for all drinking water supply systems.
- Institute adaptation measures and disaster risk reduction and mitigation strategies to minimize the impact of climatic events on drinking water supply systems.

7.1.6 Strategic Development Plan

i. Long Term Plan

- Municipality will adopt a demand led approach in providing access to safe water and sanitation to ensure that scarce resources are properly utilized and ownership and sustainability of schemes is ensured over the long-term.
- Frame a broad policy framework at the provincial level which encourages and supports city district to design and implement policy which is in-keeping with the existing capacities and strengths of institutions.
- Feasibility Study for identification of new water sources for town
- Exploration and regulation of fresh groundwater

[44] Water and Sanitation Policy for Sindh 2017.

Draft

ii. Short Term Plan

- The design and layout of water supply pipes, storage tanks etc. should ensure that there is no contamination by overflowing sewerage systems, for example by maintaining a minimum distance between the two systems.
- Wherever possible, preference should be given to rehabilitate existing schemes (functioning or not) over the construction of new schemes, unless there are special reasons to justify otherwise.

The strategic development plan for water supply focuses on ensuring equitable, safe, and sustainable access to drinking water through a balanced approach of long-term vision and immediate actions. The long-term plan emphasizes adopting a demand-led approach that prioritizes resource efficiency, community ownership, and sustainability, supported by provincial policy frameworks and thorough feasibility studies for new water sources and groundwater management. In the short term, priority will be given to rehabilitating existing infrastructure, improving system designs to prevent contamination, and upgrading facilities to meet safety and quality standards. This integrated approach aims to strengthen water supply systems, safeguard public health, and enhance resilience against climatic challenges, ensuring reliable water services for all communities over time.

7.1.7 Priority projects

i. Improvement of Water Intake Works

Uninterrupted raw-water abstraction is essential to sustain treatment output for Kotri MC and Bolhari MC. Present intakes/pumps and key rising mains are capacity-constrained and partially non-functional, causing <2 hours/day supply and vulnerability during canal closures. The project strengthens abstraction at the Main Kotri Water Supply Marvi Cinema Scheme and the Kotri Water Supply Scheme near Christian Graveyard and in Bolhari MC three Muslim Town Scheme, Water Supply Scheme near Degree College asadabad and Water Supply Pumping Station Scheme at KB Feeder intakes, adds/rehabilitates pumping sets, and upsizes priority transmission reaches to stabilize flows to treatment and storage.

Marvi Cinema Water Supply

Marvi Cinema Water Supply Tank

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Mixing of Water Supply line with sewerage

Water Supply Scheme

➢ **Scope**

The project focuses on strengthening raw-water abstraction and transmission infrastructure to ensure uninterrupted and efficient water supply for Kotri Municipal Committee (MC) and Bolhari MC. Existing intakes, pumps, and key rising mains are currently operating below capacity, resulting in limited supply (less than 2 hours per day) and vulnerability during canal closure periods.

i. Improvement of Raw-Water Intakes and Pumping Systems

- Upgradation and rehabilitation of intakes at:
  - Main Kotri Water Supply (Marvi Cinema Scheme)
  - Kotri Water Supply Scheme near Christian Graveyard
  - Bolhari MC Water Supply Systems at Muslim Town Scheme, near Degree College (Asadabad), and the Pumping Station at KB Feeder.

- Installation of new and energy-efficient pumping sets to restore and augment abstraction capacity.

ii. Rehabilitation and Expansion of Transmission Infrastructure

- Replacement and up-sizing of priority rising mains (18”, 16”, and 12”) to improve flow stability between intake points, treatment plants, and storage reservoirs.

- Rehabilitation of storage tanks and electrical systems to improve operational efficiency and reduce O&M costs.

iii. System Resilience and Operational Optimization

- Improved conveyance capacity and redundancy to sustain water supply during canal closure periods.

- Reduction in energy consumption and unaccounted-for water losses through modernized pumping and monitoring systems.

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- **Size**

i. Geographical Coverage:

The project encompasses major abstraction and transmission facilities serving Kotri MC and Bolhari MC, including:

- Main Kotri Water Supply (Marvi Cinema Scheme)
- Kotri Water Supply Scheme near Christian Graveyard
- Bolhari MC Systems: Muslim Town Scheme, Water Supply Scheme near Degree College (Asadabad), and Pumping Station at KB Feeder.

ii. Physical Components:

- Upgraded intakes and pumping sets.
- Rehabilitated storage tanks and electrical systems.
- Replacement and up-sizing of rising mains in critical reaches.

iii. Service Impact:

- Reliable water abstraction and transmission to treatment plants, ensuring continuous water supply.
- Improved resilience during seasonal canal closures through enhanced conveyance and storage turnover.
- Reduction in operational energy consumption and maintenance costs through efficient pumping and automation.

iv. Beneficiaries:

- Residents across Kotri and Bolhari MCs.
- Direct benefits to urban households, educational institutions, and small industries through improved water reliability.

- **SDG'S Alignment**

I. **GOAL 3 – Good Health and well-Being Goal:** Strengthened raw-water abstraction, rehabilitated pumping sets, and upgraded transmission mains ensure reliable and equitable access to safe drinking water. This intervention directly supports SDG 6.1 and SDG 6.4, which focus on achieving universal access to safe and affordable drinking water and increasing water-use efficiency to secure sustainable withdrawals.

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II. **GOAL 6 – Clean Water and Sanitation:** This is the most directly aligned goal. The project supports SDG 6.1 and 6.4, which target universal and equitable access to safe and affordable drinking water, and improving water-use efficiency across sectors. By strengthening intake and supply infrastructure, the project directly addresses water scarcity and quality.

➢ **Project List & Locations**

- Intake & pump upgrades – **Main Kotri Water Supply Marvi Cinema Scheme and the Kotri Water Supply Scheme near Christian Graveyard**.
- Storage tank & pump rehab – **Muslim Town Scheme, Water Supply Scheme near Degree College Asadabad and Water Supply Pumping Station Scheme at KB Feeder**.
- Priority rising mains (18"/16"/12")—critical reaches to **Main Kotri Water Supply Marvi Cinema Scheme & the Kotri Water Supply Scheme near Christian Graveyard**.

➢ **Implementing Authority:** Kotri MC, Government of Sindh and PHE Department.
➢ **Preliminary Estimated Cost:** 700 million PKR Approx.

ii. Construction / Rehabilitation of Water Supply Network

Almost All the network of Water Supply in Kotri city at kotri MC and Bolhari MC is in poor condition and most of it are totally damaged. Kotri MC water Supply is divided into two zones A and B with two water supply schemes Main Kotri Water Supply Marvi Cinema Scheme and the Kotri Water Supply Scheme near Christian Graveyard. In Bolhari MC three Muslim Town Scheme, Water Supply Scheme near Degree College asadabad and Water Supply Pumping Station Scheme at KB Feeder, in many areas no proper Water Supply Network. This project will help to supply of water in those areas where the network is not available and existing network is damaged. The Water Supply network is needed to be rehabilitate and where the Network is not available there should be provided.

➢ **Scope**

The project aims to rehabilitate and expand the existing water supply network across Kotri Municipal Committee (MC) and Bolhari MC to ensure continuous and equitable access to safe drinking water. The current network in both jurisdictions is severely deteriorated many pipelines are damaged or non-functional, and several areas lack a proper water supply system altogether.

The proposed intervention focuses on:

i. Rehabilitation of the Existing Network

- Replacement of damaged and leaking pipelines within Zone A and Zone B of Kotri MC, which are served by:
    - Main Kotri Water Supply (Marvi Cinema Scheme)
    - Kotri Water Supply Scheme near Christian Graveyard

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- Restoration of old connections, valves, and distribution chambers to reduce losses and improve pressure.

ii. Extension of Water Supply Network in Unserved Areas

- Laying of new pipelines in Bolhari MC, particularly in:
  - Muslim Town Scheme
  - Water Supply Scheme near Degree College (Asadabad)
  - Water Supply Pumping Station Scheme at KB Feeder

- **Provision of new service connections in areas currently dependent on tankers and hand pumps.**

➢ **Size**

i. Geographical Coverage:

- The project encompasses the entire service area of Kotri MC (Zones A & B) and Bolhari MC, focusing on both rehabilitation of old infrastructure and network expansion in underserved localities.

ii. Physical Components:

  - Rehabilitation of existing damaged pipelines.
  - Extension of new distribution lines in unserved areas.
  - Installation of valves, washouts, distribution chambers, and household service connections.

iii. Target Population:

  - Residents of Kotri MC and Bolhari MCs.
  - Special focus on low-income and underserved neighborhoods currently lacking piped water access.

➢ **SDG'S Alignment**

I. **GOAL 3 –** Good Health and well-Being Goal: Consistent access to safe drinking water significantly reduces the risk of waterborne diseases. This supports SDG 3.9, which focuses on reducing illness from contaminated water and poor sanitation.

II. **GOAL 6 –** Clean Water and Sanitation: This is the most directly related goal. Rehabilitating and constructing overhead water reservoirs support SDG 6.1 and 6.4 by increasing access to safe, reliable, and sustainable drinking water and improving water storage and efficiency. It ensures equitable access for all, especially in marginalized areas.

III. **GOAL 11 –** Make cities and human settlements inclusive, safe, resilient and sustainable: Reliable water infrastructure is foundational for building inclusive and resilient urban environments. This project aligns with SDG 11.1 and 11.3 by promoting basic service provision and sustainable urban infrastructure planning.

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- **Implementing Authority:** Government of Sindh, PHED Kotri
- **Preliminary cost estimate:** 1800 million PKR Approx.

Table 7-5 Rehabilitation of Water Supply Network Estimated Cost (Kotri City)

S. No.	Project Name	Estimated Cost in Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Water Supply						
1.	Procurement for additional land for water works	400	-	Non-ADP	-	Long Term
2.	Intake & Pump Upgrades (Main Kotri Water Supply Marvi Cinema Scheme and the Kotri Water Supply Scheme near Christian Graveyard)	300	-	Non-ADP	Short Term	-
3.	Rehabilitation of existing Water Supply Network	700	-	Non-ADP	Short Term	-
4.	Installation of New Water Supply Network for Remaining areas (incl. HH connections)	900	-	Non-ADP	Short Term	-
5.	Tube-Wells (Emergency / Peak-Shaving Only; sanitary-sealed with post-treatment blending)	200	-	Non-ADP	Short Term	-

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7.1.8 Immediate Action Plan for Core Urban Area

- **Improvement of Water Supply**

In the core urban areas of Kotri MC, Bolhari MC, and Jamshoro TC, water distribution relies on a few key schemes. Kotri is supplied through the Marvi Cinema facility and the system near the Christian Graveyard, drawing from both the K.B. Feeder and the Indus River, with supply divided between Zone A and Zone B. Bolhari operates three schemes—the Muslim Town facility, the system near Degree College Asadabad, and the pumping station at K.B. Feeder—while Jamshoro Colony is served by a single scheme. The S.I.T.E. area depends on a treatment plant near its industrial zone, also sourcing from the K.B. Feeder. Despite these arrangements, Jamshoro lacks a comprehensive network, and existing systems in Kotri and Bolhari face critical limitations, highlighting the urgent requirement for a reliable, sustainable, and efficiently managed solution to ensure fair access across all communities.

To address these shortcomings, an immediate plan has been prepared to rehabilitate and modernize distribution infrastructure, guaranteeing uninterrupted access to clean drinking water. Key priorities include upgrading outdated pipelines, preventing contamination, strengthening treatment processes, and improving resilience against future demand pressures. Through the integration of technical capacity and strategic investment, the initiative seeks to eliminate current deficiencies, safeguard public health, and establish a foundation for sustainable urban water governance.

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I. Scope:

- **Rehabilitation of Distribution Network:** Old, leaking, and corroded pipes will be replaced to ensure clean, contamination-free water supply in pathan Colony, shirazi paro, Bhatti Para, Malik Town, Muslim Town.
- **Upgradation of Pumping Machinery:** Installation of modern pumps and control systems for efficient and uninterrupted supply at Marvi Cinema, system near the Christian Graveyard, the Muslim Town facility, the system near Degree College Asadabad, and the pumping station at K.B
- **Metering & Monitoring:** Introduction of household water meters and leakage detection systems.
- **Expansion of Service Coverage:** Extension of pipelines to underserved areas within the core.
- **Community Engagement:** Awareness campaigns for water conservation and safe usage.

II. Size:

The Water Supply improvement will cover the entire core urban area of Kotri and Bolhari, which spans 825 acres. The detailed breakdown of the area and cost is as follows:

III. Preliminary cost estimate

Total Estimated Cost: 1200 million approx.

Table 7-6: Rehabilitation of Existing Water Supply Network of Core Urban Area Kotri & Bolhari

S. No	Component	Length / Coverage	Remarks	Per acre cost (PKR) million	Cost (PKR)
1	**Main Rising Line**	**1077 m (3,533 RFT)**	**Replacement with high-pressure pipes**	90,000	**144**
2	**Type A Distribution Lines**	**9,319 m (30,575 RFT)**	**Rehabilitation of primary supply lines**	90,000	**1000**
3	**Type B Distribution Lines**	**734 m (2408.84 RFT)**	**Secondary distribution to households**	90,000	**66**
Total Cost					**1200**

- Note: Rehabilitation includes supply pipe networks, pumping machinery, and associated equipment for reliable, efficient water delivery.

- Note: Rehabilitation includes supply pipe networks, pumping machinery, and associated equipment for reliable, efficient water delivery.

IV. Implementation Framework

- **Funding:** Provincial ADP allocations through the Public Health Engineering Department (PHED), supplemented by municipal resources.
- **Execution:** PHED will execute the works, with the Municipal Committee and Town Committee is responsible for operation and maintenance.
- **Monitoring:** KPIs will include % of households connected to piped supply, reduction in groundwater reliance, and water quality testing results.

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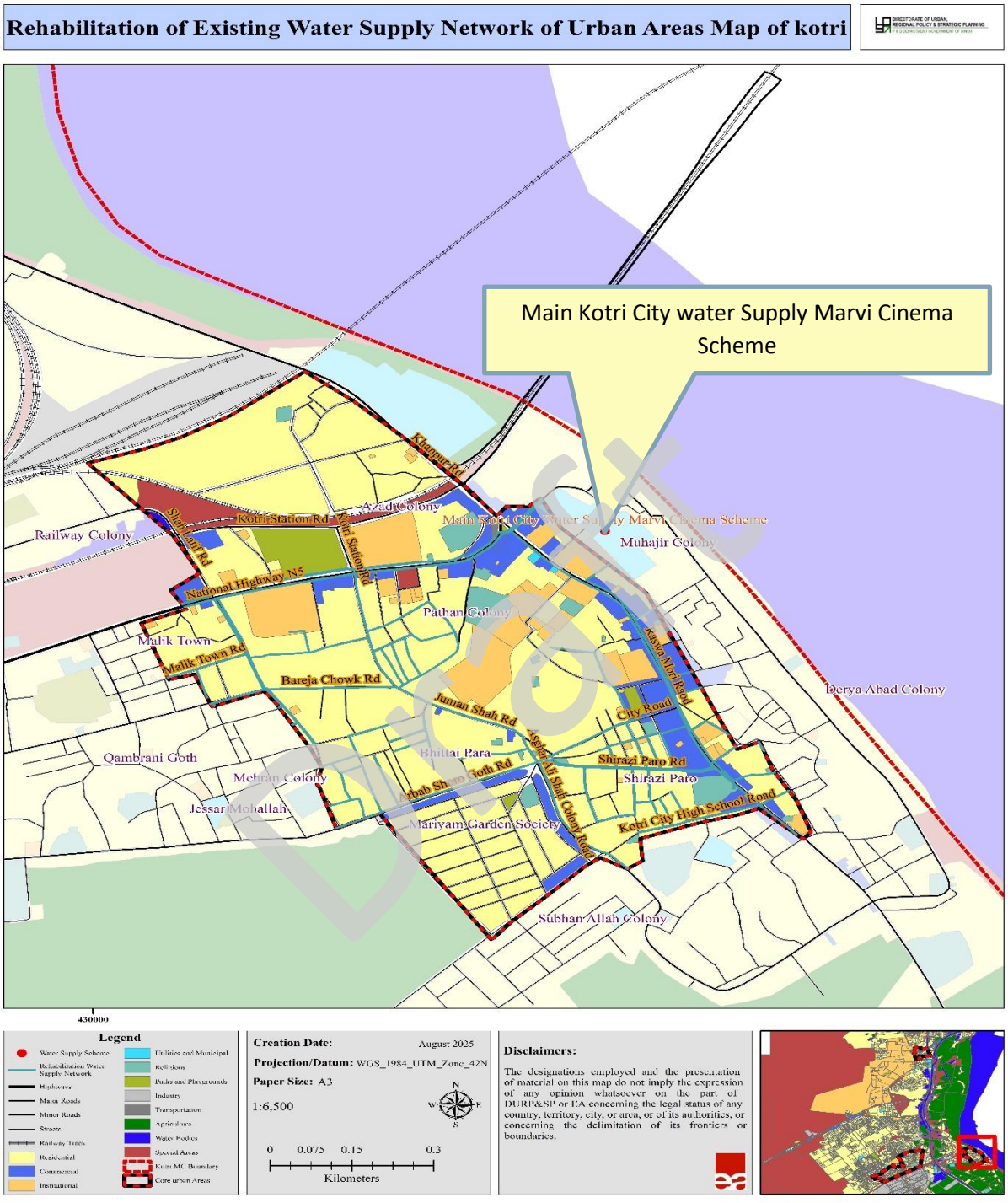

Figure 7-3: Rehabilitation of Existing Water Supply of Core Urban Areas Map of Kotri

Rehabilitation of Existing Water Supply Network of Urban Areas Map of kotri

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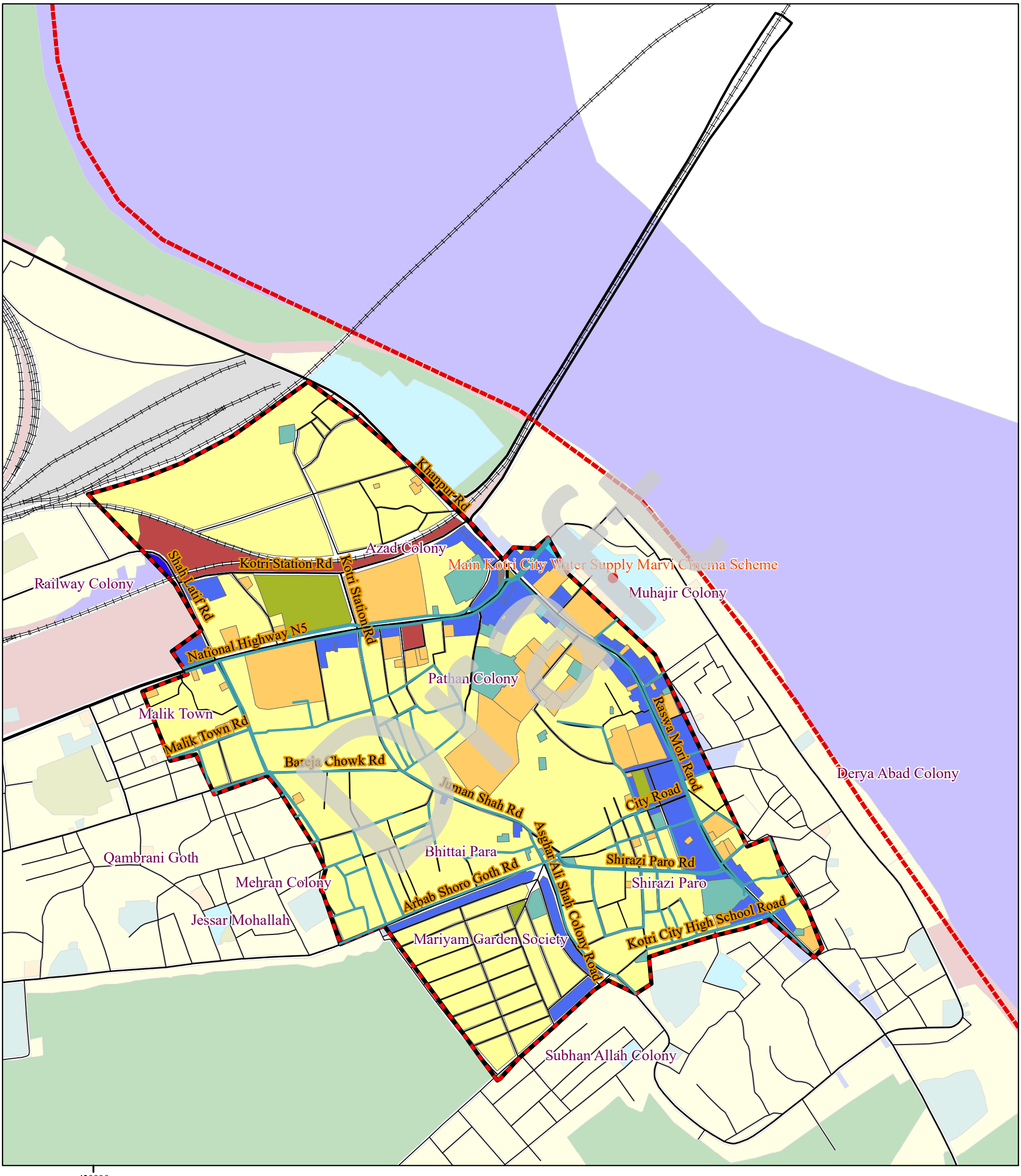

Legend

- Water Supply Scheme
- Rehabilitation Water Supply Network
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Kotri MC Boundary
- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:6,500

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0 0.075 0.15 0.3

Kilometers

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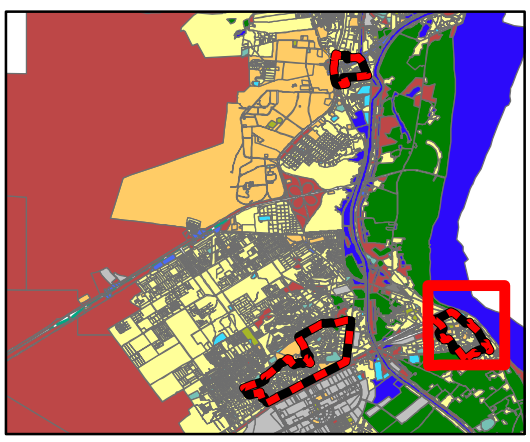

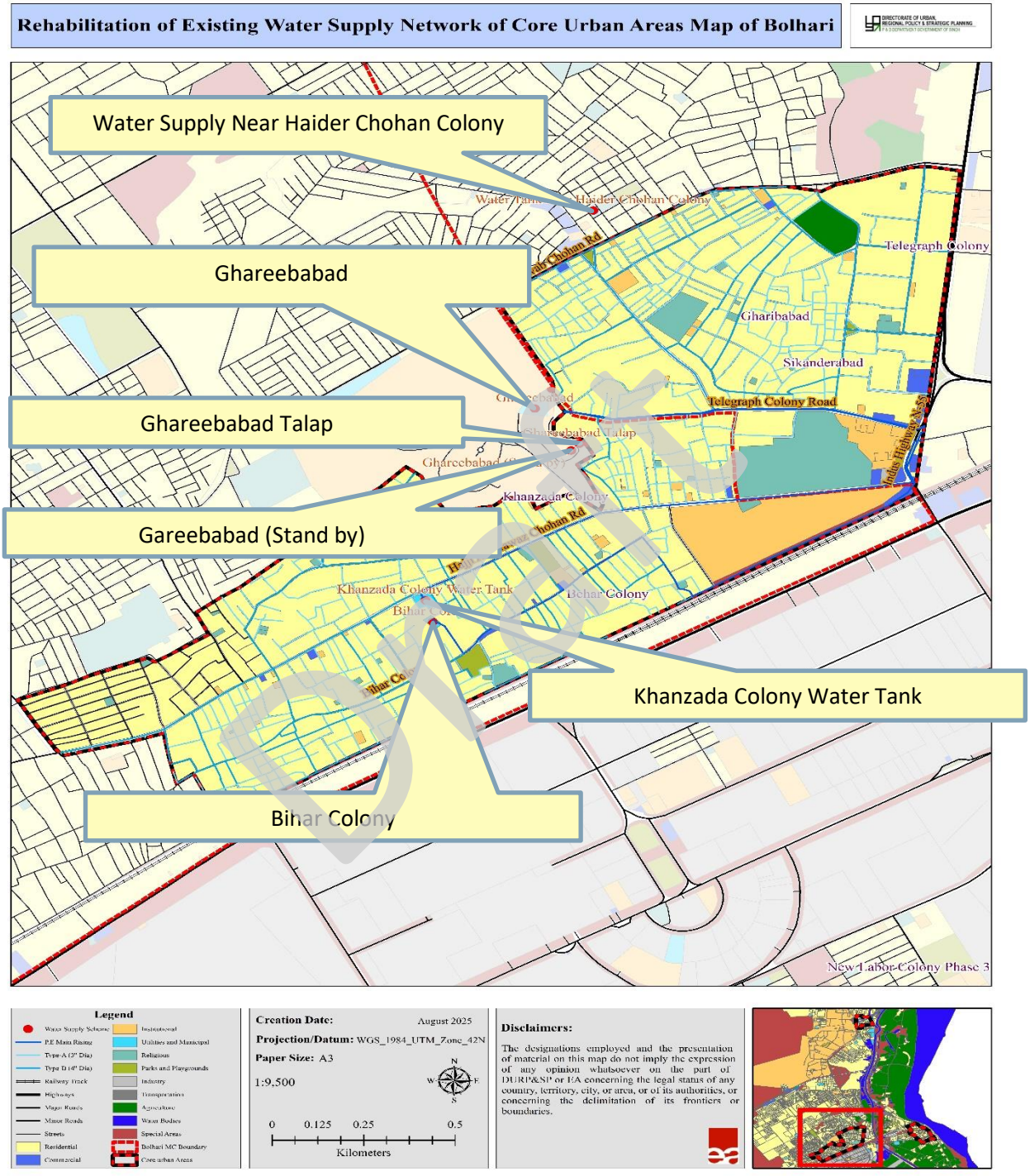

Figure 7-4: Rehabilitation of Existing Water Supply of Core Urban Areas Map of Bolhari

Rehabilitation of Existing Water Supply Network of Core Urban Areas Map of Bolhari

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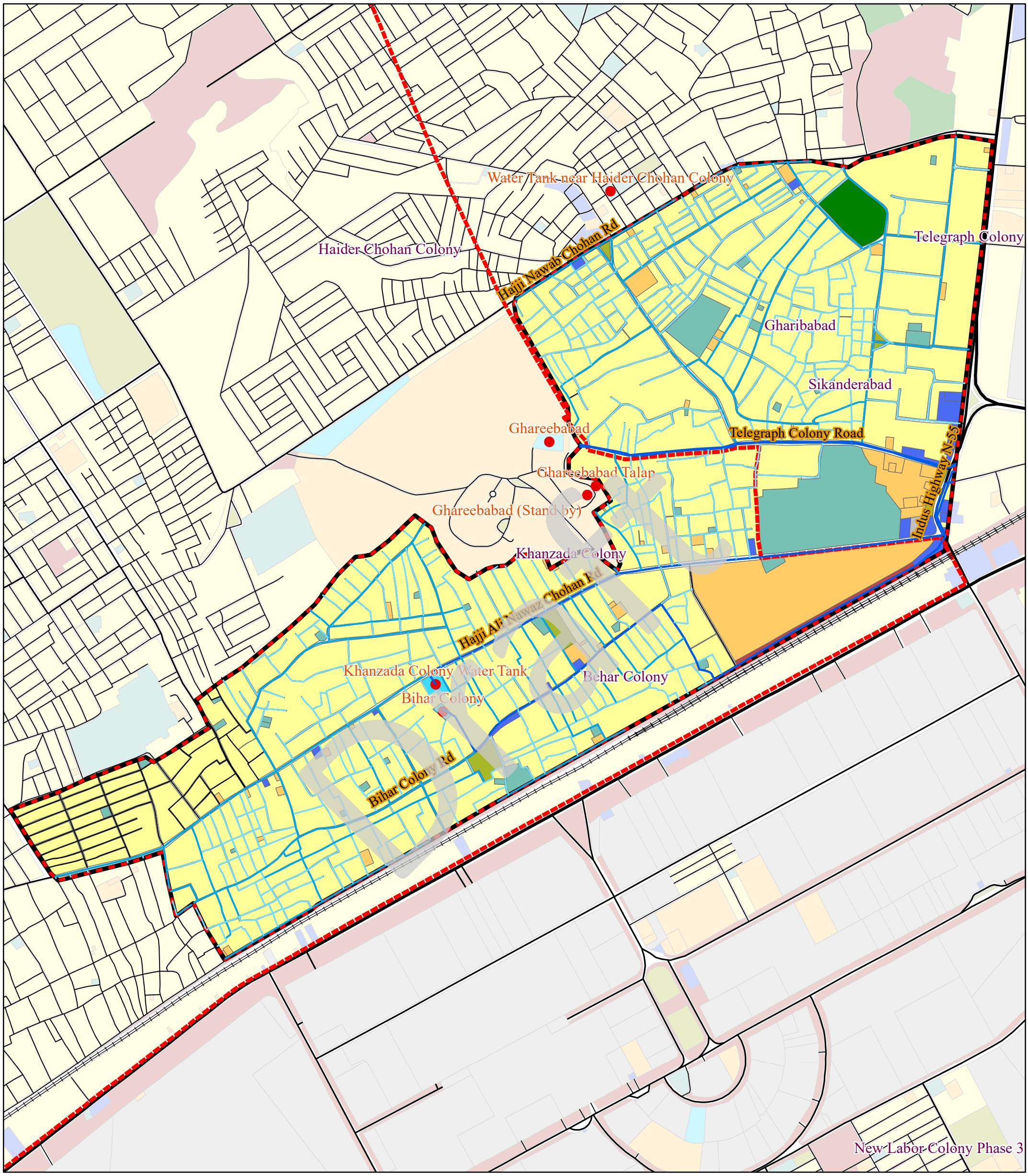

Legend

- Water Supply Scheme
- P.E Main Rising
- Type-A (3" Dia)
- Type-B (4" Dia)
- Railway Track
- Highways
- Major Roads
- Minor Roads
- Streets
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Bolhari MC Boundary
- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

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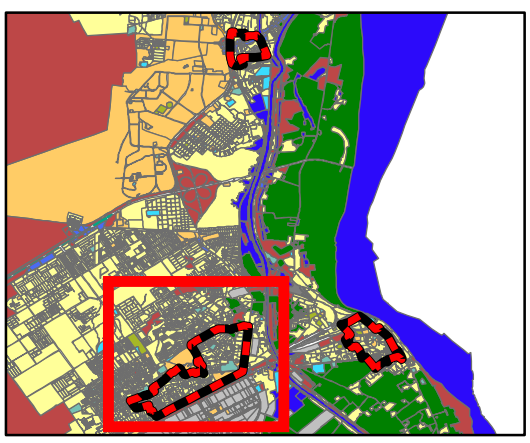


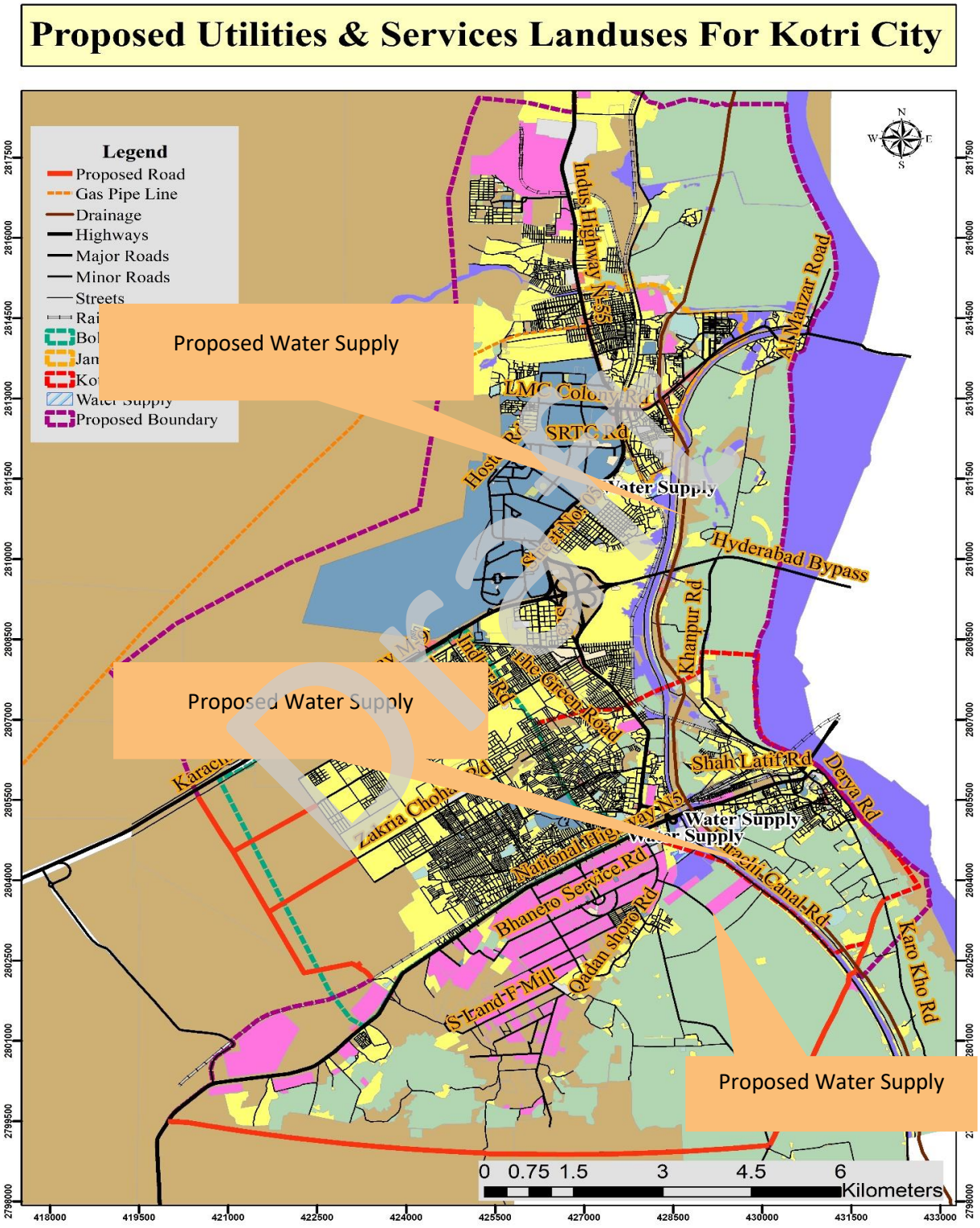
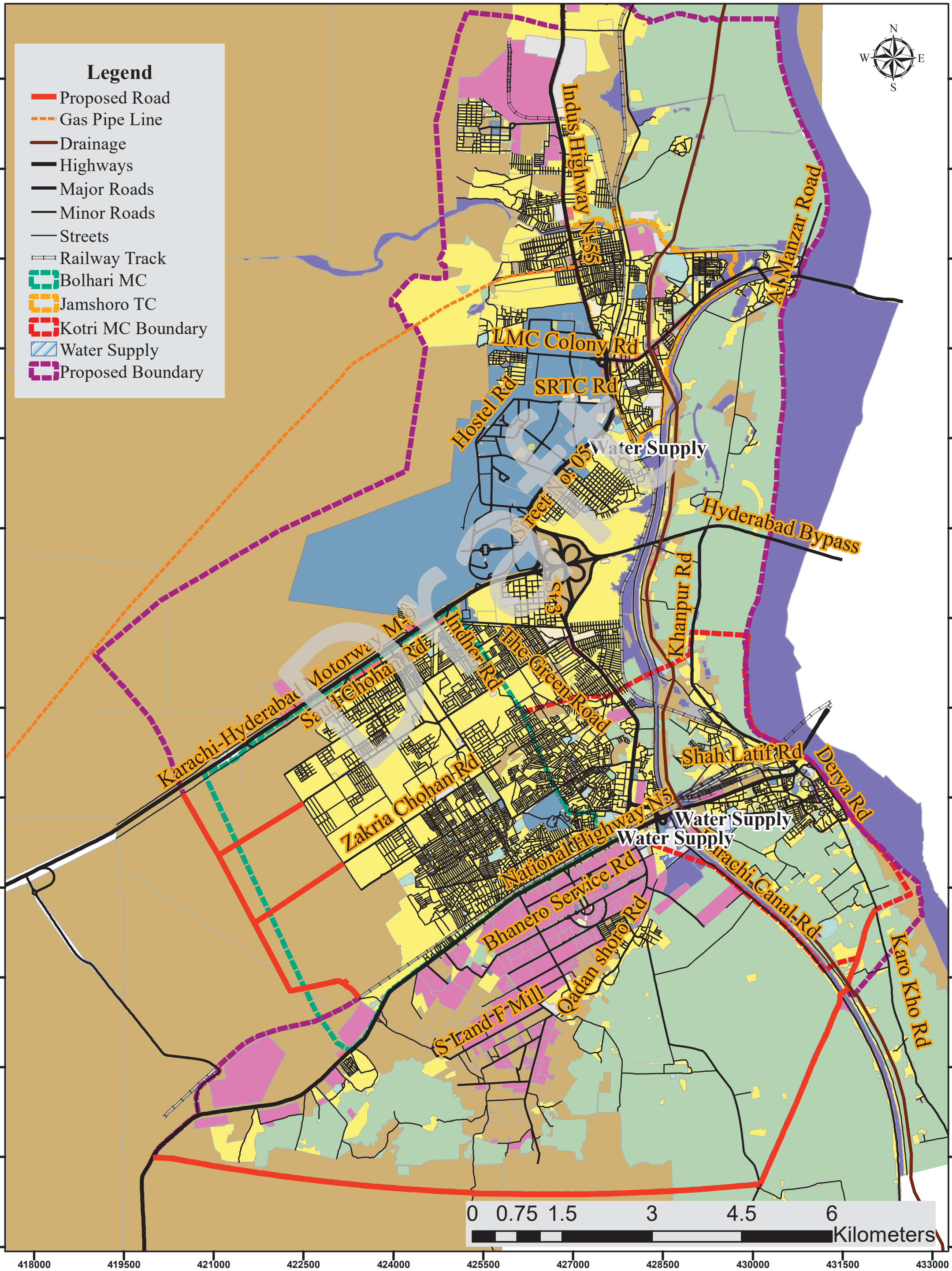


Figure 7-5: Proposal For water Supply Landuse for Kotri City

Proposed Utilities & Services Landuses For Kotri City



7.2 Sewerage and Drainage

*7.2.1 **Existing Situation***

In the existing system of sewerage and drainage within DHQ town Kotri at Jamshoro, including the Bolhari MC area, the infrastructure comprises four types of disposal systems: underground sewer pipes, covered drains, and open drains, which are further, categorized into Type A, B, and Type C concrete drains. The construction quality of these systems is generally poor, predominantly utilizing block masonry as opposed to more durable cast in situ or RCC structures.

This substandard construction quality results in higher operation and maintenance costs. Often, the drains are found to be broken or damaged, creating unsanitary conditions and contributing to environmental health issues. In many cases, these broken drains and overflowing gutters become breeding grounds for flies and mosquitoes, exacerbating public health concerns.

The sewerage and drainage system, built in 1979 at various stages, integrates a mix of underground pipe sewers and concrete drains. There are three main pumping stations located in Kotri MC, situated at Main City, Nagay Lane, and behind Baba Salaudin. These stations are responsible for pumping wastewater for disposal, discharging it into the main KB feeder and private field courses without any treatment, thus Total length of Drains Type A = 1.5 km, Type B = 1.8 km & Type C = 1.5 km (including pipes). AC & RCC Pipes have been used from 16" to 36" diameter.

Urban Drainage Scheme Kotri Phase – I was approved in the year 1979 for Rs: 5.372 million for the designed population of 57,800-person upto year 1988 and the scheme was revised and approved in the year 1986 for Rs: 8.877 million for the designed population of 58,100-person upto 1992. For the design purpose, the city has divided into three zones. The Scheme was completed in the year 1990 to the cost of Rs: 8.877 million. Urban Drainage Scheme Phase-II was approved in the year 1994 amounting to Rs: 18.597 million for the designed population of 86,000-person upto year 2004. Therefore, designed proposed city was divided into three zones as per topographic conditions of city. Each zone has separate drainage system sullage water of Zone 'A', 'B' & 'C' is treated in the natural oxidation pond and after treatment used for agriculture purpose. In zone 'D' and 'E' only drains were provided.[45]

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[45] *PC-1 shared by PHED Kotri*

Table 7-7: Revised improvement and extension of drainage scheme for kotri city taluka kotri district Jamshoro (Existing drainage arrangement)

Components		
Zone 'A'		
i)	Collecting tank 30' dia	2 Nos:
ii)	Screening chamber 16' dia	1 No:
iii)	Pump House 25' dia (12' x 10')	1 No:
iv)	Surface drains Type I, II & III	-
v)	R.C.C A.S.T.M Sewer 30", 27" & 18" dia	-
vi)	Pumping Machinery 25 BHP	4 Sets
vii)	Rising Main 16" dia	700.00 Rft
viii)	Compound Wall	-
ix)	Staff Quarter	3 Nos:
Zone 'B'		
i)	Collecting tank 20' dia	3 Nos:
ii)	Screening chamber 10' dia	1 No:
iii)	Pump House 20'	1 No:
iv)	Pump House 14' x 12'	1 No:
v)	Surface drains Type A, B & C	-
vi)	Pumping Machinery 20 BHP	1 Set
vii)	Pumping Machinery 30 BHP	2 Sets
viii)	Rising Main 16" dia	300.00 Rft
ix)	Disposal Channel	3000.00 Rft
x)	Compound Wall	-

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On going schemes details

The ongoing schemes for the improvement and extension of drainage in Kotri, approved by the Government of Sindh, are currently in execution. This scheme aims to upgrade and extend the drainage system, including elements like rising mains, pumping machinery, and oxidation ponds, for efficient wastewater management. However, due to strict financial constraints, the comprehensive plan had to be scaled back, and not all areas of the city, especially Zone 'C', are included for certain developments like RCC sewer, surface drains, and pave blocks[46].

Table 7-8 Revised Improvement and Extension of Drainage Scheme for Kotri City Taluka Kotri District Jamshoro (Existing / On-Going Detail of Approved Scheme)

Components		
Zone 'A'		
i)	Collecting tank 30' dia	2 Nos:
ii)	Screening chamber 15' dia	1 No:
iii)	Pumping Machinery 30 BHP	3 Nos:
iv)	Rising Main 16" dia P.E. Pipe	2000 Rft (From Existing Disposal Work Junction point)
v)	Rising Main 16" dia P.E. Pipe	2000 Rft (Oxidation ponds to River Indus)
vi)	Pumping Machinery 40 BHP	3 Nos: (at Oxidation ponds)
Zone 'B'		
i)	Collecting tank 37' dia	1 No:
ii)	Screening chamber 15' dia	1 No:
iii)	Pumping Machinery 50 BHP	3 Nos:
iv)	Rising Main P.E. Pipe 18" dia	4750.0 Rft (Existing Disposal work to Junction point)
v)	Rising Main P.E. Pipe 24" dia	6500.00 Rft
vi)	Oxidation Ponds 500 x 300	3 Nos:
vii)	Pump House 14' x 12'	3 Nos:
viii)	Compound Wall	1376.0 Rft

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[46] *PC-1 shared by PHED Kotri*

Scope of the Work:

- **P.E. Rising Main:** A 12-inch diameter Polyethylene (P.E.) rising main extending 3,000 Rft (feet) is proposed for disposal works in Zone – C.
- **Pumping Machinery:** The scheme includes three sets of 40 BHP (Brake Horsepower) pumping machinery for disposal works in Zone - C.
- **Diesel Engine Set:** A 60 BHP diesel engine set is planned for installation.
- **Pumping Machinery at Oxidation Pond:** A 50 BHP pumping machinery is designated for the oxidation pond.
- **Surface Drains:** Construction of Type-I, II, and III surface drains throughout the town, totaling 63,000 Rft.
- **Pave Blocks:** Laying pave blocks across the town covering an area of 522,000 square feet.
- **RCC Sewer:** Installation of Reinforced Cement Concrete (RCC) sewers with diameters of 24 inches and 18 inches, totaling 11,580 Rft.
- **RCC Nala Bills:** Construction of RCC Nala Bills measuring 2.50' x 3'0' internally, extending over 13,178 Rft.
- **Compound Wall for New Disposal Works:** Building a compound wall measuring 388 Rft for the new disposal works.
- **Pump House:** Construction of one pump house for operational efficiency.
- **Oxidation Ponds:** Development of oxidation ponds with a capacity of approximately 4.78 million gallons.
- **Staff Quarter (Type-III):** Construction of one staff quarter.
- **External Electrification:** Implementation of an external electrification project as part of the overall scheme.

These initiatives reflect a significant effort towards improving Kotri's sewerage and drainage infrastructure, which is vital for the town's sanitation and environmental health. While financial limitations have restricted

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the scope in certain zones, the progress in other areas signifies a step towards enhanced urban infrastructure and living conditions in Kotri.

Table 7-9 Revised Improvement and Extension of Drainage Scheme for Kotri City Taluka Kotri District Jamshoro (Proposed Arrangements)

Components		
Zone 'C'		
1	P.E. Rising Main 12" dia 3000.00 Rft for disposal work Zone - C	3000.0 Rft
2	Pumping Machinery 40 BHP for Disposal works Zone - C	3 Sets
3	Diesel Engine set 60 BHP	1 Set
4	Pumping Machinery 50 BHP @ Oxidation Pond	1 Set
5	Surface drains Type-I, II and III in whole Town	63000.0 Rft
6	Pave Blocks in whole town	522000.0 Sft
7	RCC Sewer 24", 18" dia	11580.0 Rft
8	RCC Nala Bills 2.50' x 3.0' inside	13178.0 Rft
9	Compound Wall for new Disposal works	388.0 Rft
10	Pump House	1 No:
11	Oxidation ponds	4787423 gallons
12	Staff Quarter (Type-III)	1 No:
13	External Electrification	1 Job

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For Bolhari, there is no comprehensive sewerage system. Instead, an open nalli system serves the area, connecting to the main nalli and disposing of sewerage directly into the KB feeder without treatment. The same situation exists in Jamshoro; however, a new project has recently been initiated by the PHED department in TC Jamshoro.

Capacity

In the year 2004, the existing capacity of services was 2.064 MGD sullage (waste water), however, upto year 2030, a scheme has been proposed to dispose of 3.504 MGD sullage water per day. The Supply-Demand gap is 1.44 MDG of Sullage water per day for Kotri MC only.[47]

[47] *PC-1 shared by PHED Kotri*

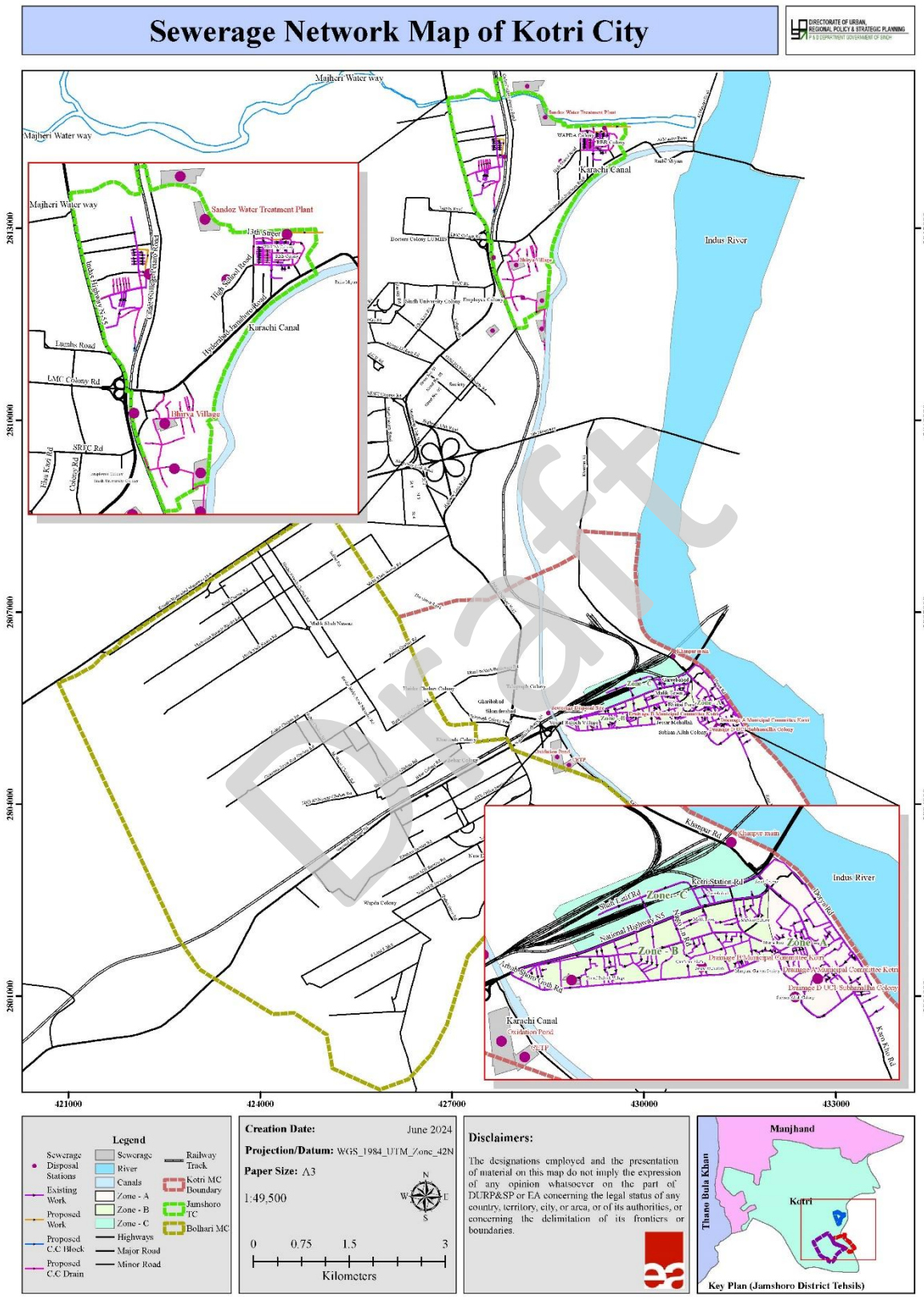

Figure 7-6: Sewerage network map Kotri City

Sewerage Network Map of Kotri City

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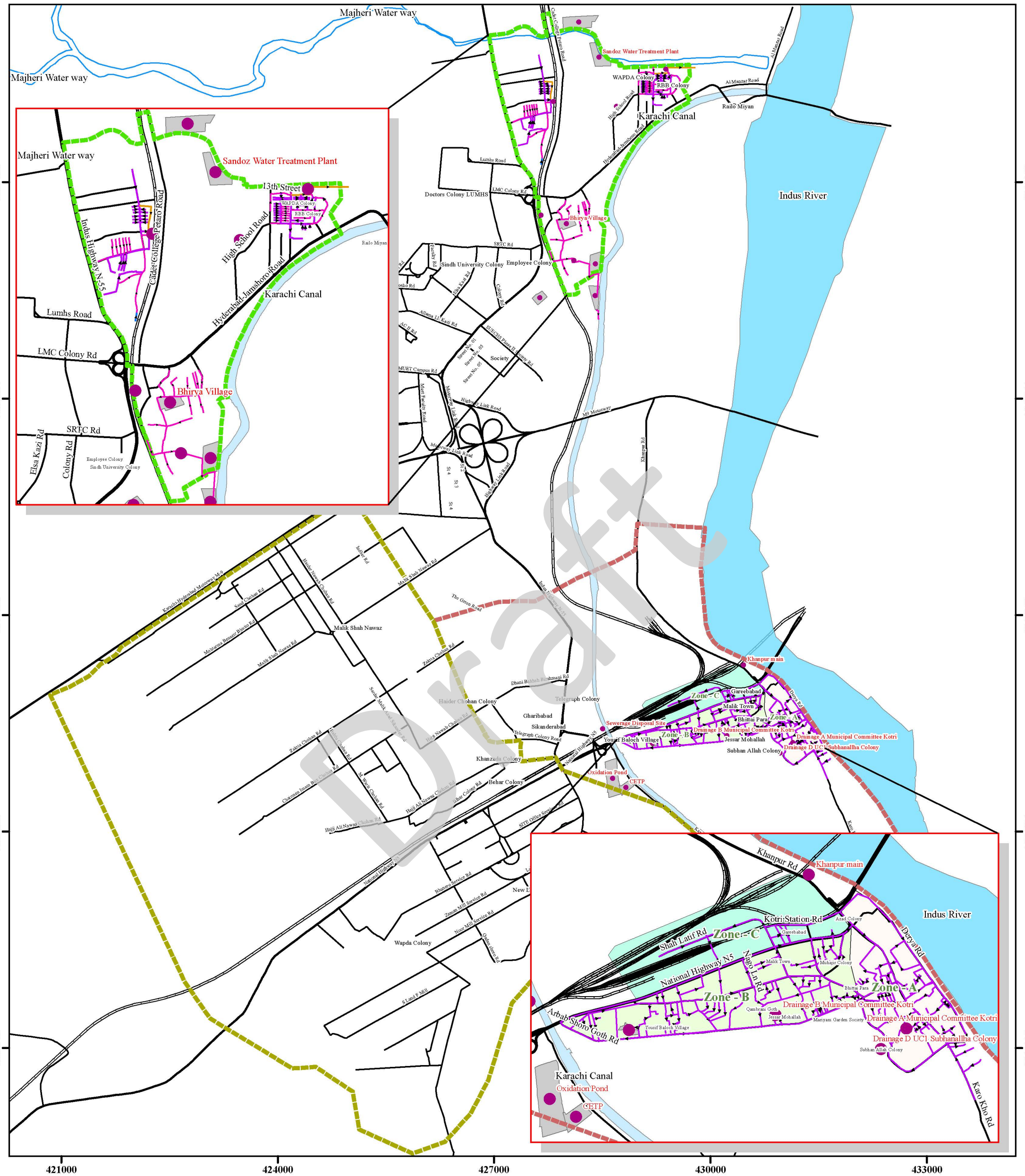

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- Sewerage Disposal Stations
- Existing Work
- Proposed Work
- Proposed C.C Block
- Proposed C.C Drain
- Sewerage
- River
- Canals
- Zone - A
- Zone - B
- Zone - C
- Highways
- Major Road
- Minor Road
- Railway Track
- Kotri MC Boundary
- Jamshoro TC
- Bolhari MC

Creation Date: June 2024

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:49,500

0 0.75 1.5 3

Kilometers

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Key Plan (Jamshoro District Tehsils)

Waste Water Treatment Plant

Currently, there is no wastewater treatment plant for residential wastewater in Kotri MC, Bolhari MC, and Jamshoro TC. The sewage and drainage water from these residential areas are directly disposed of into the KB Feeder without any treatment. However, the industrial area of Bolhari MC disposes of its wastewater into the KB Feeder after treatment at a plant located at the KB Feeder.

- **Kotri MC, Bolhari MC, and Jamshoro TC**: Residential sewage and drainage water are directly disposed of into the KB Feeder without treatment.
- **Bolhari MC (Industrial Area)**: Wastewater is treated before being disposed of into the KB Feeder.

During consultations with the Public Health Engineering Department (PHED), it was informed that a new scheme has been initiated to reconstruct the sewerage system in Jamshoro TC. This project is currently under progress.

- **Jamshoro TC**:
    - **Oxidation Ponds**: There are three oxidation ponds in Jamshoro, each measuring 300 feet by 115 feet. These ponds are connected by PE pipes and serve as a basic treatment facility for wastewater.

The lack of wastewater treatment plants for residential areas in Kotri MC, Bolhari MC, and Jamshoro TC poses a significant environmental and public health challenge. The untreated sewage directly discharged into the KB Feeder can lead to contamination and various health issues. The ongoing reconstruction of the sewerage system in Jamshoro TC and the existing oxidation ponds are positive steps towards improving wastewater management in the region. However, there is a critical need for comprehensive wastewater treatment solutions to ensure sustainable urban development and environmental protection.

Given the widespread deficiencies in sewerage and drainage infrastructure, including outdated construction, inadequate treatment facilities, and incomplete coverage in key areas, the sewerage and drainage strategy must prioritize: I. rehabilitation and upgrading of existing drainage and pumping systems to improve functionality and reduce health risks; II. extension and completion of sewerage networks, especially in underserved zones, with durable construction materials; III. implementation of effective wastewater treatment solutions such as oxidation ponds and treatment plants to prevent environmental contamination; and IV. integration of modern technologies and maintenance frameworks to ensure sustainable management and resilience against urban growth and climate challenges.

*7.2.2 **Issues:***

- The infrastructure, including underground sewer pipes, covered drains, open drains, and concrete drains (Types A, B, and C), is generally of poor construction quality. This results in higher operation and maintenance costs, with drains often found to be broken or damaged, leading to unsanitary conditions and environmental health issues.

- The broken drains and overflowing gutters become breeding grounds for flies and mosquitoes, exacerbating public health concerns. Diseases like malaria, diarrhoea, parasitic infections, and even polio are prevalent due to inadequate sanitation systems.

- The existing sanitation facilities are estimated to be adequate for no more than 30% of the population, highlighting a significant deficit in sanitation infrastructure.

- Wastewater is being pumped from three main stations and discharged into the main KB feeder and private field courses without any treatment, raising serious environmental and health concerns.

- Although there are ongoing schemes for improvement, financial constraints have limited their scope. Not all areas of the city are covered, especially for developments like RCC sewers, surface drains, and pave blocks.

- There is no wastewater treatment plant for residential wastewater in Kotri MC, Bolhari MC, and Jamshoro TC. The industrial area of Bolhari MC is the only exception, having a treatment plant at KB Feeder.

- A significant portion of the existing systems employs a combined disposal approach for both surface and wastewater, which can be less efficient and increases risks during heavy rains or floods.

- A considerable number of residents experience flooding in both their houses and streets, indicating problems with water management and drainage systems.

- The majority of the area relies on open or semi-covered drainage systems, which are less effective and pose various environmental and health risks.

- The estimated wastewater generation is projected to increase significantly, underscoring the urgent need for developing and enhancing wastewater treatment and management systems.

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*7.2.3 **SWOT Analysis:***

STRENGTH	WEAKNESSES	OPPORTUNITY	HREATS
Sewage Collection & Disposal			
1. The initiation of ongoing schemes for the improvement and extension of the drainage system reflects a commitment to addressing the existing challenges and enhancing the infrastructure. 2. The existing system comprises underground sewer pipes, covered drains, and open drains, providing a variety of options that, if properly maintained, can contribute to efficient wastewater management. 3. There are three oxidation ponds in Jamshoro TC. 4. The existing sewerage system facilitates the urban area of the city.	1. Poor maintenance condition; garbage enters into sewers, which requires de-silting. 2. Drain water is disposed of untreated into canals and drains. 3. Open sewers 4. Outdated and disconnected network. 5. No policy for re-cycling, and reduction in generation of sewerage 6. Mixing of solid waste disposal into Sewerage.	1. The ongoing schemes, if implemented effectively, provide an opportunity to upgrade and modernize the sewerage and drainage system, reducing health risks and improving overall environmental conditions. 2. Public awareness can drive support for improved sanitation projects and policies. 3. Public health/hygiene can be improved by proper maintenance and cleaning of sewerage system. 4. Wastewater treatment plants should be increased so that Canals should be saved from pollution. 5. When proper maintenance of sewerage and drainage network should be carried out then it will create many job opportunities to skilled staff. 6. Raising public awareness and involving the community in sanitation initiatives may contribute to better maintenance and management. 7. Proper service delivery should be provided by PPP mode. 8. Development of well-designed trunk sewerage network with	1. The financial limitations have resulted in a scaled-back comprehensive plan, leaving certain areas without essential developments. This poses a threat to the overall effectiveness of the improvement schemes. 2. The existing broken drains and overflowing gutters contribute to environmental health risks, including the spread of diseases. 3. The lack of water management and drainage systems results in flooding in both residential areas and public spaces. 4. Public Health risks. 5. Environmental degradation. 6. Lack of Funds. 7. Inadequate policies. 8. Encroachment. 9. Land grabbing.

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STRENGTH	WEAKNESSES	OPPORTUNITY	HREATS
		less number of disposal station. 9. Planning for well-connected gravity based open drainage system covering ponds. 10. Revenue can be generated through by charging services for cleaning. 11. Reclamation of land (that accommodates water of flood/rain) for public land uses.	
Drainage & Flood Control			
1. Majority of Kotri city is served by combined drain and sewer system.	1. Open drain. 2. Improper channelization of drains. 3. Over flow of storm water drains 4. Poor administrative control for operating existing drainage system of the town. 5. Depression areas causing permanent ponding. 6. About 70% of the urban area of the district is deprived of sanitation facilities.	1. Flood protection embankments should be enhanced up to greater extent to provide maximum protection to surrounding villages and the people living near Indus basin. 2. Development of surface drainage network with easy disposal to river/canals. 3. Complete removal or treatment of land where temporary ponds have been formed in Kotri city.	1. Medium level flood disaster threat to local communities living near to main course of River Indus. 2. Open and overflowing drains have impact upon human health and give birth to epidemic diseases. 3. Overflowing drains on the street create non-aesthetic scenes and inconvenience for the people.

Draft

*7.2.4 **Need Assessment***

As per the secondary data collected from PHED Jamshoro, the present generation of sewerage in Kotri MC, Bolhari MC, and Jamshoro TC is 20.7 mgd. For the future population of 2045, the estimated waste generation is given below table:

Table 7-10: Estimated Wastewater Generation for the period up to 2045

Location	Description	2025 (Current year)	2030	2035	2040	2045
Kotri MC + Jamshoro TC+Boalari MC	Water Demand	11.5 (MGD)	13.1	15.2	17.9	21.4
	Sewerage Flows @70 % water supply mgd	**9** (MGD)	**10** (MGD)	**12** (MGD)	**14** (MGD)	**17** (MGD)

Source: Consultant's estimation

Given the significant shortfall in existing water supply infrastructure and the projected increase in demand, the water supply strategy must prioritize: I. upgrading and expanding current water distribution networks to ensure reliable access aligned with population growth, with a focus on meeting the increasing demand from 11.5 million gallons per day (MGD) in 2025 to an estimated 21.4 MGD by 2045; II. improving water quality management to guarantee safe and consistent supply, reducing health risks; III. enhancing system maintenance and reducing losses through modern technologies and operational efficiency; and IV. fostering community engagement and institutional partnerships to support sustainable water service delivery that meets the needs of both urban and peri-urban populations.

*7.2.5 **Sindh Sanitation Policy 2017***[48]

Targets:

Its key targets are:

- Eradicate Open Defecation from Sindh Province by 2025, while 70% villages of 13 high priority districts achieve the status of open defecation free by 2020.
- 100% households in Sindh have access to and use sanitary latrines by 2025, while 70% of rural households in high priority districts will achieve this by 2020.
- Strengthen and implement liquid waste management with sewer lanes and Covered/improved drains with 85% coverage of urban areas and 60% coverage in rural areas.
- Create and develop wastewater treatment mechanisms to cover 75% of urban areas and 40% in rural areas by 2025.
- More than 90% of rural households and 100% of urban households wash hands with soap at critical times by 2025.

  Principles:

[48] Water and Sanitation policy for Sindh 2017

Draft

- The Policy aligns itself with the goals and targets of the SDGs for sanitation, which require sanitation services to be safely managed, have a private improved facility where faecal wastes are safely disposed on site or transported and treated off-site; plus, a hand-washing facility with soap and water.
- Safely managed sanitation services is a fundamental right for all persons in Sindh province, and should be ensured through enhanced access to marginalized and low resource areas with equitable distribution of resources. Recognition of inequities and rights-based programming will be given key emphasis during the planning, execution and monitoring of sanitation programmes.
- The policy seeks to prioritize the areas that pose the greatest risk to human health namely hygiene awareness and excreta disposal, and then address the environmental health risks that are posed by poor drainage and solid waste disposal.
- Increase access to high quality nutrition-sensitive services, including access to water, sanitation facilities, and hygiene.
- The policy shall promote the community led approaches to strengthen the demand for safely managed improved sanitary conditions that emerges from local communities. The multistakeholder partnerships and collaborations comprising of citizens, governments, civil society, non-governmental organizations (NGOs), donors, academia, media, etc. be encouraged to maximize the synergies in designing and implementation of interventions.
- Affordable (in terms of designs as well as availability of water) and cost-effective technical solutions with necessary modifications and adaptations in technical standards to be consistent with cultural sensitivities of specific communities will be identified and marketed.
- The component sharing model as envisaged in the National Sanitation Policy will be
- Institutionalized gradually in which the community is responsible to construct lane and neighborhood level sewers (internal development) on self-help basis and the government focuses on trunks, disposal and treatment unit (external development).
- Raw sewerage use for agriculture must be stopped.

*7.2.6 **Strategic Development Plan***

The aim of Strategic Development plan is Provision of adequate Sewerage and Drainage facilities to the DHQ Town through equitable, efficient and sustainable sanitation services. Lanes may continue using concrete drains and to discharge into sewers through screening chamber. Some of the objectives include:

i. Long Term Plan:

- Improving standards of public health through provision of improved services supported up by legal, regulatory and binding framework.
- Wherever existing sewerage systems discharge untreated sewerage in storm water drains or irrigation canals it should be treated before discharging, and may be used for agricultural purposes or converted into lakes and ponds as part of recreational areas.
- Construction of Waste Water Treatment Plant

Draft

ii. Short Term Plan:

- Priority for sanitation will be accorded to un-served, under-served areas, and disadvantaged areas.
- An overall sanitation plan will be developed for all urban settlements by city District governments and the municipalities in coordination with all other agencies involved in sanitation.
- Special focus on need-based interventions in sanitation sector.
- Gravity flow systems will be used for sewerage schemes so as to avoid pumping and O&M costs.
- Acquire Land & Provide Stabilization ponds for full treatment to produce acceptable quality of effluent for re use.

The strategic development of sewerage and drainage systems must focus on delivering equitable, efficient, and sustainable sanitation services that protect public health and the environment. Priority should be given to underserved and vulnerable areas through need-based interventions and comprehensive sanitation planning in coordination with all relevant agencies. Long-term goals include upgrading infrastructure to treat wastewater before discharge, promoting reuse through stabilization ponds and treatment plants, and implementing regulatory frameworks to ensure service quality. In the short term, emphasis on gravity flow systems and careful land acquisition for treatment facilities will reduce operational costs and improve system resilience. Community involvement and multi-stakeholder collaboration will be key to sustaining these improvements and achieving cleaner, healthier urban environments.

Draft

*7.2.7 **Priority Projects***

i. CONSTRUCTION / REHABILITATION OF PRIMARY AND SECONDARY DRAINS

The majority of drains in Kotri MC and Jamshoro TC are open, deteriorated, and unable to handle wastewater and stormwater effectively. For Bolhari, there is no comprehensive sewerage system. Instead, an open nalli system serves the area, connecting to the main nalli and disposing of sewerage directly into the KB feeder without treatment. The same situation exists in Jamshoro; however, a new project has recently been initiated by the PHED department in TC Jamshoro. Households often rely on septic tanks or discharge directly into open nalas, leading to frequent overflows, ponding, and contamination of nearby roads and water supply lines. The 32-inch RCC trunk sewer and other old drains are damaged in several sections. With 85% of households reporting Nali System in the socio-economic survey, upgrading primary and secondary drains is essential to reduce health risks and environmental hazards.

Raswa mori Road drainage work

Disposal station

Mixing of solid waste into open drain

Overflowing of the wastewater

Draft

➢ **Scope**

The project aims to rehabilitate and upgrade the existing drainage and sewerage systems in Kotri Municipal Committee (MC), Bolhari Municipal Committee (MC), and Jamshoro Town Committee (TC) to ensure safe, efficient, and sustainable wastewater management.

Currently, most drains in Kotri MC and Jamshoro TC are open, deteriorated, and hydraulically insufficient to manage wastewater and stormwater effectively. In Bolhari, there is no formal sewerage system, and wastewater is conveyed through an open nalli network that ultimately discharges untreated effluent into the KB Feeder, posing significant environmental and public health risks.

The proposed interventions are designed to:

i. **Rehabilitate and Upgrade Existing Drainage Infrastructure**

- Repair and partial replacement of the 32-inch RCC trunk sewer and associated primary and secondary drains that have collapsed or lost capacity.
- Conversion of open nallis into covered or lined drains to improve flow efficiency and reduce contamination.
- Desilting, cleaning, and structural rehabilitation of existing drainage channels to restore full functionality.

ii. **Provision of New Sewerage and Drainage Networks in Underserved Areas**

- Construction of new closed sewer lines in Bolhari MC, where no formal system exists.
- Integration of neighborhood-level collection systems with main disposal drains to ensure safe wastewater conveyance.
- Installation of manholes, inspection chambers, and discharge structures to improve maintenance access and flow management.

iii. **Environmental and Sanitation Improvements**

- Minimization of sewage overflows, street ponding, and waterlogging, particularly in low-lying and densely populated zones.
- Reduction of contamination risks to nearby roads, water supply lines, and surface water bodies.
- Support the long-term goal of transitioning toward wastewater treatment-based systems, complementing recent PHED initiatives in Jamshoro TC.

Draft

- **Size**

i. **Geographical Coverage:**

The project covers the drainage and sewerage systems within:

- Kotri MC: rehabilitation of existing open and damaged drains.
- Bolhari MC: establishment of a new structured sewerage system to replace the existing open nalli network.
- Jamshoro TC: selective upgrades to secondary and tertiary drains to complement ongoing PHED works.

ii. **Physical Components:**

- Rehabilitation and lining of primary and secondary drains.
- Construction of new covered drains/sewer lines in Bolhari.
- Replacement of damaged RCC trunk sections (including 32-inch main) with reinforced pipes and improved manhole access.
- Provision of drainage inlets, inspection chambers, and culverts for stormwater and wastewater management.

iii. **Target Population:**

- Benefiting residents across Kotri, Bolhari, and Jamshoro urban areas.
- Priority support to low-lying, flood-prone areas like Khanpur and areas near derya road.

- **SDG'S Alignment**

I. **GOAL 3 –** Good Health and well-Being Goal: Open drains and stagnant water are breeding grounds for disease vectors and increase the risk of diarrheal diseases, malaria, and dengue. This project addresses SDG 3.9, which targets reducing illness and death from hazardous water and environmental conditions.

II. **GOAL 6 –** Clean Water and Sanitation: This is the most directly aligned goal. The project supports SDG 6.2, which focuses on achieving access to adequate and equitable sanitation and hygiene for all, and SDG 6.3, which calls for improving water quality by reducing pollution and untreated wastewater discharge. Upgrading the drainage infrastructure is a fundamental step toward safe sanitation.

III. **GOAL 11 –** Make cities and human settlements inclusive, safe, resilient and sustainable: Effective drainage systems are essential components of sustainable urban infrastructure. The project supports SDG 11.1 and 11.6, aiming for access to basic services and reducing the environmental impact of cities, especially related to waste and pollution management.

- **Implementing Authority:** Government of Sindh- PHE Department Kotri
- **Preliminary cost estimate:** 1200 million PKR Approx.

Draft

ii. Construction of Storm Water Drain

Kotri MC, Bolhari MC and Jamshoro TC currently lacks storm water drainage system, resulting in severe urban flooding during periods of heavy rainfall. The absence of proper drainage infrastructure has made the city highly vulnerable to flash floods, with low-lying areas such as khanpur, areas near darya road and its surrounding localities being particularly affected.

The recent flooding has underscored the urgent need for the development and implementation of a comprehensive storm water drainage system. Such infrastructure is essential to effectively manage surface runoff, mitigate flood risks, and protect public health, property, and critical infrastructure across the city.

- **Scope**

The project is aimed at the design and development of a comprehensive stormwater drainage system for Kotri Municipal Committee (MC), Bolhari MC, and Jamshoro Taluka Council (TC) to effectively manage surface runoff and reduce the recurring problem of urban flooding.

At present, these urban centers lack a formal stormwater drainage network, which results in significant flooding during periods of heavy rainfall. Low-lying areas such as Khanpur, Darya Road, and their surrounding neighborhoods are particularly vulnerable, with frequent water accumulation damaging property, roads, and other municipal infrastructure.

The proposed project focuses on:

i. Development of Primary and Secondary Stormwater Drains

- Construction of primary drainage channels to collect and convey runoff from major roads and built-up areas.
- Installation of secondary and tertiary drains to serve residential and commercial neighborhoods.
- Integration of the new system with existing natural drainage paths and culverts to ensure efficient flow.

ii. Rehabilitation and Strengthening of Existing Natural and Man-Made Drains

- Cleaning, desilting, and lining of open natural drains to restore their hydraulic capacity.
- Provision of covered drains in dense urban areas to prevent blockages and enhance safety.
- Construction of storm inlets, manholes, and inspection chambers for effective operation and maintenance.

iii. Flood Mitigation and Resilience Measures

- Installation of cross-drainage structures, culverts, and outfall arrangements to minimize urban flooding.
- Use of climate-resilient design standards and sustainable drainage solutions (SuDS) to improve long-term adaptability.

Draft

- **Size**

i. **Geographical Coverage:**

- The project covers flood-prone and high-risk areas within Kotri MC, Bolhari MC, and Jamshoro TC, with priority given to low-lying zones such as Khanpur, Darya Road, and adjoining residential localities.

ii. **Physical Components:**

- Construction of new stormwater drains (primary and secondary).
- Rehabilitation of existing natural/open drains.
- Installation of storm inlets, cross-drainage culverts, and discharge outlets at key flood-prone intersections.
- Integration of manholes, inspection chambers, and outlet protection works for long-term maintenance and operation.

iii. **Target Population:**

- Directly benefiting residents across the three municipal jurisdictions.
- Indirectly improving the urban environment and flood resilience for thousands of daily commuters, businesses, and institutions.

- **SDG'S Alignment**

I. **GOAL 3 –** Good Health and well-Being Goal: Stagnant rainwater contributes to the spread of diseases like dengue, malaria, and cholera. This project aligns with SDG 3.9, which aims to reduce illnesses caused by water pollution and environmental hazards.

II. **GOAL 6 –** Clean Water and Sanitation: Proper storm water management is essential for preventing the contamination of freshwater sources and managing runoff effectively. The project supports SDG 6.3, which focuses on improving water quality and reducing untreated wastewater discharge into the environment.

III. **GOAL 11 –** Make cities and human settlements inclusive, safe, resilient and sustainable: The project directly supports SDG 11.5 (reducing the number of people affected by water-related disasters) and SDG 11.6, which promotes reducing the environmental impact of cities. By preventing urban flooding and improving infrastructure resilience, the city becomes safer, more inclusive, and better prepared for climate challenges.

- **Implementing Authority:** Government of Sindh, PHED Kotri
- **Preliminary cost estimate:** 1200 million PKR Approx.

Draft

iii. Construction of Waste Water Treatment Plant and rehabilitation of the Disposal Station

At present, untreated wastewater is being discharged directly into the KB Feeder, posing serious risks to both public health and the environment. The pumps at existing disposal stations are not operating at full capacity, resulting in ponding and stagnant water that further exacerbates health hazards for nearby communities. The direct disposal of untreated wastewater into canals is highly concerning, as this water is not only used for irrigation but also, in some areas, for drinking purposes. Such practices threaten the safety of agricultural lands, contaminate food chains, and undermine the well-being of residents who rely on these resources. To address this urgent issue, a suitable site for a wastewater treatment plant has been identified, and a detailed feasibility study will be undertaken to ensure the project's effectiveness and sustainability. The establishment of this treatment facility will play a vital role in protecting public health, safeguarding agricultural productivity, and ensuring that canal water remains a safe and reliable resource for both irrigation and human use.

- **Scope**

The project focuses on the development of a wastewater treatment facility to address the ongoing and critical issue of untreated wastewater discharge into the KB Feeder. Presently, wastewater from Kotri MC, Bolhari MC, and adjoining areas is being released directly into the canal system without any treatment, posing severe health, environmental, and agricultural risks.

Existing pumping stations operate below capacity, resulting in ponding, stagnant water, and localized contamination, further deteriorating sanitary conditions in nearby neighborhoods. Given that KB Feeder water is used for both irrigation and domestic purposes, the contamination has direct consequences on food safety, agricultural productivity, and community health.

The proposed intervention aims to:

i. **Establish a Wastewater Treatment Plant (WWTP)**

- Development of a modern wastewater treatment facility at an identified suitable site, designed to handle the current and projected wastewater volumes.
- The plant will include screening, sedimentation, biological treatment, and sludge management units to ensure the safe and efficient treatment of municipal wastewater.

ii. **Rehabilitation of Existing Disposal Stations**

- Upgradation of pumps, motors, and electrical systems to ensure full operational capacity at existing wastewater disposal stations.
    - Repair/rehabilitate compound wall, pump house
    - Repair/replace collecting tanks, screening chambers and structural elements.
    - Repair/replace sewer connections and manholes up to nearest mains or oxidation pond link.
    - Repair and/or replace generators, transformers and control panels.

Draft

- Repair/upgrade screening chambers and provide coarse screens and grit removal where absent.

- Integration of the disposal network with the new treatment facility for controlled inflow and outflow management.

iii. Environmental Protection and Sustainability Measures

- Prevention of direct discharge into the KB Feeder through redirection of wastewater to the treatment plant.
- Implementation of safe disposal and reuse options for treated effluent, including potential non-potable reuse for landscaping or agriculture.
- Incorporation of climate-resilient and energy-efficient technologies to promote sustainability and long-term operational viability.

➢ **Size**

i. Geographical Coverage:

- The project covers the wastewater management network serving Kotri MC, Bolhari MC, and adjacent localities along the KB Feeder corridor, where untreated wastewater currently poses environmental and health threats.

ii. Physical Components:

- Establishment of a Wastewater Treatment Plant (WWTP) designed to treat 8–10 million gallons per day (MGD) of sewage (indicative, subject to feasibility).
- Rehabilitation of existing disposal stations with upgraded pumping sets and control systems.
- Construction of inlet and outlet pipelines, connecting main disposal points to the treatment facility.
- Provision of sludge drying beds, flow meters, monitoring units, and effluent quality control systems.

iii. Target Population and Impact Area:

- Direct benefit residents of Kotri and Bolhari MCs.
- Indirect benefit to downstream communities and agricultural zones dependent on KB Feeder water.

➢ **SDG'S Alignment**

I. GOAL 3 – Good Health and well-Being Goal: Untreated wastewater is a major vector for diseases like cholera, hepatitis, and dysentery. This project aligns with SDG 3.9, which targets the reduction of illnesses caused by hazardous water and pollution, contributing to a healthier population across Kotri and downstream communities.

Draft

II. **GOAL 6 –** Clean Water and Sanitation: This project directly supports SDG 6.3, which calls for halving the proportion of untreated wastewater and substantially increasing safe reuse. By treating wastewater before discharge, the city contributes to improving water quality, protecting aquatic ecosystems, and ensuring sustainable water management.

III. **GOAL 11 –** Make cities and human settlements inclusive, safe, resilient and sustainable: The project strengthens the city's urban sanitation infrastructure, making Kotri city more livable and environmentally responsible. It aligns with SDG 11.6, which promotes reducing the adverse per capita environmental impact of cities, particularly concerning water and sanitation.

- **Implementing Authority:** Government of Sindh, PHED and Kotri Municipal Committee, Bolhari Municipal Committee, Jamshoro Town Committee.
- **Preliminary cost estimate:** 2500 million PKR Approx.

Table 7-11: Sewage and Drainage Estimated Cost (Kotri City)

S. No.	Project Name	Estimated Cost in Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Sewage & Drainage						
1.	Construction / rehabilitation of primary and secondary drains	**1200**	-	**Non ADP**	**Short Term**	-
2.	Construction of Storm Water Drain	**2500**	-	**Non ADP**	**Short Term**	-
3.	Feasibility study for Wastewater Treatment Plant.	**200**	-	**Non ADP**	**Short Term**	-
4.	Procurement for additional land for Wastewater Treatment Plant	**600**	-	**Non ADP**	-	**Long Term**
5.	Rehabilitation of the Disposal Station	**400**	-	**Non ADP**	**Short Term**	-

Draft

7.2.8 Immediate Action Plan for Core Urban Area

- **Improvement of Sewerage and Drainage**

The sewerage and drainage system in Kotri is limited to Kotri MC and Bolhari MC, with the Public Health Engineering Department (PHED) recently initiating projects in Jamshoro TC. In Kotri's central areas, untreated wastewater is discharged through open roadside drains into the K.B. Feeder, posing significant risks to public health and the environment. Community feedback highlights widespread illness linked to poor sanitation, frequent exposure to open drains, and recurring instances of both household and street-level flooding. Poor maintenance, seasonal overflows, and the combined use of drains for sewage and stormwater intensify foul odors, stagnant water, and the spread of disease, emphasizing the urgent need for a modern, well-managed drainage network.

To address these critical shortcomings, an action framework has been designed to rehabilitate existing facilities and implement advanced stormwater solutions. Key priorities include preventing pollution, reducing inundation risks, and ensuring effective surface runoff management. Through the application of technical capacity and strategic investment, these interventions aim to overcome current weaknesses, enhance system durability, and promote sustainable urban development.

Garbage accumulation in core urban area

Broken Road and Over flowing wastewater

Draft

I. Scope

The improvement plan for sewerage and drainage includes the following key actions:

- **Comprehensive Sewerage System Overhaul:** The entire sewerage network will be rehabilitated, including replacing damaged pipelines, constructing new manholes, and installing pumping stations where needed. This work will especially focus on pathan Colony, shirazi paro, Bhatti Para, Malik Town and surrounding areas of Jamshoro Phattak.
- **Comprehensive Sewerage System Overhaul:** Rehabilitation of the entire sewerage network, including replacement of damaged pipelines, construction of manholes, and installation of pumping stations where required.
- **Preventive Maintenance and Monitoring:** Establishing inspection routines, installing sensors or flow meters, and setting up a monitoring cell for early fault detection.
- **Community Awareness:** Public education campaigns on responsible waste disposal to reduce blockages and improve system performance.

II. Size:

The program will cover the **entire core urban area (825 acres)**, with a total sewerage and drainage network length of **13939.78 running feet (RFT)**.

III. Preliminary cost estimate

Total Estimated Cost: 1500 million approx

Table 7-12: Rehabilitation of Existing Sewerage Network System

S. No.	Name	Area (RFT)	cost (PKR) million
Total Core Urban Area: 825 acres			
1	Sewerage Network System	13939.78	1500
		Total Cost (PKR). Million	**1500**
Note: ✓ Rehab of Sewerage system includes all urban core area network system with all related machinery and equipment. ✓ Rehab of Storm water drain system includes all the core City area storm drain system through steeps slopes and peak areas with all linking equipment and machinery.			

V. Implementation Framework

- **Funding:** Municipal Committee allocations, provincial ADP grants, and international development funds for sustainable infrastructure.
- **Execution:** Works will be executed by the Public Health Engineering Department (PHED) in coordination with the Municipal Committee.
- **Monitoring:** A preventive maintenance system will be institutionalized, supported by periodic inspections and reporting.

A preliminary cost estimate will be provided, itemizing the costs associated with each of the activities listed above. The cost breakdown includes:

- Sewerage System Rehabilitation
- Preventive Maintenance and Monitoring Setup
- Public Awareness Campaigns

Draft

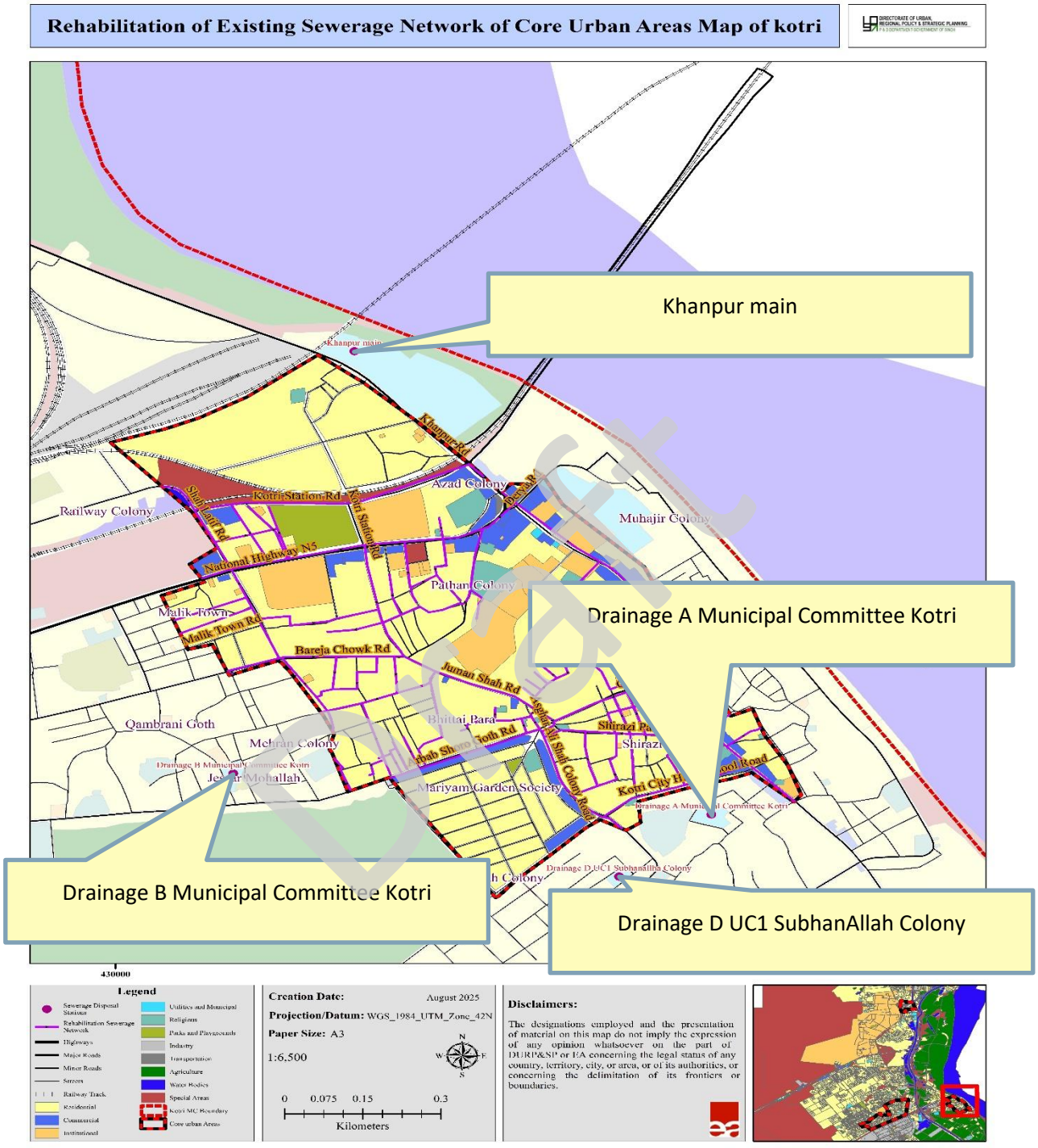

Figure 7-7: Rehabilitation of Existing Sewerage Network of Core Urban Areas Map of Kotri

Rehabilitation of Existing Sewerage Network of Core Urban Areas Map of kotri

DIRECTORATE OF URBAN, REGIONAL POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVERNMENT OF SINDH

Khanpur main
Khanpur Rd
Azad Colony
Derya Rd
Kotri Station Rd
Shah Latif Rd
Railway Colony
National Highway N5
Muhajir Colony
Pathan Colony
Malik Town
Malik Town Rd
Bareja Chowk Rd
Derya Abad Colony
Raswa Mori Road
City Road
Juman Shah Rd
Asghar Ali Shah Colony Road
Qambrani Goth
Bhittai Para
Shirazi Paro Rd
Shirazi Paro
Mehran Colony
Arbab Shoro Goth Rd
Drainage B Municipal Committee Kotri
Jessar Mohallah
Mariyam Garden Society
Kotri City High School Road
Drainage A Municipal Committee Kotri
Drainage D UC1 Subhanallha Colony
Subhan Allah Colony

430000

Legend

- Sewerage Disposal Stations
- Rehabilitation Sewerage Network
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Kotri MC Boundary
- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:6,500

N W E S

0 0.075 0.15 0.3
Kilometers

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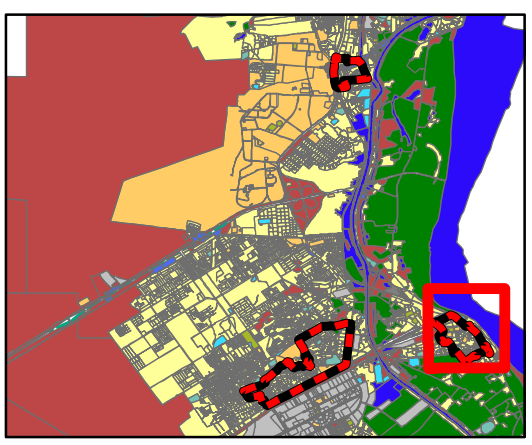


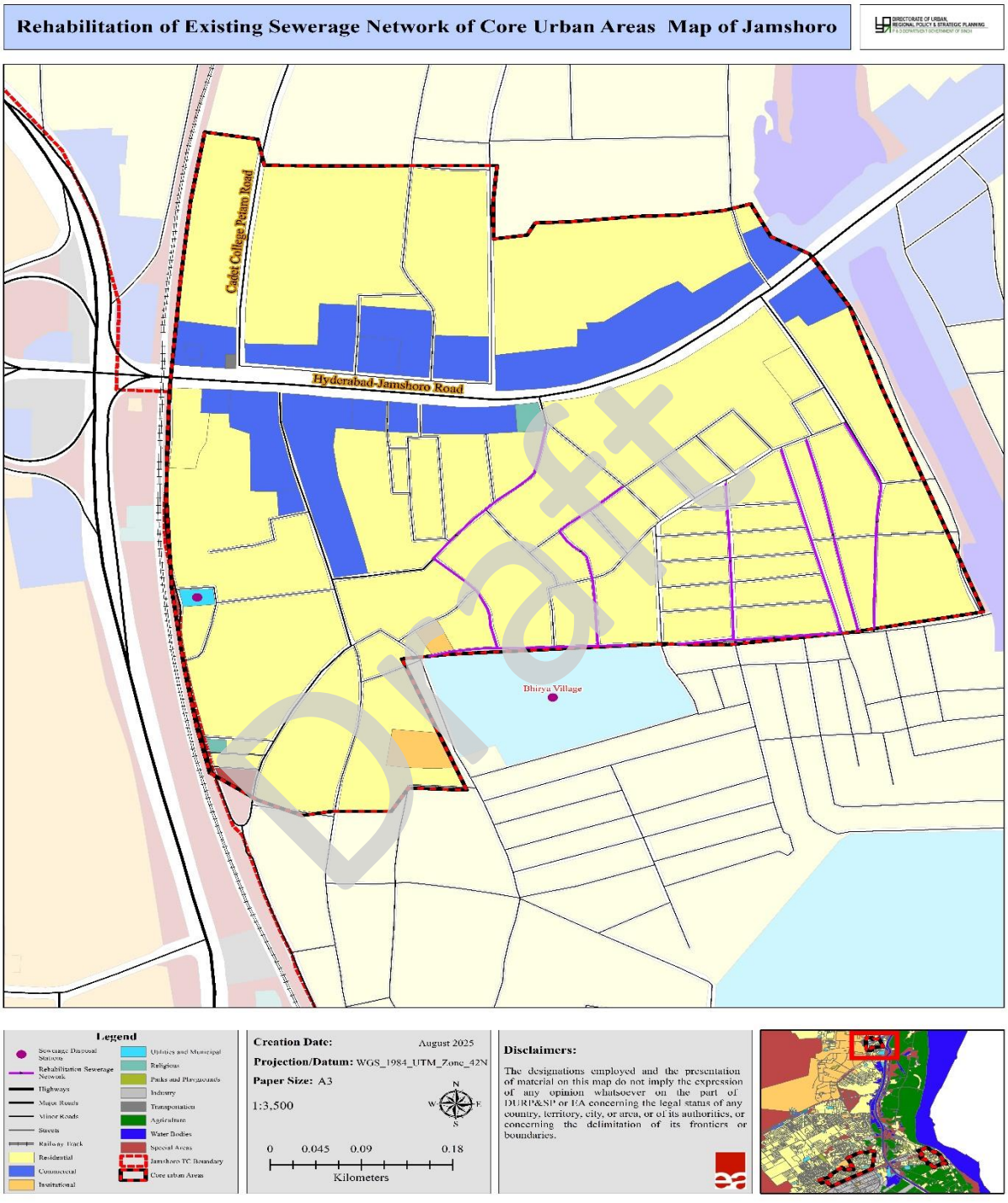
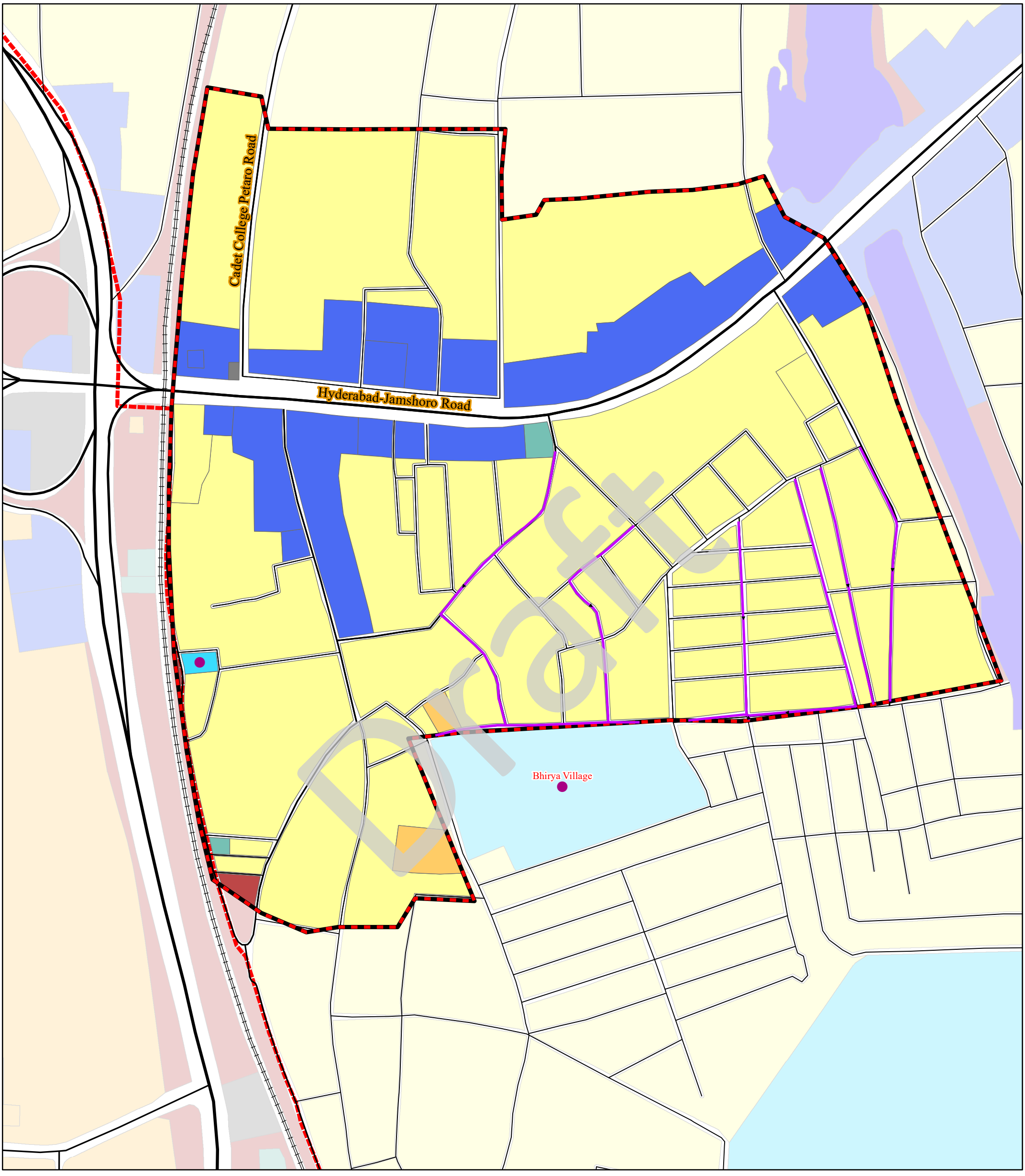


Figure 7-8: Rehabilitation of Existing Sewerage Network of Core Urban Areas Map of Jamshoro

Rehabilitation of Existing Sewerage Network of Core Urban Areas Map of Jamshoro

DIRECTORATE OF URBAN, REGIONAL POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Sewerage Disposal Stations
- Rehabilitation Sewerage Network
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Jamshoro TC Boundary
- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:3,500

N W E S

0 0.045 0.09 0.18

Kilometers

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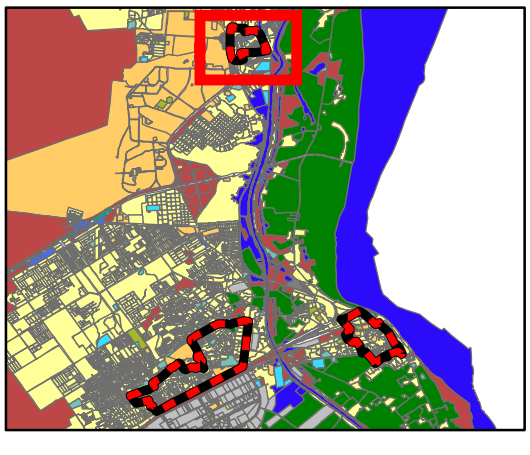

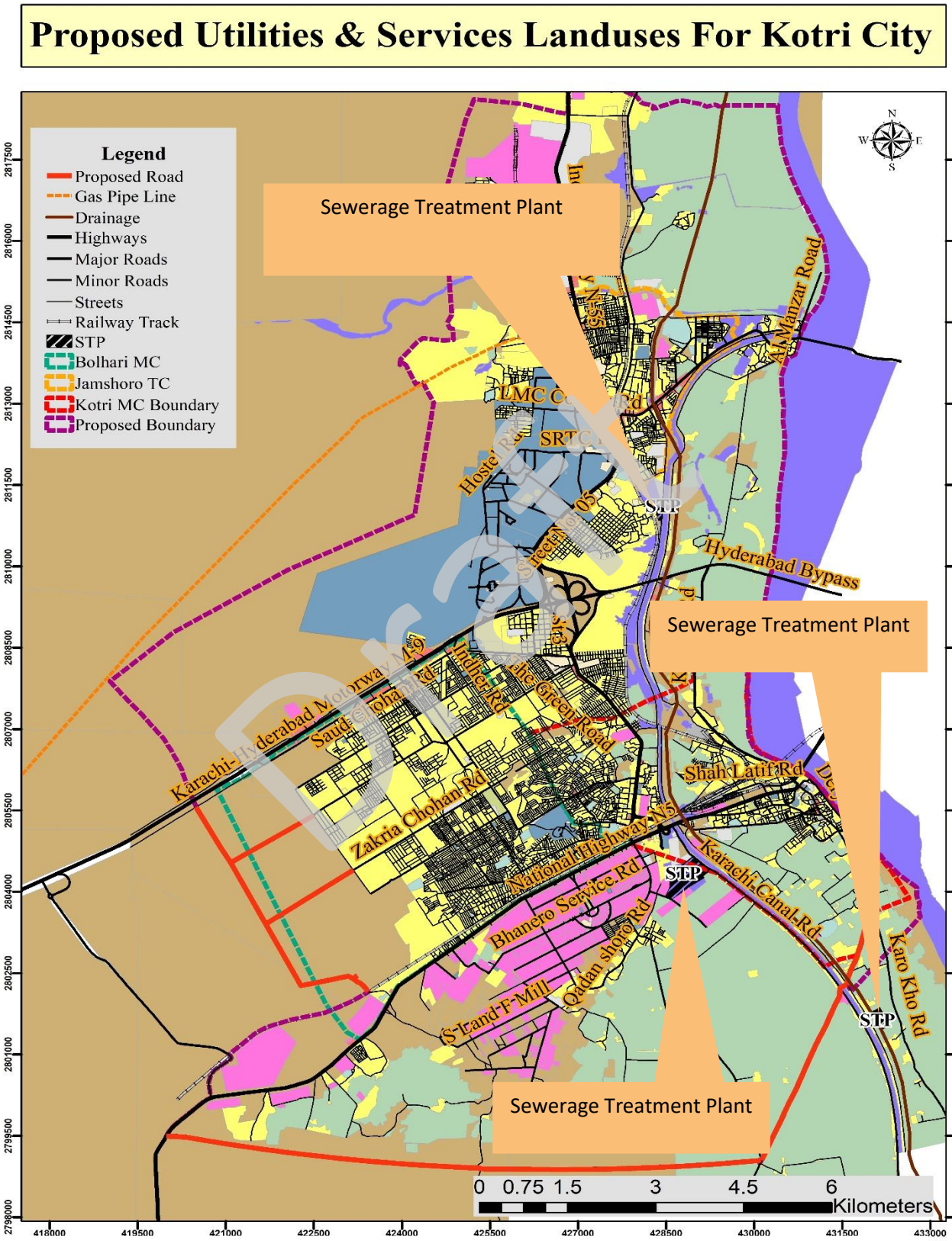

Figure 7-9: Proposal for Sewerage Treatment plant Landuse for Kotri City

Proposed Utilities & Services Landuses For Kotri City

Legend

- Proposed Road
- Gas Pipe Line
- Drainage
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- STP
- Bolhari MC
- Jamshoro TC
- Kotri MC Boundary
- Proposed Boundary

N
W E
S

Indus Highway N55
Al Manzar Road
LMC Colony Rd
SRTC Rd
Hostel Rd
STP
Street No. 05
Hyderabad Bypass
Khanpur Rd
Indher Rd
The Green Road
Karachi-Hyderabad Motorway M9
Zakria Chohan Rd
Shah Latif Rd
Derya Rd
National Highway N5
Karachi Canal Rd
Bhanero Service Rd
Qadan shoro Rd
S-Land F-Mill
Karo Kho Rd

0 0.75 1.5 3 4.5 6
Kilometers

2817500 2816000 2814500 2813000 2811500 2810000 2808500 2807000 2805500 2804000 2802500 2801000 2799500 2798000

418000 419500 421000 422500 424000 425500 427000 428500 430000 431500 433000

7.3 Solid Waste Management

*7.3.1 **Existing Situation***

Primary Collection: In kotri MC Sindh Solid Waste Management Board (SSWMB) Solid waste is responsible for collecting waste from households, door to door garbage is collected on daily basis from 9 A.M to 5 P.M except Friday and 60 tonnes garbage is collected on daily basis which includes a significant portion of organic waste (food waste and yard debris), plastics, paper, and other miscellaneous inorganics as metals and glass. This waste originates from residential, commercial, and some industrial sources within the city. Furthermore, the quantity of waste generation is not available for MC Bolhari and TC Jamshoro, as MC and TC itself operate and maintain the municipal waste. However, currently 250 staff is working and 01 contractor hired by SSWMB in MC Kotri and the following current machinery is available in MC Kotri:

- 05 MP (Small Rickshaw)
- 01 Loader
- 05 tractor trollies

Waste is transported from primary points to area near baba salahuddin. Furthermore, the collected waste is dumped at designated landfill site which is located near Kando Khan Khoso village, and the total area of landfill site is 100 Acres without having any boundary wall. One dozer is currently working in the landfill site. Currently SSWMB is working on developing the landfill site. SSWMB is not working in S.I.T.E area Kotri and the waste generated by industries is lifted and treated by S.I.T.E through K.A.T.I.

The Municipal Committee of Kotri has sanctioned a total of 292 employee positions, which matches the current staffing levels. However, there is a shortfall in the number of sweepers and cleaning personnel, with only 51 of the required 70 currently employed. Additionally, while the sanctioned firefighting staff consists of 17 positions, only 12 personnel are available. In the Town Committee of Jamshoro, there are 100 sanctioned positions, with 70 employees currently on staff. The cleaning personnel includes 77 individuals, comprised of 70 on daily wages and 7 permanent employees. Moreover, the sanctioned firefighting staff is limited to 1 firefighter and 1 driver.

According to the socioeconomic survey, a significant majority about 72% of respondents reported disposing of their daily garbage by throwing it outside their houses, reflecting a prevalent informal waste disposal practice. In contrast, approximately 21% stated that their waste is collected by municipal sweepers, indicating that a portion of the population does rely on the formal municipal waste collection system.

Given the significant gaps in formal waste collection services, limited staffing and equipment, and the prevalent informal disposal practices by a large portion of the population, the solid waste management strategy must prioritize: I. strengthening and expanding door-to-door collection coverage to reduce unsanitary dumping; II. upgrading landfill facilities with proper boundaries, operational machinery, and environmental safeguards; III. addressing staff shortages, especially among sweepers and firefighting personnel, to improve service efficiency and safety; and IV. enhancing public awareness and participation to promote responsible waste disposal and support formal collection systems.

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*7.3.2 **Issues related solid waste management***

- The solid waste management landscape in Kotri City, comprising Kotri MC, Bolhari MC, and Jamshoro TC, is grappling with substantial challenges that stem from a mix of systemic, infrastructural, and behavioral issues. The advent of the Sindh Solid Waste Management Board (SSWMB) brought a structured approach to managing solid waste, yet the on-ground realities paint a picture of struggle and unmet needs.

- Despite the presence of waste management fleets, the existing collection and disposal mechanisms heavily rely on community bins and manual collection methods, leading to inefficiencies and unhygienic conditions. The significant deficit in the number of vehicles and equipment, coupled with a shortage of trained personnel, hampers the capacity to manage the growing waste volume effectively.

- The infrastructure for waste collection, from community bins to disposal sites, is inadequate. The reliance on ad-hoc dumping sites and the absence of structured disposal mechanisms contribute to environmental pollution and health hazards.

- The survey highlights a concerning trend of waste disposal, with a majority of the population resorting to throwing garbage outside their houses. This practice not only indicates a lack of adequate municipal waste management services but also a gap in community awareness and adherence to proper waste disposal methods.

- A fraction of the population relies on municipal or privately appointed sweepers, reflecting the inadequacy of public waste management services and the community's attempts to compensate for these shortcomings.

- The projections indicate a steep increase in waste generation, aligning with population growth. This trend underscores the urgent need for strategic planning and enhancement of waste management systems to handle the anticipated increase in waste, necessitating the adoption of sustainable practices and technologies to ensure efficient waste management, public health, and environmental sustainability.

- The involvement of SSWMB in identifying suitable landfill sites and conducting comprehensive planning for waste disposal points is a step in the right direction. However, the integration of Bolhari and Jamshoro into this framework remains a pending task. The establishment of systematic waste disposal points is crucial for the holistic improvement of waste management across the region.

- The handling of healthcare waste poses a significant challenge. The considerable volume of hazardous waste generated by healthcare facilities requires meticulous management strategies. Planning for future increases in healthcare waste is essential, underscoring the need for robust waste management protocols, proper treatment technologies, and the implementation of safe waste handling and disposal practices.

Draft

7.3.3 ***SWOT Analysis:***

Solid Waste Management			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Establishment of the Sindh Solid Waste Management Board (SSWMB) provides a structured approach to solid waste management. 2. The involvement of SSWMB in identifying suitable landfill sites and conducting comprehensive planning for waste disposal points is a step in the right direction. 3. door to door garbage is collected on daily basis from 9 A.M to 5 P.M 4. The Availability of 100 Acres landfill site 5. The office premises of Kotri Municipal Corporation (MC) and Bolhari Municipal Corporation (MC) function as operational hubs for their waste management fleets, accommodating a range of vehicles and equipment critical for waste collection and management activities.	1. The Sindh Solid Waste Management Board (SSWMB) is currently operational solely in Kotri city and is not engaged in Jamshoro Town Committee or Bolhari Municipal Committee. 2. The existing collection and disposal mechanism heavily rely on community bins and manual collection method despite the presence of waste management fleets. 3. The significant deficit in the number of vehicles and equipment, coupled with a shortage of trained personnel, hampers the capacity to manage the growing waste volume effectively. 4. The infrastructure for waste collection, from community bins to	1. Anticipated population growth necessitates strategic planning for increased waste generation. 2. Adoption of sustainable practices and technologies can ensure efficient waste management, public health, and environmental sustainability. 3. Appropriate measures should be adopted for collection and re-cycling of solid waste. 4. SWM recycling will help to generate revenue. 5. Appropriate landfill sites should be identified for future disposals. 6. PPP in service delivery 7. Awareness campaigns should be initiated. 8. Job creation 9. New environmentally	1. The reliance on dumping sites and the absence of structured disposal mechanism contribute to environmental pollution and health hazards. 2. Lack of adequate municipal waste management services. 3. There is a gap in community awareness and adherence to proper waste disposal methods. 4. Improper waste disposal practices, such as throwing garbage outside houses, contribute to health and environmental issues. 5. Inadequate infrastructure and resources may result in an insufficient capacity to manage the increasing volume of waste, potentially leading to inefficiencies and operational challenges in waste management.

Draft

Solid Waste Management			
Strength	**Weakness**	**Opportunity**	**Threats**
	disposal sites, is inadequate. 5. No separate collection of medical waste. 6. Absence of proper disposing sites for hazardous waste generated by healthcare facilities. 7. Lack of awareness among peoples about proper disposal procedures. 8. Poor financial and operational management system. 9. A fraction of the population relies on municipal or privately appointed sweepers, reflecting the inadequacy of public waste management services. 10. Reliance on community bins and manual collection methods leads to inefficiencies and unhygienic conditions.	sustainable technologies should be introduced to control the increasing solid waste issues. 10. Opportunity for recycling and reuse of solid waste, such as Refuse-derived fuel (RDF), bio-gas etc. 11. Introducing Volume-Based Waste Fee (VBWF) Modal.	6. Public health issues 7. Projections suggest a significant rise in waste generation corresponding with population growth, which may exacerbate existing waste management challenges and strain current infrastructure and resources. 8. Handling of healthcare waste.

Draft

*7.3.4 **Need Assessment***

The waste generation forecast for Kotri presents a clear trajectory of increasing waste production parallel to the population growth. The table indicates a steady rise in waste generation, measured in tons, based on a per capita municipal waste generation rate of 0.42 kg per day. Considering waste generation rate for design purpose as 0.42 kg per capita per day with the current (2025) population of the municipal committee as 382,492 the total municipal solid waste load arising in the municipality is approx. 160,647 kg per day.

Table 7-13: Estimated Waste Generation Rates Are Based on a Per Capita Daily Generation

Years	2025	2030	2035	2040	2045
Population (Kotri)	382,492	436,114	505,205	595,393	714,441
0.42 kg per capita per day (KG)	160647	183168	212186	250065	300065

Given the quantified deficits in formal waste collection, infrastructure gaps, limited equipment and personnel, and widespread informal disposal practices, the solid waste management strategy must prioritize: I. expansion and modernization of collection services with adequate fleet and trained staff to meet growing demand; II. development and upgrading of landfill and disposal facilities with environmental safeguards and boundary protections; III. implementation of hazardous and healthcare waste management protocols; and IV. public awareness campaigns and stakeholder engagement to improve waste disposal behaviors and support sustainable practices, in line with projected increases from 160 to 300 tonnes of daily waste by 2045.

*7.3.5 **Policy Guidelines**[49]*

Implement integrated solid waste management with 100% coverage in urban areas and 60% in rural areas of Sindh by 2025.

Principle

- Develop integrated solid waste management system.
- Conduct a study on wastewater and solid waste to develop town level profiles (including Infrastructure, equipment and staffing)
- Conduct waste characterization studies.
- Smooth and efficient Solid waste collection and disposal by providing door to door collection services.
- Ensure Effective solid waste management by developing a list of staffing, hardware and equipment for solid waste management.
- Efficient Solid waste disposal and recycling by establishing transfer stations to reduce disposal time.
- Recycle solid waste by systematic separation.
- Sanitary landfill options identify for towns where it is feasible.

[49] Solid Waste Management Policy for Sindh
Sindh Water and Sanitation Policy 2017

Draft

- Formalize contracts with companies for waste to energy options. At least each mega/intermediate city has a WTE (Waste to energy options) in place.
- Provide each town with a centralized and functional high risk hospital waste disposal facility.
- Update status of all slaughterhouses (recognized and unrecognized) in each district and prioritize those for rehabilitation, solid waste and wastewater management.
- Provide refresher training on slaughterhouse safety and hygiene practice guidelines to 100% slaughterhouse staff in recognized slaughterhouses in safe handling and disposal of carcass, entrails, hides, and wastewater.
- Efficient and effective management of Industrial solid waste by determining the current status of industrial solid waste production and disposal and development of strategies and actions for efficient and effective management of industrial solid waste.
- Develop and use technologies that are affordable, applicable and cost effective to maintain the solid waste management.
- Allocation of proper landfill sites outside of the urban area and Final disposal of waste at least 500m from housing to a contained area chosen and designed according to geological conditions, water table, wind etc.

*7.3.6 **Strategic Development Plan***

The aim of this strategic development plan is to improve the quality of life of the people of DHQ Town and the physical environment and also provide guidelines for the management of solid waste in the town.

i. Long Term

- Community and Private Sector Involvement in SWM: The active involvement of local communities and the private sector is essential for an effective waste management system. It would be beneficial to start involving local communities and the private sector in waste management, which has been a slow process. This process needs to be accelerated in a well planned manner.
- Public Awareness and Education: It can be brought about in many different ways through the electronic and printed media and street talks, through community organizations such as schools, institutions, and households, using a public-address system, distributing leaflets, for public awareness.
- Implement Waste minimization: It is done through pilot and demonstration projects. These pilot and demonstration projects can be used to raise awareness of basic waste-minimization measures.

ii. Short Term

- The collection and disposing of solid waste is the responsibility of the MC. The mechanism for solid waste management is not available, so therefore a detailed feasibility is proposed to develop an efficient solid waste management in Jamshoro DHQ.
- The collection system needs to be made more effective and efficient.

Draft

- Municipal Committee has already initiated some work on biomedical-waste management. It should immediately start segregation practice for biomedical waste collection system.
- Encourage On-site Reuse and Recycling: This method will reduce material consumption and the quantity of hazardous waste generated. As a result, material cost and waste treatment cost will be reduced.
- Techno-economic feasibility and detail study of characterization of waste is proposed on basis of the policy guidelines.
- Develop integrated solid waste management system keeping in mind the method, procedure and design at front end, middle end and back end, based on best possible public health practices and environmental protection laws/rules.
- Industrial waste disposal should be treated seperately and safely.

Solid waste management initiatives will be integrated with municipal infrastructure planning, focusing on drainage access, road connectivity, WASH services, energy reliability, and public safety across urban and rural settings. This coordinated approach will enhance waste collection, disposal, and recycling efficiency, minimize environmental and health risks, and ensure continuous, resilient service delivery even during flood or rain events, ultimately contributing to improved quality of life and sustainable urban development.

*7.3.7 **Priority Project***

i. Construction of solid waste transfer station

The Sindh Solid Waste Management Board (SSWMB) is operational in Kotri City, while schemes for Jamshoro and Bolhari await budget allocation. Currently, door-to-door collection takes place daily from 9:00 a.m. to 5:00 p.m. (except Fridays), with around 60 tonnes of waste gathered each day. This waste stream is largely organic, along with plastics, paper, metals, and glass from residential, commercial, and limited industrial sources. Despite these efforts, Kotri Municipal Committee continues to rely on open and unauthorized dumping, resulting in environmental degradation, groundwater contamination, foul odors, and health risks from vector-borne diseases.

A Solid Waste Transfer Station (SWTS) offers a practical solution to these challenges. By serving as a centralized facility, it would consolidate waste from collection vehicles and transfer it into larger haulage vehicles for efficient transport to designated landfill or treatment sites. This system would significantly reduce transportation costs and time while ensuring environmentally sound handling of waste. Importantly, it would also enable preliminary segregation, recycling, and composting, thereby reducing the volume of waste sent to landfills.

The proposed facility would be designed with proper drainage, leachate collection, odor control, and buffer landscaping to minimize environmental and social impacts. In the absence of such infrastructure, uncontrolled dumping and its consequences will persist. Establishing a transfer station is therefore a critical step toward building a structured, sustainable, and modern solid waste management system for Kotri MC, Bolhari MC, and Jamshoro TC, in line with public health needs, environmental regulations, and urban development goals.

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Garbage accumulation in outside the Residential area

Garbage Mixing with waste water

Garbage Accumulation in Empty Plot

Garbage accumulation

Draft

- **Scope**

The project involves the establishment of a Solid Waste Transfer Station (SWTS) to address the challenges of inefficient waste collection, disposal, and open dumping in Kotri MC, Bolhari MC, and Jamshoro TC.

The SWTS will act as a centralized facility where waste collected door-to-door will be consolidated from smaller vehicles and transferred into larger haulage trucks for transport to designated landfill or treatment sites. This consolidation will improve operational efficiency by reducing transportation costs and time.

Key components of the project include:

- Construction of a transfer station facility equipped with areas for waste unloading, temporary storage, and compaction.
- Provision for preliminary waste segregation zones to separate recyclables and organic waste, enabling recycling and composting efforts.
- Installation of drainage systems and leachate collection to manage runoff and prevent contamination.

- Implementation of odor control measures and buffer landscaping to minimize environmental and social impacts.
- Development of supporting infrastructure such as administrative offices, access roads, and vehicle maneuvering areas.

➢ **Size**

i. **Geographical Coverage:**

- The Solid Waste Transfer Station SWTS will serve the waste management needs of Kotri MC, Bolhari MC, and Jamshoro TC, consolidating waste streams from these urban areas.

ii. **Capacity and Physical Components:**

- Designed to handle approximately 60 tonnes of solid waste per day, reflecting current collection volumes with room for future growth.
- Includes waste transfer and compaction zones, segregation and recycling areas, leachate and drainage management systems, and odor control facilities.
- Adequate space for vehicle circulation, including areas for unloading collection trucks and loading larger haulage vehicles.
- Supporting infrastructure including office facilities, maintenance areas, and buffer zones with landscaping to reduce environmental impacts.
- Improved urban sanitation and public health by minimizing open dumping and waste burning.

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➢ **SDG'S Alignment**

I. **GOAL 3 – Good Health and well-Being:** Uncollected and improperly disposed solid waste creates breeding grounds for bacteria, mosquitoes, and rodents, leading to frequent outbreaks of communicable diseases. By introducing a structured Solid Waste Transfer Station, this project contributes directly to SDG 3.9, which aims to reduce illnesses and deaths caused by hazardous chemicals, air, water, and soil pollution.

II. **GOAL 7 – Affordable and clean energy:** The feasibility can include waste-to-energy options such as biogas from organic waste or RDF (refuse-derived fuel) from non-recyclables, supporting SDG 7.2 and 7.3, which aim to expand clean energy sources and enhance energy efficiency.

III. **GOAL 11 – Make cities and human settlements inclusive, safe, resilient and sustainable:** By introducing a structured solid waste management system, the project addresses SDG 11.6, which targets the reduction of cities' adverse per capita environmental impacts, with a special focus on air quality and municipal waste management.

➢ **Implementing Authority:** Government of Sindh, PHED and Municipal Committee Kotri, Municipal Committee Bolhari and Town Committee Jamshoro.

➢ **Preliminary cost estimate:** 300 million PKR Approx. However, a Feasibility study is required for the designing and costing of the project.

Table 7-14 : Solid Waste Estimated Cost (Kotri City)

S. No.	Project Name	Estimated Cost in Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Solid Waste						
1.	Feasibility study for construction of Solid Waste Transfer Station	100	-	Non ADP	**Short Term**	-
2.	Procurement for land acquisation process for Solid Waste Transfer Station.	200	-	Non ADP	-	**Long Term**

7.3.8 Immediate Action Plan

- **Provision for Solid Waste Management**

The Sindh Solid Waste Management Board (SSWMB) is presently active in Kotri MC, while initiatives for Jamshoro TC and Bolhari MC have been approved but remain stalled due to a lack of budgetary allocation. Although daily door-to-door collection is carried out, litter continues to accumulate in public areas, particularly in the core zones of Bolhari and Jamshoro, where streets frequently display unattended refuse. Many households resort to dumping waste outside their residences, a practice that reflects both gaps in municipal service delivery and limited community awareness regarding proper disposal methods. To address these deficiencies, it is essential to strengthen operational efficiency, introduce well-planned infrastructure upgrades, and establish systematic monitoring mechanisms. Equally important are community-focused awareness programs and behavioral change campaigns that can foster responsible practices, encourage civic participation, and create a cleaner, healthier, and more sustainable urban environment.

The Immediate Action Plan for SWM focuses on segregated waste collection, community awareness, additional vehicles and bins, and better regulatory oversight. By modernizing operations and introducing user-based contributions, the plan aims to establish a sustainable model of solid waste management that ensures cleanliness, protects public health, and aligns with SDG 11 (Sustainable Cities & Communities) and SDG 12 (Responsible Consumption & Production).

Garbage accumulation in core urban area

Broken road and over flow of sewerage water

Draft

I. Scope

The solid waste management improvement plan will include the following key actions:

- Deployment of community waste bins will be carried out through the strategic placement of clearly labeled containers for recyclables, organics, and general waste across residential, commercial, and public areas. This includes localities such as Pathan Colony, Shirazi Paro, Bhatti Para, Malik Town, Muslim Town, Telegraph Colony, Muslim Town, Sikanderabad, Gharibabad, Khanzada Colony, Behar Colony, and the surrounding areas of Jamshoro Phattak. Bins will also be installed along major roads including Haji Ali Nawaz Chohan Road, Riswa Mori Road, and the N 5, as well as in key public spaces such as the Malik Sikandar Khan Sports Complex, Malik Mehrab Khan Park, Brohi Chowk Park, Khanzada Ground, Garho Ghot Ground, and the DHQ Hospital Kotri.
- Structured Collection System: Primary collection from households to bins, and secondary transfer to designated dumping sites or portable transfer stations.
- Public Awareness Campaigns: Education on segregation and disposal practices through workshops, flyers, and local NGOs.
- Street Sweeping: Daily sweeping with accountability mechanisms under the Municipal Committee.
- Equipment and Infrastructure: Acquisition of collection vehicles, compactor trucks, and portable transfer stations; deployment of waste tracking technologies (GPS, monitoring apps).
- Regulatory & Contingency Planning: Compliance with Sindh Solid Waste Management Authority (SSWMA) standards and preparedness for service disruptions.

II. Size:

The program will cover the entire core urban area (825 acres) with a scalable system to meet future growth in population and waste volumes.

III. Preliminary cost estimate

Total Estimated Cost: 200 million approx.

Draft

Table 7-15: Solid Waste Disposal of Core Urban Area Kotri City

S. No	Name	Containers No.s	Cost / Container	Cost (PKR)
Total Core Urban Area: 825 acres				
1	Placing of Garbage Container at different sites/locations in core Urban area	200	1,000,000	**200**
			Total Cost (PKR). Million	**200**

Note:
1. Each site located for garbage container must be strictly followed by MC & TC to collect and manage solid waste from this site for proper management of the core area.
2. Containers must be fully get maintained by MC & TC office.
3. Sindh solid waste management department/authority will keep control on each project for the uplifting of City as per master plans.

Modern Community Bins

Modern Community Bins

IV. Implementation Framework

- **Funding Sources:**
    - Municipal budgets dedicated to SWM.
    - Provincial government ADP grants for environment and sanitation.
    - Community contributions via user fees.
    - International development support for sustainable SWM programs.
- **Execution:** MC & TC in collaboration with SSWMA.
- **Monitoring:** Smart monitoring tools (GPS tracking, digital reporting) to improve accountability.

7.4 Firefighting

7.4.1 Existing Situation

The current state of firefighting services in Kotri City and Jamshoro reveals several significant shortcomings that need urgent attention. In Kotri City, the Fire Brigade Station is located within the Municipal Committee (MC) office and is equipped with only one firefighting vehicle. This provision falls short of the current requirement, which calls for at least two additional fire vehicles to adequately meet the city's needs. Furthermore, the MC lacks a dedicated budget for firefighting services, including vehicle maintenance, often resulting in the unavailability of essential resources like diesel to operate the vehicles. The staffing situation also reflects a deficit, with only eleven actual firefighters on duty compared to the sanctioned strength of fourteen.

In Jamshoro, the situation is even more concerning. While there is one firefighting vehicle available in Town.

Committee (TC) Jamshoro, the absence of trained firemen considerably undermines its effectiveness. Moreover, the lack of a specific firefighting station in TC Jamshoro further exacerbates the challenge of responding to fire emergencies efficiently.

Draft

Given the critical shortages in firefighting vehicles, inadequate staffing levels, and the absence of dedicated budgets and facilities, the firefighting strategy must prioritize: I. procurement and maintenance of additional fire vehicles to meet operational demands; II. recruitment and training to bridge staffing gaps and enhance emergency response capacity; III. establishment and upgrading of dedicated firefighting stations equipped with necessary resources; and IV. ensuring sustainable budget allocations for fuel, equipment maintenance, and ongoing operational needs to strengthen overall fire safety infrastructure.

*7.4.2 **Need assessment***

As the current total population of (Kotri MC + Jamshoro TC+ Bolhari MC) is 382,492, which will be 714,441 in 2045. As per National reference manual the one fire station is recommended for 0.1 million population and one fire engine is required for 50,000 population. Currently there is one vehicle available with municipal committee. So, fourteen more vehicles are needed for city.

The need assessment confirms that the firefighting response cannot rely on existing resources alone; it must be delivered through a two-track approach: (i) rehabilitation and capacity building of current firefighting infrastructure and personnel to improve operational readiness, and (ii) strategic procurement of additional fire vehicles and establishment of new fire stations to meet population growth demands. This phased approach ensures both immediate enhancement of emergency response and long-term resilience aligned with urban expansion projections.

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*7.4.3 **Strategies***

- City committee people would need to be trained about local early warning systems, evacuation, first aid search and rescue, firefighting etc.
- Provision of Sprinkler protection should be ensured in each multi story building for firefighting.
- Assure that all areas of the Town have the highest level of fire protection, at the lowest possible cost, to meet existing and future demand.
- Establishment of fire-stations to accommodate required number of fire vehicles.
- Establish sub-stations at different locations to ensure short response time for the whole city.
- Increase service efficiency through number of vehicles, dedicated staff and financial mechanism. To ensure readiness of all vehicles with ample stocks of POL and spares

Firefighting strategies will be integrated with municipal infrastructure planning, particularly focusing on road connectivity, energy reliability, water supply for firefighting, early warning systems, and public safety across the city. This integration will enhance emergency response times, ensure operational readiness of equipment, and strengthen overall resilience against fire-related risks.

*7.4.4 **Priority Project***

i. Provision for the fire station

The firefighting services in Kotri City and Jamshoro are currently inadequate to meet the growing safety needs of their communities. Kotri City operates with a single firefighting vehicle housed within the Municipal Committee office, which is insufficient compared to the recommended fleet size of at least three vehicles. Moreover, the lack of a dedicated budget for firefighting operations hampers vehicle

maintenance and availability of essential resources such as fuel. Staffing levels are also below sanctioned strength, compromising operational readiness.

In Jamshoro, firefighting capabilities are further constrained by the absence of a dedicated fire station and a shortage of trained personnel, despite having one firefighting vehicle. This limits effective emergency response and poses significant risk to public safety.

Addressing these critical gaps through investment in infrastructure, equipment, trained personnel, and operational funding is essential to improve fire emergency preparedness, response times, and overall community protection in Kotri and Jamshoro.

Incomplete fire station Building

Fire Bridge vehicles

- **Scope**

The project aims to enhance firefighting services in Kotri City and Jamshoro through:

- Procurement of additional firefighting vehicles to meet recommended fleet requirements.
- Establishment of dedicated fire stations equipped with modern facilities in both Kotri City and Jamshoro.
- Recruitment and training of additional firefighters to reach and maintain sanctioned staffing levels.
- Development of a sustainable operational budget to cover maintenance, fuel, equipment, and personnel needs.
- Implementation of resource management systems ensuring consistent availability of essential firefighting supplies.

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- **Size**

Geographical Coverage:

The project targets firefighting infrastructure and services within the administrative boundaries of Kotri Municipal Committee and Jamshoro Town Committee.

Physical Components:

- Acquisition of at least two additional firefighting vehicles for Kotri City and one for Jamshoro TC.
- Construction or upgrading of two dedicated fire stations one in Kotri City and one in Jamshoro TC featuring vehicle bays, training facilities, administrative offices, and equipment storage.
- Staffing expansion to achieve a total of approximately 14 firefighters in Kotri City and an adequately staffed team for Jamshoro TC, supported by ongoing training programs.
- Establishment of a maintenance and operations budget covering fuel, repairs, equipment replacement, and staff welfare.

- **SDG'S Alignment**

I. **SDG 3: Good Health and Well-Being:** Enhances community safety and reduces fatalities and injuries from fire incidents and emergencies.
II. **SDG 11: Sustainable Cities and Communities:** Improves urban resilience, emergency preparedness, and risk reduction measures in line with sustainable urban development principles.

- **Implementing Authority:** Government of Sindh, Municipal Committee Kotri and Town Committee Jamshoro.
- **Preliminary cost estimate:** Preliminary cost estimate: 182 million Approx.

S. No.	Project Name	Estimated Cost in Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Fire Fighting						
1.	Establishment of Fully Operational Fire Station, Kotri City	182	-	Non ADP	**Short Term**	-

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8. INFRASTRUCTURE

8.1 Transportation

*8.1.1 **Existing Situation***

- **Airport**

Hyderabad Airport

Sehwan Sharif Airport serves Sehwan only during the Urs festival, the death anniversary of Lal Shahbaz Qalandar. Pakistan national carrier Pakistan International Airlines operates a daily flight between Karachi and Sehwan every year during the annual Urs which usually lasts for three days. In actual Jamshoro has direct access to Hyderabad Domestic Airport via M9 and Jamshoro-Hyderabad Road, but due to some technical reasons Hyderabad domestic airport is now closed for commercial traffic as of 2013. Given the non-operational status of closer airports, the primary airport serving Kotri City residents is the Jinnah International Airport in Karachi. Situated approximately 120 kilometers away, it is linked via the M9 motorway, making it the most accessible airport for international and domestic flights. As the largest and busiest airport in Pakistan, Jinnah International Airport plays a pivotal role in connecting Kotri City with various national and international destinations.

- **Railway Station (Junction)**

Kotri Junction

The construction of the railway line between Karachi and Kotri began in April 1858. By May 13, 1861, Kotri Junction was officially opened to the public, marking the commencement of the first public railway line between Karachi and Kotri, covering a distance of 108 miles (174 km)[50]. The station also plays a pivotal role in connecting Jamshoro to the rest of the country, particularly through the Kotri–Dadu railway line, which extends to Quetta. Kotri Junction is recognized as one of the busiest railway junctions in Pakistan, reflecting its strategic importance in the national railway network. The station facilitates several express and passenger trains, connecting Kotri to various cities across Pakistan. These services include[51]:

- Allama Iqbal Express
- Awam Express

[50] Scinde Railway - Graces Guide
[51] Kotri Railway Station Train Time Information 2023 (pakinformation.com)

Draft

- Bahauddin Zakaria Express
- Bolan Mail
- Fareed Express
- Hazara Express
- Khushhal Khan Khattak Express
- Shah Latif Express
- Sindh Express
- Sukkur Express

Kotri Junction, with its historical roots and current operational significance, continues to be a pivotal element of Pakistan's railway infrastructure. It not only serves as a key transit point connecting various parts of the country but also stands as a testament to the rich history of railway transport in the region. As such, it remains an integral part of the transportation framework in Kotri City and the broader Jamshoro District.

- **Inter City Modes of Transportation (Bus and Truck Stand)**

  Within the DHQ (District Headquarters) Town of Kotri, there are no significant bus and truck stands. This absence indicates a lack of organized and centralized locations for inter-city transportation services.

  Inter-city bus services in Kotri are limited and operate without proper regulation or designated stands. This lack of organization often leads to operational inefficiencies and overcrowding. Due to the high number of passengers relying on public transport and the limited availability of inter-city buses, overcrowding is a common issue. This not only affects passenger comfort but also raises safety concerns. The presence of illegal buses and Qingqi (motorized rickshaw) stands in the DHQ Town reflects an alternative transportation system that many passengers prefer over conventional buses.

  Unregistered Qingqi rickshaws and auto-rickshaws outnumber the buses, indicating their popularity as a mode of transport, possibly due to their accessibility, flexibility, and cost. While the central areas of Kotri lack major bus and truck stands, some are located on the outskirts of Jamshoro, serving as points for inter-city connections.

- **Intra City modes of Transportation**

  Kotri City's intra-city transportation dynamics are shaped by its geographical location, the presence of major national highways, and the local road network. Despite some infrastructure developments, there are challenges that impact the efficiency of transportation within the city.

  Bus Stands and Routes: While there are no major bus and truck stands within DHQ Town Kotri, private bus stands are found under the newly constructed flyover at Jamshoro Phatak in Jamshoro TC. The presence of the national highway crossing through DHQ Town facilitates numerous bus routes.

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Road Connections: Kotri City is well-connected by several key routes, including:

- Jamshoro-Hyderabad
- Kotri-Thatta through N-5
- Jamshoro-Karachi through M9
- The Indus Highway connecting DHQ Town with Dadu and Larkana

*8.1.2 **Local Road Network***

- **Regional Connectivity:**

Jamshoro's road network provides significant connectivity to surrounding towns and other parts of the country. Major routes include the Indus Highway (N55) and the Motorway (M-9), connecting Jamshoro with Karachi and other major cities.

- **Condition of Road**

Jamshoro has significant connectivity with surrounding towns as well as other parts of the country through the regional and national road networks. Jamshoro district covers an area of 11,517 sq. km yet it has only 179 kilometres of good quality Roads, which are inadequate for the area and its population. A National Highway (Indus Highway, N55) and Motorway (M-9) connect Jamshoro with Karachi and other major cities of the province.

Condition of Roads

Drainage issues on roadside are evident due to which roads are worsening day by day. The absence of street furniture is another issue due to which traffic incidents take place. Encroachments and unorganized/illegal Qinqui and Rickshaw stands are also evident on the roadside which causes on street and off-street parking issues. Occasional institutional and religious gatherings (Urs etc.) are also one of the major reasons for traffic congestion.

- **Internal Roads**

The internal road network in Jamshoro TC, Kotri MC, and Bolhari MC is generally not satisfactory, marked by physical deterioration, congestion, and parking issues. However, main roads like M-9 Road, N-55 Road, and others are in better condition.

- **Parking/Street Furniture/Street lightning**

There is no designated parking except for roadside parking, and street furniture is notably absent. While street lighting exists, it requires upgrades and maintenance. Expansion is needed in areas currently without proper lighting.

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- **Major Completed Projects (Kotri & Jamshoro)**
  i.) Construction of Bridge over Railway Line at Jamshoro Phatak (Highway Volume of turning movements and closure of Railway gate at this cause significant delays in traffic flow coming from sehwan side and also for the traffic to & from Jamshoro University).
  ii.) Construction of Overhead Bridge on Railway line between Kotri City and the Industrial Area Kotri. District Jamshoro
  (This bridge is intended to ease traffic flow between the Industrial Area Kotri and the educational city of Jamshoro).

- **Traffic Volume Count (TVC)**

Traffic and travel behavior in Kotri City shows clear dominance of short distance, high frequency movements but under severe road stress. Origin Destination survey results indicate that work and office trips are mostly completed within 11 to 15 minutes (33 percent), followed by 6 to 10 minutes (26 percent) and 0 to 5 minutes (21 percent), while only 4 percent of commuters travel 31 minutes or more. School trips are even shorter, with 32 percent of students reaching schools within 0 to 5 minutes and 27 percent within 11 to 15 minutes, confirming proximity of educational facilities to residential areas. Shopping trips show slightly longer durations, with 25 percent taking 11 to 15 minutes, 20 percent taking 6 to 10 minutes, and 13 percent traveling 26 to 30 minutes, indicating concentration of higher order commercial activities in limited locations. Hospital access is the most time intensive, where 22 percent of respondents require 16 to 20 minutes, 18 percent take 26 to 30 minutes, and 7 percent exceed 31 minutes, highlighting spatial gaps in healthcare accessibility.

- **OD Survey**

Mode choice and accessibility patterns further explain these time-based trends. About 32 percent of residents rely entirely on public or local transport, while another 32 percent use a mix of public and private modes; only 17 percent depend solely on private transport. Vehicle ownership is overwhelmingly motorcycle based, with 81 percent of households owning bikes, compared to just 3 percent owning cars and 8 percent owning bicycles. In terms of availability near homes, rickshaws serve 61 percent of residents, followed by vans at 22 percent and buses at 15 percent, reinforcing the role of para transit in short travel times. However, service quality remains weak, as 48 percent rate public transport as average and 33 percent as bad, while 91.5 percent report a lack of parking facilities. Together, the percentage-based travel times and access patterns confirm that Kotri City functions as a short trip city, but without adequate capacity, quality, and safety, making targeted transport improvements essential to sustain efficiency and reduce congestion pressure.

Given the quantified evidence of traffic volumes far exceeding available road capacities, widespread deterioration of internal roads, inadequate drainage and street furniture, absence of organized bus and truck terminals, weak parking management, and heavy reliance on unregulated para-transit, the transportation strategy must prioritize rehabilitation and safety upgrading of existing road infrastructure through pavement strengthening, drainage improvement, street lighting, signage, and traffic calming at critical corridors and junctions; optimization of traffic management based on TVC and OD findings through junction redesign, signalization, enforcement of encroachment controls, and formal regulation of Qingqi and rickshaw operations; development of structured inter-city and intra-city transport facilities including

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bus and truck terminals, designated para-transit stands, organized parking, and improved rail–road integration around Kotri Junction; and long-term network enhancement through selective road widening, alternative routes, and strengthened public transport systems, with all interventions aligned to universal accessibility and safety requirements, to deliver an efficient, inclusive, and resilient urban mobility system for Kotri City and the wider Jamshoro District.

Given the significant gaps in transport infrastructure, deteriorating road conditions, limited organized inter-city transport facilities, and rising congestion, the transportation strategy must prioritize: I. rehabilitation and upgrading of existing road networks to improve connectivity and safety; II. development of designated bus and truck stands to regulate inter-city services; III. enhancement of intra-city public transport options with better route planning and formalization of informal transport modes; and IV. implementation of traffic management measures including parking, street furniture, and lighting to ensure efficient and safe mobility across the city.

*8.1.3 **Issues and Problems***

- Tertiary and Secondary Roads are in very poor condition
- No formal Bus Terminal
- Traffic Congestion at intersections
- Improper design of roads and intersections,
- Unavailability of Traffic signals and street furniture
- Absence of street lightening and non-uniform right of way
- Encroachments and unorganized/illegal Qinqui and Rickshaw stands are also evident on the road side which causes on street and off-street parking issues.
- Lack of Road Safety
- Road side encroachment is evident the in core urban area. Visitors are facing congestion and traffic problems in market due to encroachment and lack of parking spaces
- Drainage issues on road side are evident due to which roads are worsening day by day.

*8.1.4 **SWOT Analysis:***

STRENGTH	WEAKNESSES	OPPORTUNITY	THREATS
Land Use Pattern & Transportation			
1. Kotri City boasts a robust transportation network, anchored by pivotal thoroughfares such as the Hyderabad-Jamshoro Road, the Jamshoro	1. Poor road conditions 2. Encroachment 3. Traffic congestion issues 4. Disorganized on-street parking 5. Drainage issues alongside the roads are	1. New Bus and goods transport terminals should be designed which will ensure timely supply of industrial goods. 2. There is an opportunity to revive non-operational airports like	1. Encroachments 2. Lack of enforcement 3. Rapid population growth 4. Exponential increase vehicle ownership 5. Security issues 6. Poor maintenance of roads 7. On-street parking issues

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STRENGTH	WEAKNESSES	OPPORTUNITY	THREATS
Phatak Road, and the National Highway N5. 2. The presence of the M9 Motorway further enhances its connectivity, linking Kotri to national and international routes. 3. Jinnah International Airport is the primary airport serving the Kotri city which is linked via M-9 Motorway. 4. Kotri Junction is a significant landmark in Pakistan's Railway history, boasting a rich legacy and playing a vital role in country's railway network. 5. Kotri Junction's historical significance and current operations make it a crucial junction in Pakistan's Railway system. 6. Good national / regional connectivity through railway and road networks. 7. Strong network of inter and intra city. 8. Sufficient road right of ways are	deteriorating their condition. 6. Inadequate road maintenance 7. Inconsistency in right-of-way 8. Poor interactions design 9. Unplanned street network 10. Narrow streets 11. Poor traffic management. 12. Insufficient street furniture 13. Non-aesthetic streetscape 14. Encroachments around bus bays and railway land sites. 15. Insufficient public transport 16. Lack of coordination between different transport operating agencies. 17. Poor maintenance of railway station 18. No designated parking spaces 19. Haphazard on street parking reduces road capacity 20. Religious and institutional gatherings often cause additional traffic congestion. 21. Airport is available in	Sehwan Sharif Airport, enhancing regional connectivity and reducing dependence on Karachi's airport. 3. Addressing road conditions, drainage issues, and implementing organized parking solutions can enhance intra-city mobility and overall traffic management. 4. There is an opportunity to focus on development and expansion of public transport. 5. Activity centers (support local business) 6. Wider road space can be used to facilitate multiple transport activities by implementing road space design standards 7. After removal of encroachments adequate space available for traffic signs, lane markings and foot paths	8. Inconvenience due to traffic congestion 9. Unorganized/illegal Qingqi and Rickshaw stands 10. The absence of street furniture and organized parking contributes to frequent traffic incidents and congestion. 11. The lack of major bus and truck stands in Kotri city hampers efficient transportation and logistics. 12. Economic losses resulting from strikes by transporters and CNG shortages.

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STRENGTH	WEAKNESSES	OPPORTUNITY	THREATS
available in intra city routes	nearby city of Kotri but it is non-operational for commercial passenger flights.		
LOCATION & CONNECTIVITY			
1. Proximity to Hyderabad via Hyderabad Jamshoro By pass through Ghulam Muhammad Barrage. 2. Serves as a central corridor that connects interior Sindh with economical hub of Karachi. 3. Well connected to highway network that can be used for mass transit services. 4. National Highway N-55 (Indus Highway) 5. Express Way M-9 6. Railways junction	1. River Indus causes severe seasonal floods. 2. Majority of City population resides in rural setting having less means of public transportation services. 3. Highway is not equipped to accommodate full functioning mass transit service.	1. More industries, regional fruit and vegetable markets and on the basis of good industrial potential for the distribution of these products an efficient transport network can be developed. 2. Contribution in positive regional and local economic development. 3. Promotion of Multi-Modal Transport. 4. Embracing modern transportation technologies presents an opportunity to revolutionize connectivity in Kotri.	1. Flooding 2. Outdated Transport services may create isolation, joblessness, loss of trade and business and increased fear of alternate transport modes. 3. Strikes, protests, or conflicts can lead to roadblocks, closures of transport hubs, and overall uncertainty, making it challenging for people and goods to move in and out of the city efficiently. 4. Limited Transportation Infrastructure Investment

The need assessment and the SWOT Analysis confirms that the transportation response cannot rely solely on expanding infrastructure; it must be delivered through a two-track approach: (i) rehabilitation and functional upgrading of existing transportation assets (road safety, connectivity, traffic management, and maintenance), and (ii) targeted capacity enhancements such as adding new routes, vehicles, and sub-stations in high-demand areas. This phased strategy ensures improved service continuity and supports sustainable urban mobility aligned with population growth and future needs.

*8.1.5 **Policy Guidelines***

- Decrease in private vehicles, especially during peak hours and in CBD areas.[52]
- Decrease in traffic delay.

[52] Sustainable Urban Transport Policy-Sindh 2016

- Decrease/stability in air and noise pollution.
- Involvement of private sector in transportation infrastructure and services projects.
- Infrastructure development and up-gradation.
- Integration of public transport services and networks.
- Modernize goods transport and freight facilities.
- Planning for Unplanned Street network
- Measures to provide effective public transport
- Ribbon type commercial development in residential neighborhoods.
- Provision of parking space for rest hours for drivers.
- provision of street furniture
- Removal Encroachments around bus bays and railway land sites

8.1.6 Sindh Empowerment of 'Persons with Disabilities' Act, 2018 [53]

Keeping in view 'Persons with Disabilities' act, 2018 while planning, designing & executing any kind of infrastructure projects i.e. public places, markets, parks, educational institutions, health facilities, Roads Street and pathways centers and etc, it is now mandatory to apply Universal Design and Accessibility criteria for ease of access of differentially abled persons. Also, during the planning & designing phase universal guidelines for differently abled friendly construction should adhered for e.g provision of ramps, specialized tiles (Tactile Paving) used for visually impaired personals, signage, street furniture, foot path steps, parking, mechanical access, railings, opening of doors & windows, toilet design, lighting and illumination and etc.

Specifically planning & designing for the transport sector, universal access is the goal of enabling all citizens to reach every destination served by their public streets and pathway system. Universal access is not limited to access by persons using automobiles. Travel by bicycle, walking, or wheelchair to every destination is accommodated in order to achieve transportation equity, maximize independence, and improve community livability. Wherever possible, facilities are designed to allow safe travel by young, old, and disabled persons who may have diminished perceptual or ambulatory abilities. The universal design has following principles;

i. **Universal access to destination:**
   All destinations served by the public road system shall be accessible by pedestrians and by drivers of all vehicles (including bicycles), except that vehicle operation may be restricted for reasons of excessive weight, noise or size, or extraordinary potential for damage to property or person
ii. **Equal Right of use:**
   People's right to use that portion of a street designed for travel is not diminished by less weight, less size, or less average speed associated with their travel mode. Demand actuated tra-c signals

[53] For detail please refer; The Sindh Empowerment of 'Persons with Disabilities' Act, 2018 (https://depd.sindh.gov.pk/sindh-empowerment-of-persons-with-disabilities-act-2018)

must detect and serve a diversity of users including bicycle operators in the roadway and pedestrians using crosswalks.

iii. **Accessible surfaces:**
To the extent practicable, travel surfaces should accommodate travel on foot with minimal trip hazards and via common assistive devices such as wheelchairs. Roadway surfaces should be as clear as possible of hazards for narrow tires such as bicycle wheels.

iv. **Crossable Roadways:**
Crossing distances at non-signalized access locations must not exceed the distance that can be covered at walking speed before tra-c may arrive from beyond sight distance, or during reasonable gaps in roadway tra-c. Refuges provided to reduce crossing distances should be large enough to

8.1.7 Strategic Development Plan

The aim of strategic development plan is envisions providing equal and equitable sustainable transport system to all groups of society on affordable basis with minimal impacts on environment, also Provision of Citizen-centric, Sustainable and Growth Oriented Modern Transport system and rehabilitation of existing roads.

i. **Long Term Plan**
- Create Traffic Engineering Bureaus (TEBs) at divisional level to perform functions as specified in Karachi Division (Traffic Engineering) Act 1985.
- Environmental Impact Assessment (EIA) should be mandatory for all transportation projects.
- Declaring private vehicle free zones, especially in peak hours, in CBD areas to reduce noise and air pollutions.
- Satisfy mobility needs via integration of existing and planned routes, services and Infrastructure.
- Implementation of Axle Load Management.
- Dualization of main arteries.
- Improvement of existing roads geometry.

ii. **Short Term Plan**
- Expansion of railway station
- Improve road design to make safer roads.
- Prevent encroachments on footpaths through litigation.
- Rehabilitation of Farm to Market Road network.
- Reduce traffic growth and congestion by achieving a mode shift.

To reduce congestion in commercial corridors and protect the core city from unnecessary through-traffic, the short-term strategy will implement a traffic re-routing plan that:

- Directs regional through-traffic and heavy vehicles to ring road/bypass corridors (where feasible) and restricts their movement in the core during peak hours.

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- Implements time-based management (peak-hour control) for freight loading/unloading and para-transit staging in commercial areas.
- Establishes one-way/loop circulation arrangements on the most congested inner-city links (where road widths and ROW allow), supported by signage and enforcement.
- Creates diversion routes during road rehabilitation works, with clear temporary signage and staged execution to maintain access to markets, schools, and emergency services.

- Establishes designated on-street parking bays on selected corridors through marking, lane discipline, and removal of encroachments.
- Provides off-street parking pockets near markets, railway-adjacent commercial areas, and high-demand nodes through municipal land identification and PPP options where viable.
- Introduces managed curb-side parking (including metered/regulated parking in selected commercial areas) and reinvests revenue into O&M and traffic management.
- Allocates rest parking space for drivers near formalized terminals and staging areas to reduce random truck/bus parking along roadside corridors.

Transportation interventions will be integrated with municipal infrastructure planning, particularly road rehabilitation, drainage improvement, street lighting, parking management, solid waste control along corridors, and public safety at junctions, terminals, and pedestrian crossings, to ensure continuity of movement during peak traffic, rainfall, and flood events. This integrated approach will support smoother traffic flow, safer conditions for pedestrians and vulnerable users, effective implementation of universal accessibility under the Sindh Empowerment of Persons with Disabilities Act, 2018, and reliable operation of public and para-transit systems. By aligning short-term traffic management measures with long-term network upgrades, freight regulation, and public transport integration, the strategy will reduce congestion, improve service reliability, and strengthen the resilience and livability of Kotri City and Jamshoro District's transport system.

8.1.8 Priority Projects:

i. Rehabilitation and improvement of secondary and tertiary roads

The existing network shows widespread pavement failure and unsafe conditions on secondary/tertiary links. As noted in the current situation, sewage/stormwater frequently overflows into streets (e.g., around Madina Chowk, Brohi chowk) and poor roadside drainage accelerates asphalt distress on roads such as Khuda ki Basti Road in poor condition, Khanpur Road, Derya Road, Karo kho Road, shirazi Paro Rd, Noor Mill Service Rd and Haji Ali Nawaz Chohan Rd. Traffic counts also indicate over-capacity operation at Kotri Station Road (V/C ≈ 434.87) and high loading at several bypass approaches, compounding rutting and edge breaks. Targeted rehabilitation with side drains, pavement strengthening, and junction fixes is therefore required.

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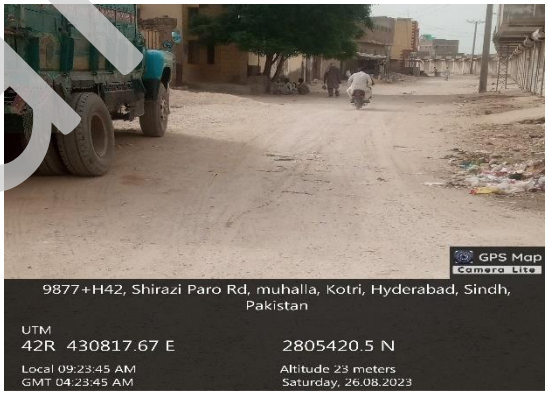
Madina Chowk kotri

Khanpur Rd, Kotri

Derya Rd, Kotri



Shirazi Paro Rd, Muhalla, Kotri

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➢ **Scope**

The project targets the rehabilitation of the existing road network in Kotri City, focusing primarily on secondary and tertiary roads that exhibit widespread pavement failure and unsafe conditions. Key issues include frequent sewage and stormwater overflow onto streets particularly around Madina Chowk and Brohi Chowk and inadequate roadside drainage that accelerates pavement deterioration on roads such as Khuda ki Basti Road, Khanpur Road, Derya Road, Karo Kho Road, Shirazi Paro Road, Noor Mill Service Road, and Haji Ali Nawaz Chohan Road.

Additionally, traffic analysis reveals severe congestion and over-capacity operation on Kotri Station Road (volume-to-capacity ratio of approximately 4.35) and high traffic loading on several bypass approaches. These conditions contribute to increased rutting, edge breaks, and compromised road safety.

The project scope includes:

- Targeted pavement rehabilitation and strengthening on identified roads to restore structural integrity.
- Installation and improvement of side and covered drains to manage sewage and stormwater runoff, preventing recurrent damage.
- Junction improvements at key nodes, including Madina Chowk, Brohi Chowk, and Jamshoro Phattak, to enhance traffic flow and safety.
- Measures to improve road safety for all users, especially at congested intersections and busy traffic nodes.
- Installation of necessary traffic management and safety features, such as signage, road markings, and pedestrian crossings.

➢ **Size**

i. **Geographical Coverage:**

- The rehabilitation covers a network of secondary and tertiary roads within Kotri City, including the major stretches and junctions noted above.

- Khuda ki Basti Road, Khanpur Road, Derya Road, Karo kho Road, shirazi Paro Rd, Noor Mill Service Rd and Haji Ali Nawaz Chohan Rd.

- Indus Highway N55 and approaches to Jamshoro-Hyderabad Road, NH-5,

ii. **Physical Components:**

- Pavement repairs and strengthening across approximately [insert estimated length] kilometers of urban roads.
- Construction or upgrading of side and covered drainage systems alongside these roads to effectively channel wastewater and stormwater.
- Junction upgrades at Madina Chowk, Brohi Chowk, Jamshoro Phattak, and other critical intersections to reduce congestion and improve safety.

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- **SDG'S Alignment**

I. **GOAL 8 – Decent work and economic growth:** Reliable roads are essential for economic productivity, access to employment, and transport of goods and services. The rehabilitation process itself will also create local employment opportunities, contributing to SDG 8.5 and 8.9 (productive employment and promotion of sustainable local economic development).

II. **GOAL 11 – Make cities and human settlements inclusive, safe, resilient and sustainable:** The project aligns directly with SDG 11.2 (providing access to safe, affordable, accessible and sustainable transport systems) and SDG 11.6, which focuses on reducing the negative environmental impact of cities. Improved road infrastructure strengthens urban connectivity, safety, and resilience.

- **Project Location & Scope (Priority Corridors)**

- Secondary/Tertiary Links (urban):
    - Khuda ki Basti Road, Khanpur Road, Derya Road, Karo kho Road, shirazi Paro Rd, Noor Mill Service Rd and Haji Ali Nawaz Chohan Rd.
    - Indus Highway N55 and approaches to Jamshoro-Hyderabad Road, NH-5,

- **Implementing Authority:** Works and Service Department government of Sindh, Local Government
- **Estimated Cost:** 800 million PKR Approx.

ii. INSTALLATION/ REHABILITATION OF STREET LIGHTING ON ROADS

Most of the Streets of Kotri MC, Bolhari MC and Jamshoro TC are without street lights or need repair in over all the city and all roads are devoid of this facility. Street Lighting is essential for safe maneuvering of vehicles at night time and enhance sense of security of pedestrians on roads in dark hours. Given the energy crisis in the country, it is recommended to have solar street lights on streets and major roads.

- **Scope**

The project focuses on the installation and rehabilitation of street lighting across Kotri MC, Bolhari MC, and Jamshoro TC. Currently, most streets in these areas lack adequate lighting, posing safety risks for both pedestrians and vehicles during nighttime. The absence of proper illumination undermines security and restricts economic and social activities after dark.

Considering the ongoing energy crisis, the project emphasizes the use of solar-powered street lights as a sustainable and cost-effective solution. This approach will reduce dependence on conventional energy sources, improve energy efficiency, and contribute to environmental sustainability.

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Key elements of the scope include:

- Installation of new solar street lighting systems on major roads and streets lacking adequate illumination.
- Rehabilitation and upgrading of existing street lights to ensure consistent and reliable operation.
- Prioritization of key corridors and nodes to maximize safety and accessibility.
- Integration of energy-efficient lighting technologies that reduce operational costs and carbon footprint.

➢ **Size**

i. **Geographical Coverage:**

- The lighting improvements will cover streets and roads within Kotri MC, Bolhari MC, and Jamshoro TC, with special focus on identified priority corridors and nodes.

ii. **Physical Components:**

- Installation and upgrade of street lighting along key corridors including Khuda ki Basti Road, Khanpur Road, Derya Road, Karo Kho Road, Shirazi Paro Road, Kotri Station Road, and Indus Highway (N55).
- Lighting enhancement at major nodes such as Madina Chowk, Brohi Chowk, and Jamshoro Phattak.
- Deployment of solar-powered luminaires, complete with poles, fixtures, wiring, and control systems.
- Provision for maintenance access and safety features to ensure long-term reliability.

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➢ **SDG'S Alignment**

I. **Goal 7 – Affordable and clean energy:** Installing solar-powered street lights contributes to SDG 7.2 (increase the share of renewable energy in the global mix) and SDG 7.3 (improve energy efficiency). This project supports the transition to clean energy in public infrastructure.

II. **GOAL 8 – Decent work and economic growth:** Street lighting extends business operating hours, improves night-time productivity, and enhances job security for informal workers, aligning with SDG 8.3 and 8.5, which focus on promoting inclusive and sustainable economic growth and employment.

III. **GOAL 11 – Make cities and human settlements inclusive, safe, resilient and sustainable:** This project directly aligns with SDG 11.2 (access to safe, affordable, and sustainable transport systems for all) and SDG 11.7 (providing safe, inclusive, and accessible public spaces). Street lighting enhances urban livability and promotes equitable access to services and spaces after dark.

➢ **Priority Corridors & Nodes**

- Corridors: Khuda ki Basti Road, Khanpur Road, Derya Road, Karo kho Road, shirazi Paro Rd, Kotri Station Road, Indus Highway N55.

- Nodes/Chowks: Madina Chowk, Brohi Chowk, Jamshoro Phattak.

➢ **Implementing Authority:** Kotri MC, Bolhari MC, Jamshoro TC, Government of Sindh
➢ **Preliminary cost estimate: 400 million PKR Approx.**

iii. CONSTRUCTION OF KOTRI CITY BUS TERMINAL

Currently, Kotri city lacks a dedicated bus terminal, resulting in severe traffic congestion within the city, largely caused by the illegal parking of local transport. Given its strategic position as a central hub connecting Karachi and Hyderabad, the establishment of a modern bus terminal is both necessary and timely. The proposed terminal, to be located on the outskirts of the city,[54] will have a parking capacity for the buses and will be designed to accommodate present and future transportation needs.

The facility will include essential amenities such as restaurants, a mosque, toilets, and banking services, ensuring comfort and convenience for passengers and operators alike. Special emphasis will be placed on universal accessibility, with features to support persons with disabilities, by incorporating ramps, accessible toilets, and barrier-free access routes. In addition, the terminal will be developed with flood-resilient infrastructure to safeguard operations and ensure continuity during extreme weather events, with the platform raised 0.6 m above Highest Flood level (HFL) and drainage infrastructure integrated.[55] By reducing inner-city congestion, improving mobility, and offering modern facilities, the proposed bus terminal will serve as a key investment in Kotri's urban infrastructure and regional connectivity. A feasibility study will be conducted prior to development to ensure suitability and long-term viability.

➢ **Scope**

The project involves the development of a modern bus terminal on the outskirts of Kotri city to address the current absence of a dedicated facility. This terminal aims to alleviate severe traffic congestion caused by illegal parking and unregulated local transport within the city core.

Key elements of the project scope include:

- Construction of a bus terminal with sufficient parking capacity to accommodate present and anticipated future bus traffic.
- Provision of essential passenger amenities including restaurants, a mosque, toilets, and banking services to enhance user comfort and convenience.
- Design focused on universal accessibility, incorporating ramps, accessible toilets, and barrier-free routes to support persons with disabilities.

[54] policy.pdf

[55] https://www.ndma.gov.pk/storage/ia-books/May2024/BxYdVimqWMHnqkKbnwld.pdf

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- Integration of flood-resilient infrastructure, including elevating the terminal platform 0.6 meters above the Highest Flood Level (HFL) and installing effective drainage systems to ensure operational continuity during extreme weather events.
- Implementation of organized operations with designated bays, ticketing areas, and staging zones to improve safety and efficiency.
- Prior completion of a feasibility study to ensure the site's suitability and long-term viability of the terminal.

➢ **Size**

i. **Geographical Coverage:**

- The bus terminal will be situated on the outskirts of Kotri city, strategically placed to serve as a regional transport hub connecting major urban centers.

ii. **Physical Components:**

- A bus parking area designed to accommodate buses with organized bays for arrivals, departures, and layovers.
- Construction of passenger facilities, including waiting areas, food courts, restrooms, a mosque, and banking services.
- Universal accessibility features such as ramps, accessible toilets, tactile guidance, and barrier-free pathways.
- Flood mitigation infrastructure with the terminal platform raised 0.6 meters above Highest Flood Level (HFL), along with a comprehensive drainage system.
- Supporting infrastructure including ticketing counters, parking management, security systems, and signage.

➢ **SDG'S Alignment**

I. **GOAL 8 – Decent work and economic growth:** Construction and operation will create jobs in transportation, facility management, hospitality, and maintenance, contributing to SDG 8.3 and 8.5, which aim to support productive employment and inclusive economic growth.

II. **GOAL 11 – Make cities and human settlements inclusive, safe, resilient and sustainable:** The terminal supports SDG 11.2 by enabling access to safe, affordable, accessible, and sustainable transport systems for all. It also aligns with SDG 11.3 by promoting inclusive urban planning and reducing urban congestion.

➢ **Implementing Authority:** Government of Sindh, Kotri Municipal Committee and Works and Services Department.
➢ **Preliminary cost estimate:** 350 million PKR Approx.

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Table 8-1 : Roads and Communication Network Estimated Cost (Kotri City)

S. No.	Project Name	Estimated Cost in Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Roads and Communication Network						
1	Rehabilitation & Improvement of Secondary/Tertiary Roads	800	-	Non ADP	**Short Term**	-
2	Installation/Rehabilitation of new solar Street Lighting On main roads and streets.	400	-	Non ADP	**Short Term**	-
3	Feasibility study for Kotri city Bus Terminal	100	-	Non ADP	**Short Term**	-
4	Procurement for land for Kotri City Bus Terminal	250	-	Non ADP	**-**	**Long Term**

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8.1.9 Immediate Action Plan

i. Urban Road Network Rehabilitation and Improvement Project

The road network in Kotri, Bolhari and Jamshoro core urban areas is broken, unplanned, and poorly maintained, reducing accessibility and compromising safety. Limited street furniture, inadequate public transport facilities, and neglected bus bays further add to mobility challenges. Encroachments, particularly along Riswa Mori Road, Jamshoro-Hyderabad together with insufficient parking, create severe congestion in commercial zones, highlighting the need for upgraded infrastructure and better traffic management. Key roads requiring attention include Khanpur Road, Kotri Station Road, Derya Road, Raswa Mori Road, shah Latif Road, Bihar Colony Road, Telegraph Road, Bareja Chowk Road, Malik Town Road, Juman Shah Road, Arbab Shoro Goth Road, City Road, Memon Street, Shaheed Altaf Hussaini Road, Kotri-Thatta through N-5, Jamshoro-Hyderabad.

The Immediate Action Plan focuses on restoring and upgrading core roads, reorganizing roadside activities, introducing structured parking, and ensuring safe pedestrian mobility. These interventions will ease traffic flow, improve safety, and enhance the efficiency of transport systems, in line with SDG 11.2 (access to safe, affordable, and sustainable transport).

Road Side encroachment

Broken Road

Road Side Suzuki stand

on -street parking

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I. Scope

- Repair & Rehabilitation of Roads: Resurfacing, strengthening, and widening where necessary.
- Road Safety Improvements: Clear markings, signage, pedestrian crossings, and traffic signals at Jamshoro-Hyderabad, N-5, Khanpur Road, Kotri Station Road, Derya Road, Raswa Mori Road shah Latif Road, Bihar Colony Road, Telegraph Road, Bareja Chowk Road, Malik Town Road, Juman Shah Road, Arbab Shoro Goth Road, City Road, Memon Street and Shaheed Altaf Hussaini Road
- Green Medians & Streetscape: Development of medians and plantation to improve aesthetics and reduce heat at Jamshoro-Hyderabad, and N-5.
- Street Furniture Installation:
    - Street Lighting: Wall-mounted Street lights at regular intervals for safety.
    - Zebra Crossings: Clearly marked crossings in pedestrian-heavy areas.
    - Roundabout Rehabilitation: Redesign and upgrade of roundabouts for smoother traffic and pedestrian safety.
    - Benches & Seating Areas: Comfortable seating at regular intervals to encourage walkability.
    - Community Engagement: Awareness campaigns to build ownership and reduce resistance to road realignment.

II. Size:

The road repair and rehabilitation program within the core urban area of Kotri Municipal Committee, Bolhari Municipal Committee, Jamshoro Town Committee will cover a total of 11 major, minor roads and streets, comprising key urban and intercity linkages. The combined length of these roads is approximately 607 kilometers, covering an estimated area of 49221 square meters.

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Table 8-2: Kotri Core urban Area Repair & Rehabilitation of Roads

Kotri City- Core urban Area Repair & Rehabilitation of Roads								
S. No	**Area / Locality / Address Major Roads**	**Length (km)**	**Length (m)**	**Width (feet)**	**Width (m)**	**Area (sq.m)**	**Per sq.m cost (PKR)**	**Total Cost (PKR)**
1	Jamshoro-Hyderabad	0.85	325	40.00		10363	10,764	250
2	N-5	0.65	645.03	40.00		7864	10,764	100
							Total PKR Rs. Million (A).	350
Minor Roads								
1	Khanpur Road	0.41	413.11	20		2518	10,764	60
2	Kotri Station Road	0.54	542.64	20		3308	10,764	86
3	Derya Road	0.58	582.61	20		3552	10,764	94
4	Raswa Mori Road	0.92	920.21	20		5608	10,764	130
5	shah Latif Road	0.25	249.13	20		1519	10,764	30
							Total PKR Rs. Million (B).	**400**
Streets								
1	Bihar Colony Road	0.18	184.00	20		1122	10,764	40
2	Telegraph Road	0.17	570.13	20		3476	10,764	37
3	Bareja Chowk Road	0.24	240.63	20		943	10,764	20
4	Malik Town Road	0.15	154.64	20		2003	10,764	30
5	Juman Shah Road	0.33	328.60	20		2003	10,764	40
6	Arbab Shoro Goth Road	0.34	344.79	20		2102	10,764	50
7	City Road	0.25	252.94	20		1542	10,764	16.60
8	Memon Street	0.11	108.79	20		663	10,764	7.14
9	Shaheed Altaf Hussaini Road	0.10	104.17	20		635	10,764	10
							Total PKR Rs. Million (C).	**250.74**
							Total PKR Rs. Million (A+B+C).	**1000.74**

Draft

Table 8-3: Proposed wall mounted street lights

Proposed wall mounted street lights				
S. No.	**Name**	**Length (m^2)**	**Length (m)**	**Cost (PKR)**
1	**Proposed Total Length of Street (km) for wall mounted streets lights.**	**2245**	**1123**	**200**
Total Cost (PKR). Million				**200**

Note:

- ✓ **Wall mounted street lights should be placed on distance of 20 feet apart.**
- ✓ **Each wall mounted street light cost (Rs. /-).**
- ✓ **As per total length of streets for this proposal No.s of street lights/wall mounted streets should be placed in core town area.**

Draft

III. Preliminary cost estimate

A preliminary cost estimate will be provided, itemizing the costs associated with each of the activities listed above. The cost breakdown includes:

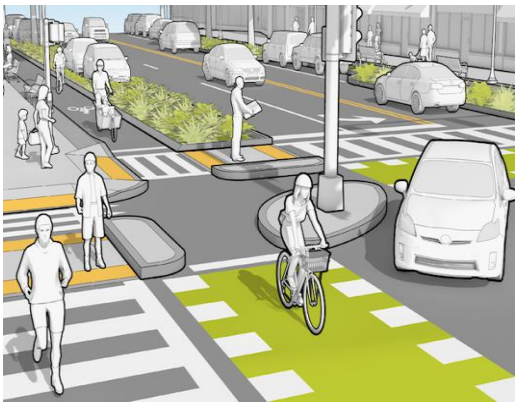
- **Major Roads Rehabilitation (A)**
- **Minor Roads Rehabilitation (B)**
- **Streets Rehabilitation (C)**
- **Proposed street lights**

Total Estimated Cost: 1200.74 million approx.

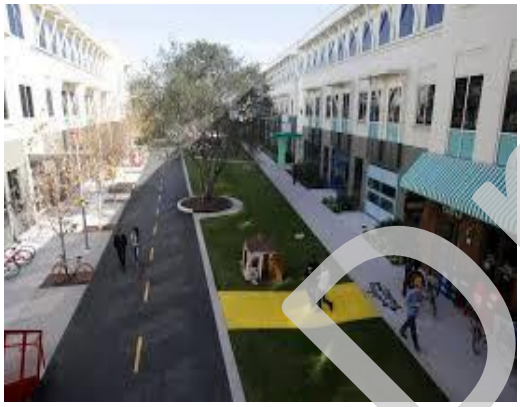
IV. Implementation Framework

- **Funding Sources:**
  - Municipal budgets for maintenance.
  - Provincial ADP grants for rehabilitation and transport development.
  - **Parking revenue** from meters reinvested into O&M.
  - Public-Private Partnerships (PPP) for parking management and possibly key corridors.
- **Execution:** Works executed by the Works & Services Department in coordination with the Municipal Committee.
- **Phasing:** Priority to congested corridors (Riswa Mori Road, Station Road, N5 Link).

Solar Street light



Major Road after Immediate Action Plan



Solar Street light

Major Road after Immediate Action Plan

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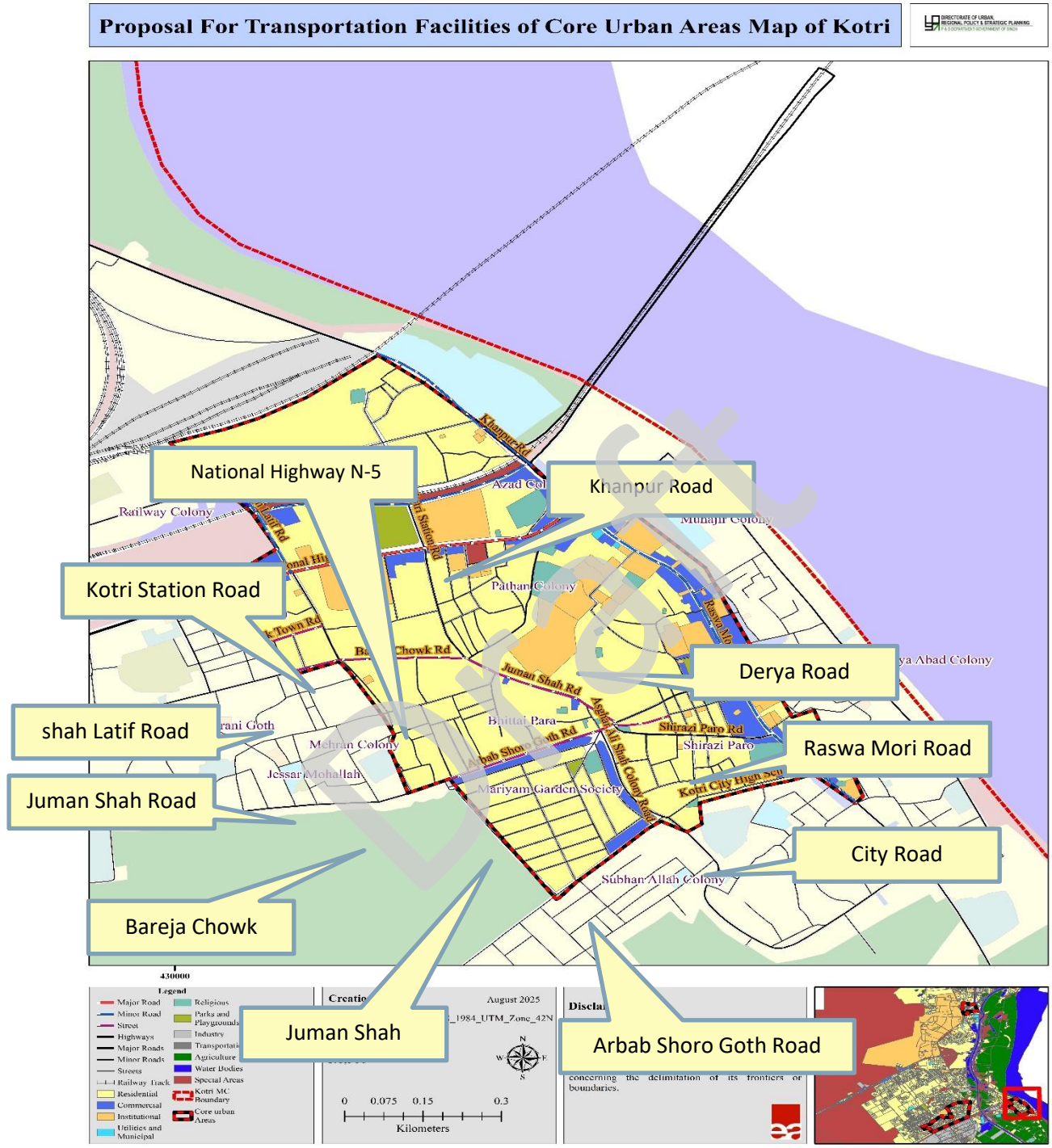

Figure 8-1: Proposal for Transportation Facilities of Core Urban Areas Map of Kotri

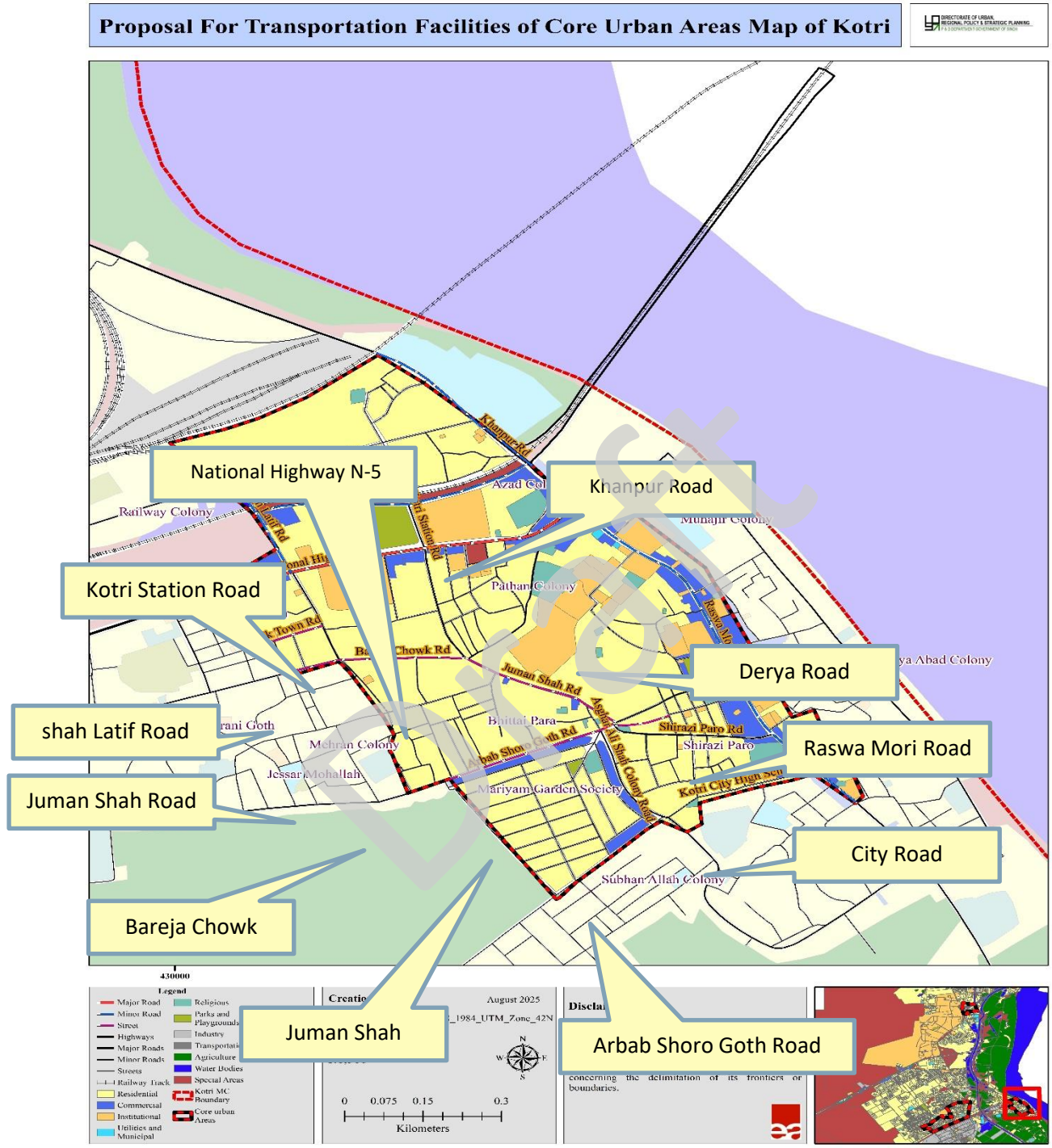

Figure 8-1: Proposal for Transportation Facilities of Core Urban Areas Map of Kotri

Proposal For Transportation Facilities of Core Urban Areas Map of Kotri

DIRECTORATE OF URBAN, REGIONAL POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVERNMENT OF SINDH

Railway Colony
Shah Latif Rd
Kotri Station Rd
Khanpur Rd
Azad Colony
Derya Rd
Muhajir Colony
National Highway N5
Kotri Station Rd
Pathan Colony
Malik Town
Malik Town Rd
Bareja Chowk Rd
Derya Abad Colony
Raswa Mori Road
City Road
Juman Shah Rd
Asghar Ali Shah Colony Road
Qambrani Goth
Bhittai Para
Shirazi Paro Rd
Mehran Colony
Arbab Shoro Goth Rd
Shirazi Paro
Jessar Mohallah
Mariyam Garden Society
Kotri City High School Road
Subhan Allah Colony

430000

Legend

- Major Road
- Minor Road
- Street
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Kotri MC Boundary
- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:6,500

N W E S

0 0.075 0.15 0.3

Kilometers

Disclaimers:

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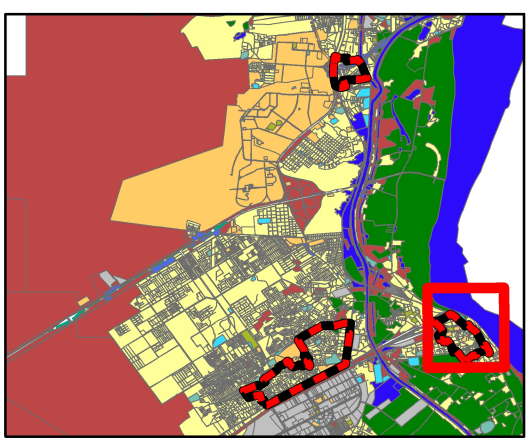


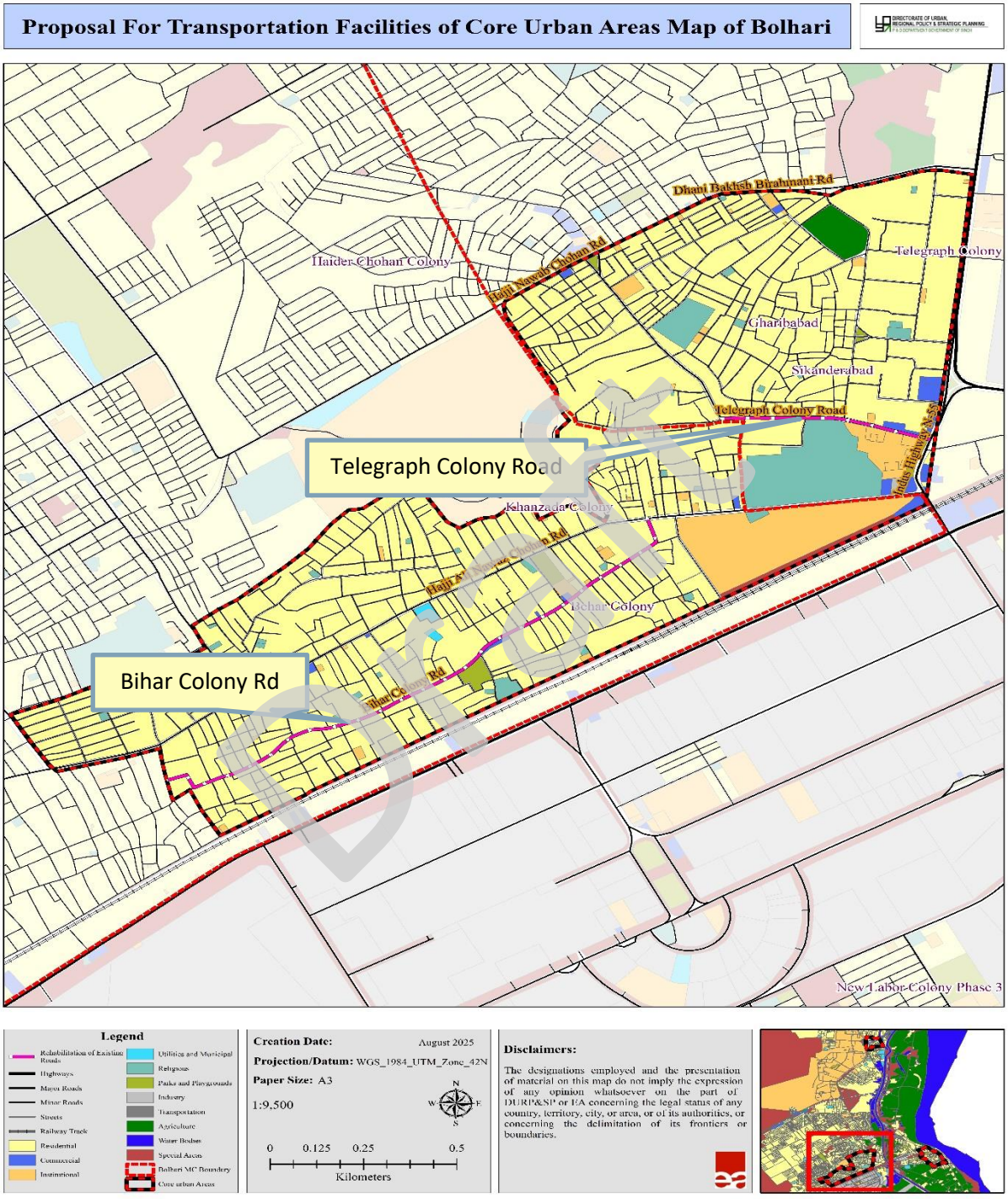
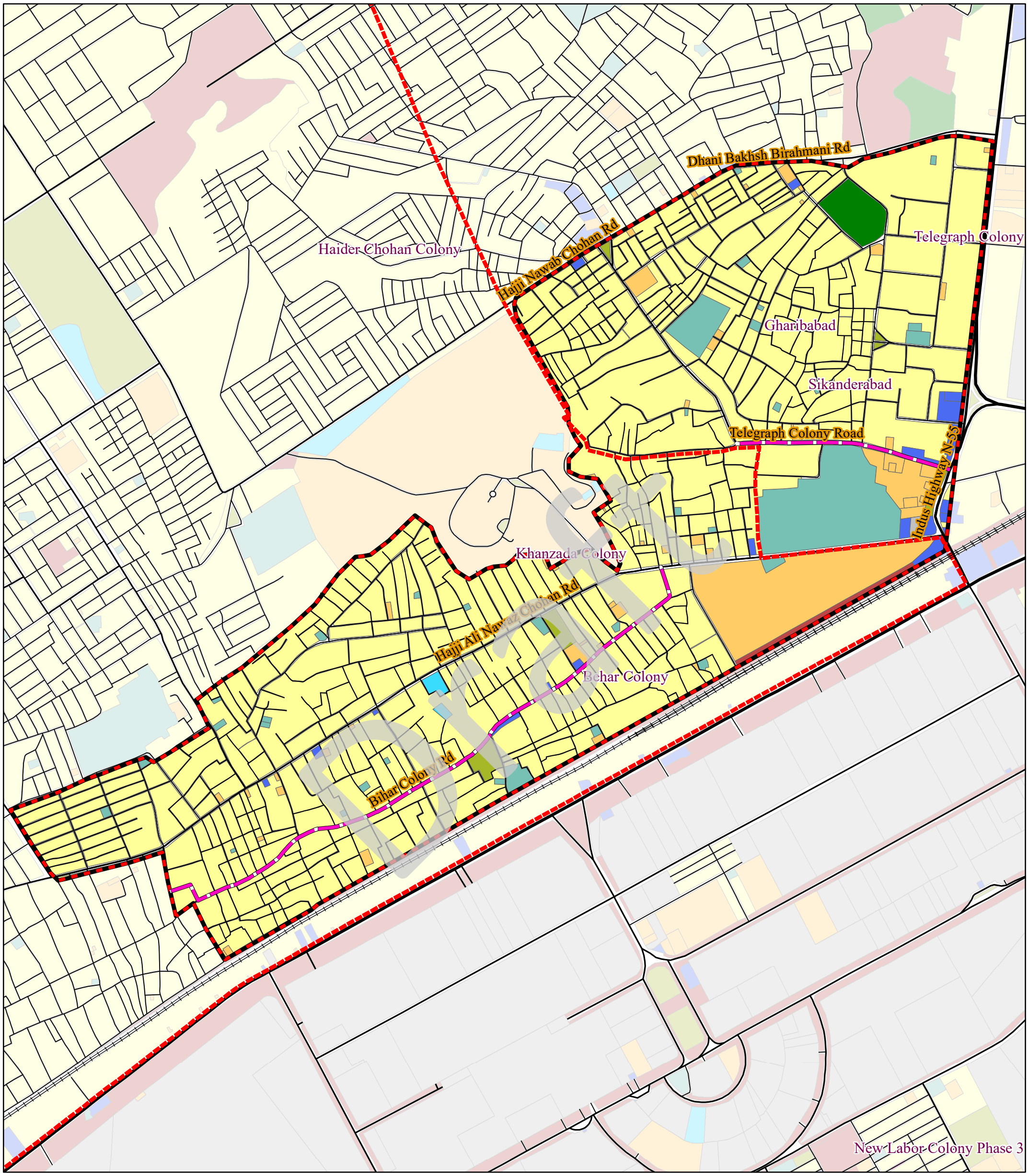


Figure 8-2: Proposal for Transportation Facilities of Core Urban Areas Map of Bolhari

Proposal For Transportation Facilities of Core Urban Areas Map of Bolhari

DIRECTORATE OF URBAN, REGIONAL POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Rehabilitation of Existing Roads
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Bolhari MC Boundary
- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

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N W E S

0 0.125 0.25 0.5

Kilometers

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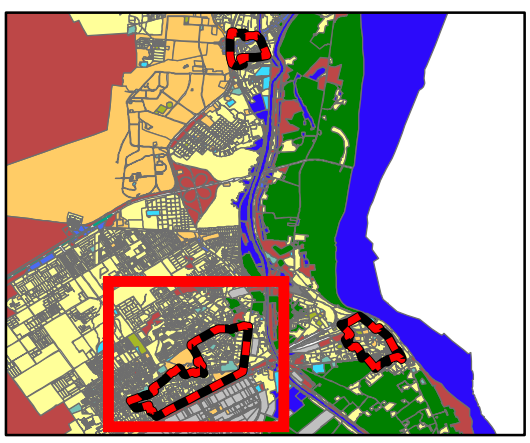


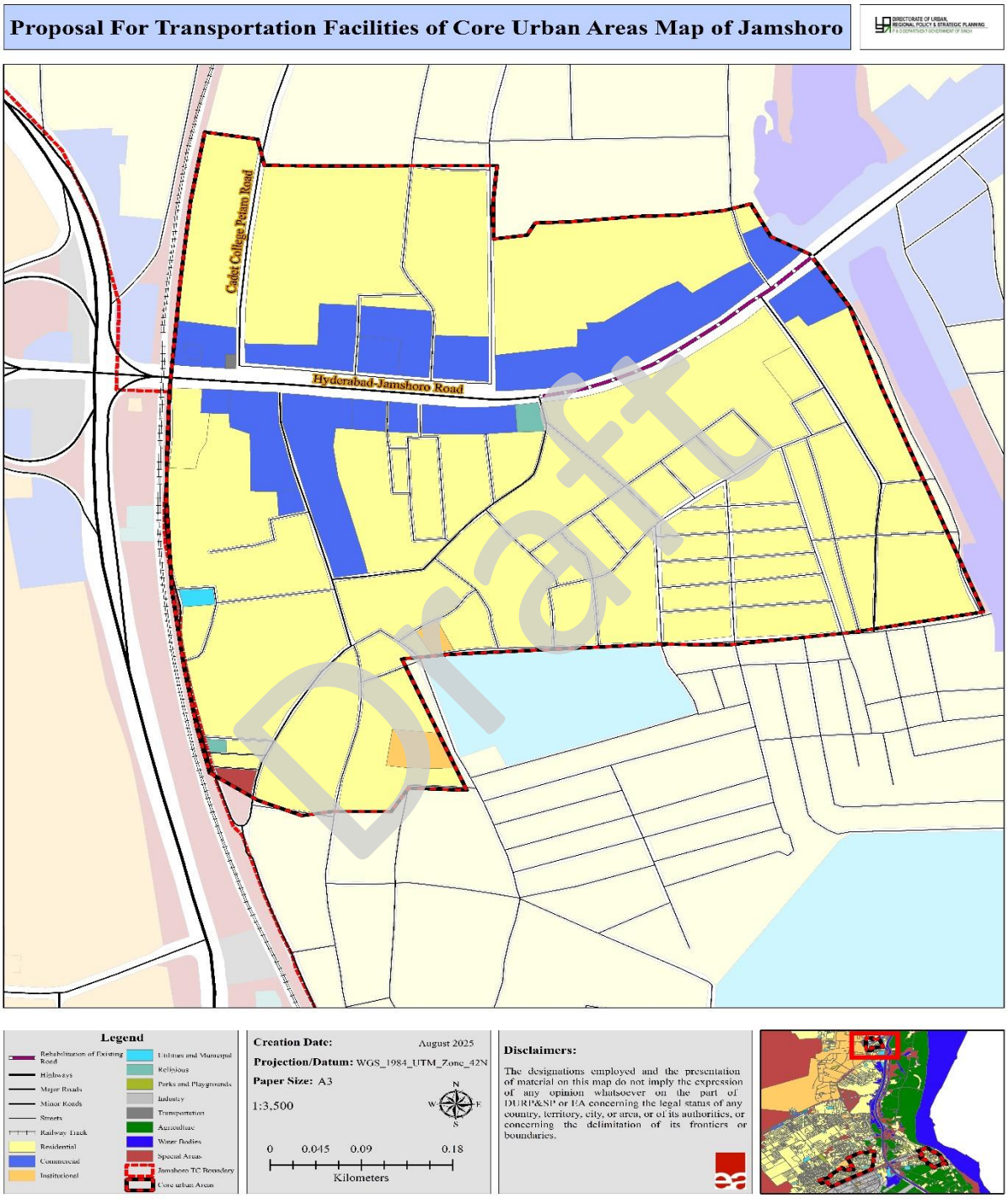
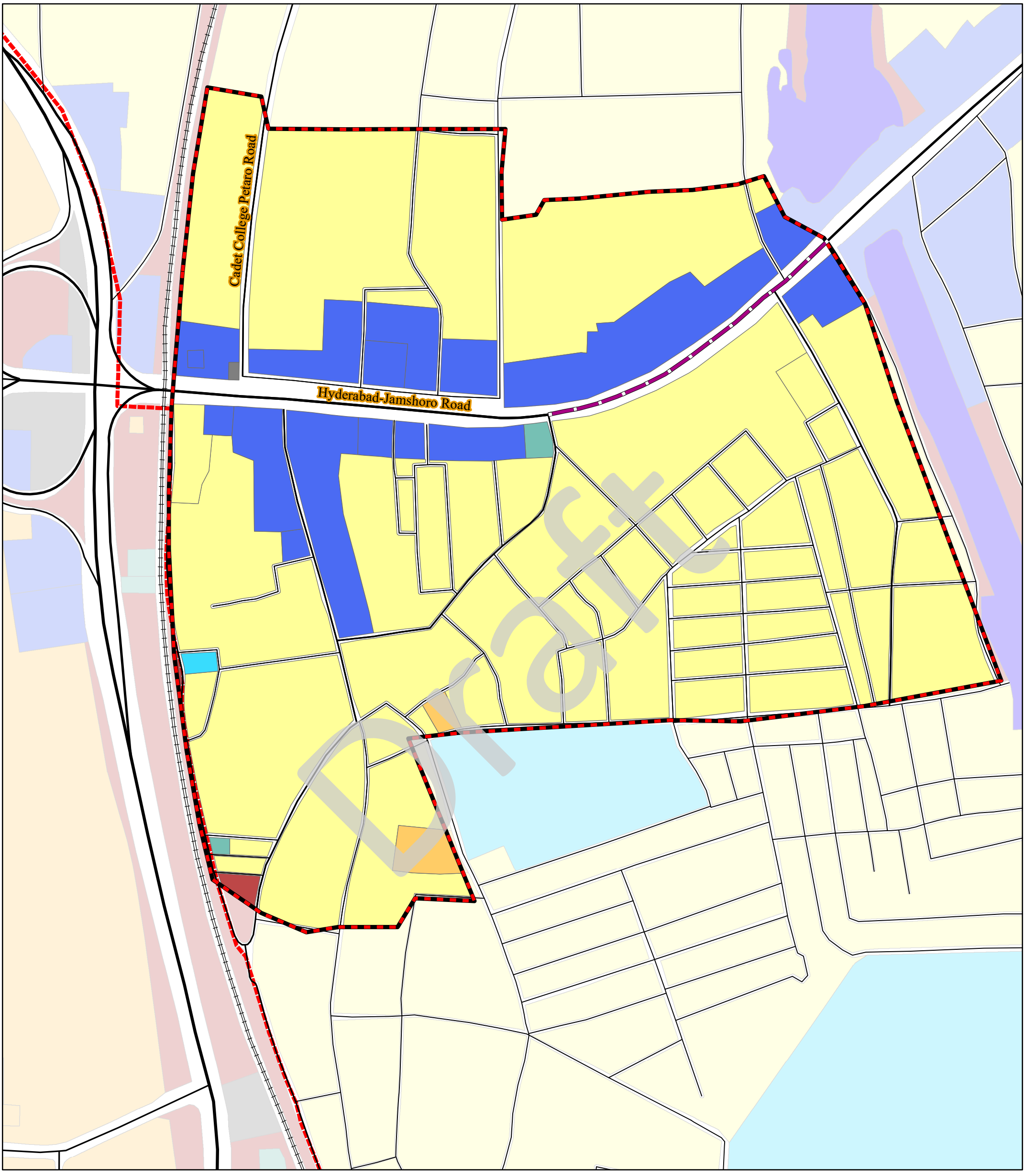


Figure 8-3: Proposal for Transportation Facilities of Core Urban Areas Map of Jamshoro

Proposal For Transportation Facilities of Core Urban Areas Map of Jamshoro

DIRECTORATE OF URBAN, REGIONAL POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Rehabilitation of Existing Road
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Jamshoro TC Boundary
- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:3,500

N W E S

0 0.045 0.09 0.18

Kilometers

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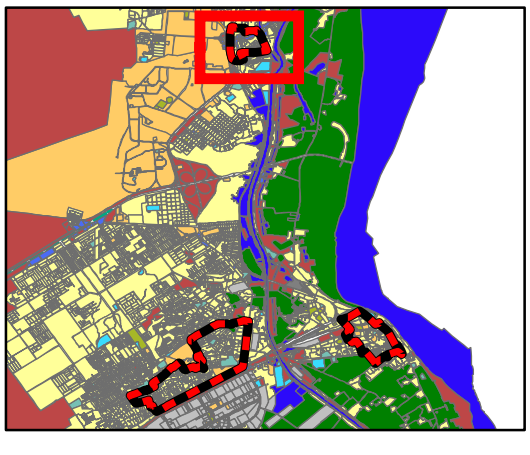


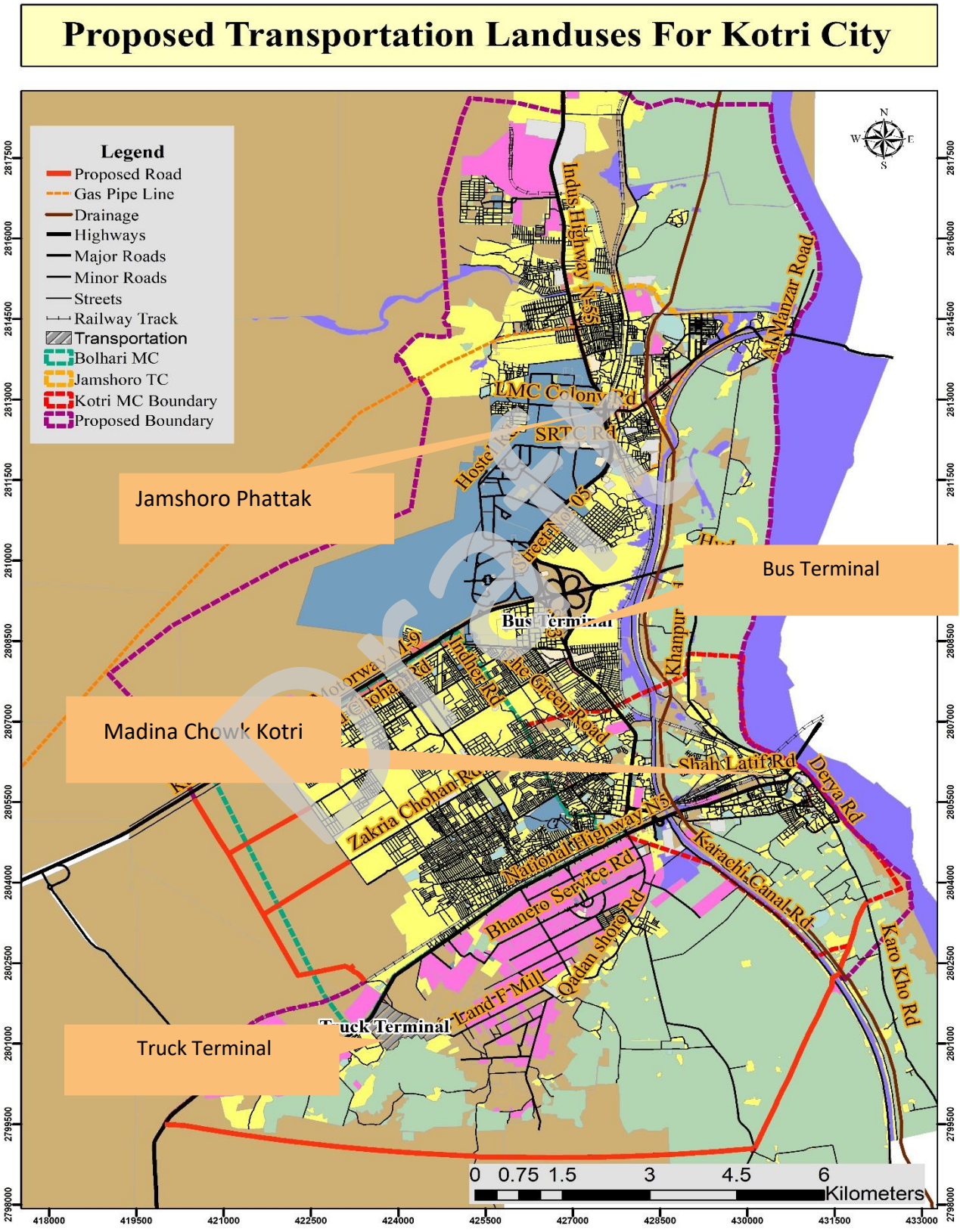


Figure 8-4: Proposal for Transportation Facilities Landuse for Kotri City

Proposed Transportation Landuses For Kotri City

Legend

- Proposed Road
- Gas Pipe Line
- Drainage
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Transportation
- Bolhari MC
- Jamshoro TC
- Kotri MC Boundary
- Proposed Boundary

N
W E
S

Indus Highway N55
Al Manzar Road
LMC Colony Rd
SRTC Rd
Hostel Rd
Street No. 05
Hyderabad Bypass
Bus Terminal
Khanpur Rd
The Green Road
Indher Rd
Motorway M9
Sa...Chohan Rd
Karachi-Hyderabad
Zakria Chohan Rd
Shah Latif Rd
Derya Rd
National Highway N5
Karachi Canal Rd
Bhanero Service Rd
Qadan shoro Rd
Land F Mill
Karo Kho Rd
Truck Terminal

0 0.75 1.5 3 4.5 6
Kilometers

2817500 2816000 2814500 2813000 2811500 2810000 2808500 2807000 2805500 2804000 2802500 2801000 2799500 2798000

418000 419500 421000 422500 424000 425500 427000 428500 430000 431500 433000

8.2 Energy

*8.2.1 **Existing Situation***

132 KV Transmission Lines

Kotri City's power infrastructure is primarily supported by HESCO through a single 132 KV grid station, supplying 16.4 MW with 6,729 connections, 337 transformers of 24,055 KVA capacity, and a network strengthened by aerial bundled cables to reduce losses. While 92% of residents report electricity access, severe challenges persist, including prolonged load shedding (over 13 hours daily for most households), modest consumption levels, and reliance on alternative sources—mainly solar energy. The city's industrial zones, notably Nooriabad and SITE Kotri with over 500 industries, place additional pressure on supply, while WAPDA's regional power plants at Jamshoro, Lakhra, and Kotri remain vital. Current supply of 17.2 MW falls short of projected demand, which is expected to nearly double to 32.8 MW by 2045, driven by population growth and industrial needs. To address this, planned projects include a new 132 KV grid (Kotri-II), HT and LT expansions, and rehabilitation works adding 350 kVA capacity and over 11 km of new lines. These efforts aim to reduce energy losses, improve reliability, and build a sustainable, resilient network capable of supporting both residential and industrial growth in the years ahead.

Given the current energy supply challenges, infrastructure limitations, and increasing demand driven by population growth and industrial expansion, the energy strategy must prioritize: I. upgrading and expanding existing grid infrastructure to ensure reliable and sufficient power delivery; II. reducing technical losses and enhancing network resilience through modernization efforts; III. integrating alternative and renewable energy sources to diversify supply and improve sustainability; and IV. strengthening energy access equity to support residential, commercial, and industrial needs while promoting efficient consumption and long-term system sustainability.

*8.2.2 **Issues and Problems***

- Advocacy efforts have not been made to promote efficient fuel use; consequently, there is little public awareness about fuel conservation measures,
- Alternative fuel sources are scarce and expensive. Liquid Petroleum Gas (LPG) and kerosene are available but costly, putting them out of the reach of the rural poor
- Maintenance of power plants
- Circular Debt
- Transmission and distribution losses are directly connected to Leakage Current Losses, Dielectric Losses, open circuit Losses and theft of electricity.

Draft

*8.2.3 **SWOT Analysis:***

Power Supply & Distribution			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Majority of the population in Kotri city is provided with electricity supply network. 2. A notable percentage (46%) of respondents use alternative power sources, with solar power being the most popular (95.1%). 3. Kotri City has an established power infrastructure, providing a foundation for improvement.	1. Insufficient power supply. 2. Load shedding issues. 3. Inadequate or aging infrastructure, including transformers and power lines, contributes to frequent breakdowns and service interruptions. 4. Short fall of electric power. 5. Poor maintenance of electricity supply infrastructure. 6. Electricity theft, line losses and power theft.	1. The strong inclination towards solar power (used by 95.1% of those with alternative sources) presents an opportunity for the city to invest in and promote renewable energy solutions. 2. Renewal of outdated network to meet existing and future demand. 3. Investing in smart grids and advanced metering systems can improve efficiency and reliability. 4. Exploring and integrating alternative energy sources such as solar, wind, or other sustainable options could mitigate dependency on conventional power systems and contribute to a more resilient energy infrastructure. 5. Improving customer service and communication channels can enhance overall satisfaction.	1. Energy crises 2. Limited financial resources may hinder the implementation of necessary upgrades and improvements. 3. Implementing new technologies may face resistance or technical challenges, impacting their effectiveness. 4. Over-reliance on conventional sources may lead to environmental issues, and failure to adopt sustainable solutions could pose long-term threats. 5. Rapid population growth also poses a threat as it intensifies the strain on existing infrastructure. 6. Communication gaps and a lack of transparent information flow regarding power outages and maintenance schedules can lead to dissatisfaction among consumers. 7. Insufficient power supply can negatively impact industrial operations, potentially affecting the economic output and productivity of the region.

Draft

The energy sector faces multifaceted challenges that extend beyond infrastructure deficits to include operational inefficiencies and growing demand pressures. With Kotri City currently supplied by a 16.4 MW grid and demand projected to nearly double to 32.8 MW by 2045, the energy strategy must focus on: (i) rehabilitation and upgrading of existing power infrastructure to reduce losses and improve reliability; (ii) expansion of capacity through new grid stations and network extensions; (iii) integration and promotion of alternative energy sources such as solar power to enhance sustainability and resilience; and (iv) addressing systemic issues like load shedding, electricity theft, and maintenance deficits. This phased approach supports both immediate service continuity and long-term energy security to meet residential and industrial needs.

*8.2.4 **Strategic Development Plan***

- Success in achieving fuel efficiency, adopting new technologies and altering existing fuel-use habits depends largely on women who are the primary users of fuel wood. They must be made aware of the long-term ramifications of adopting these innovations
- Addition of sub stations as per requirement
- Encourage energy efficient building construction
- Up gradation of grid station
- Promote energy efficient appliances and devices
- Feasibility study for alternate energy sources (Solar, wind, biogas etc.)

Draft

8.3 Gas Supply

*8.3.1 **Presence of Gas***

Kotri City, encompassing Bolhari MC, Kotri Site, and Jamshoro TC, receives its natural gas supply primarily from the Sui Southern Gas Company. The socio-economic survey conducted in the city provides valuable insights into the current state of natural gas supply, focusing on its availability, pressure sufficiency, alternate sources of energy, and load shedding hours.

A significant 88.5% of respondents confirm the availability of natural gas in their areas. This widespread availability indicates a well-established gas supply infrastructure in Kotri City.

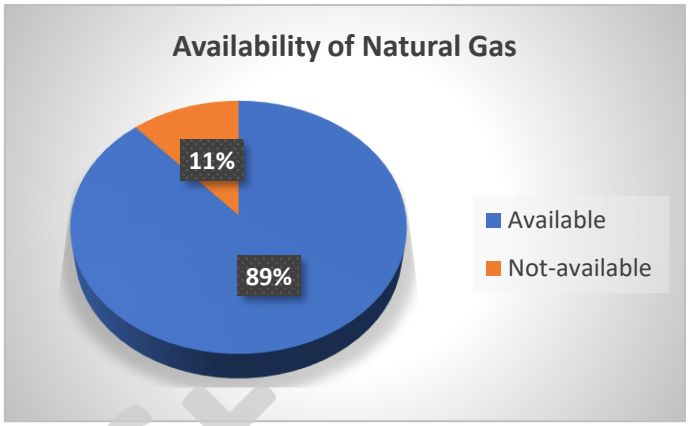


Figure 8-5: Availability of Natural Gas

*8.3.2 **Sufficient Gas Pressure***

The survey reveals a major concern regarding gas pressure, with approximately 69.7% of respondents facing issues with insufficient gas pressure. This condition hampers the effective use of gas appliances and heating systems.

Only about 30.3% of respondents report having sufficient gas pressure. This points towards the necessity for improvements in the gas distribution network to ensure consistent and adequate pressure levels.

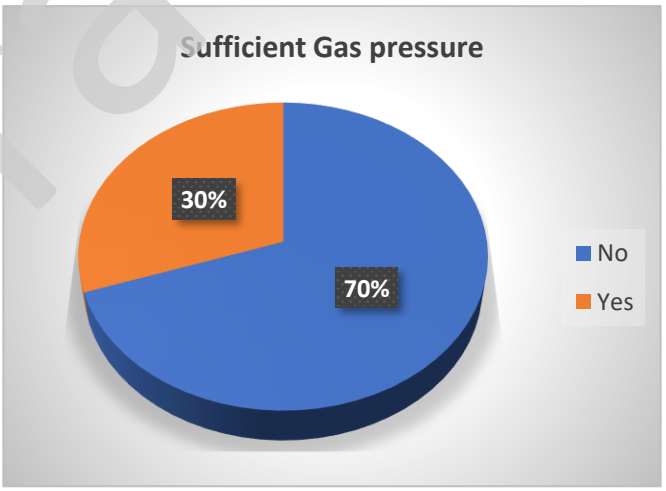


Figure 8-6: Sufficient Gas Pressure

Draft

I. Alternate Source of Energy

Dependence on Alternative Energy Sources: In response to limited or no gas supply, or where gas pressure is insufficient, residents turn to alternative sources of energy. Wood is the primary alternative, used by 84% respondents. Gas cylinders and coal are used by 9% and 6% respondents, respectively. A very small number, only 1% respondents, rely on kerosene oil.

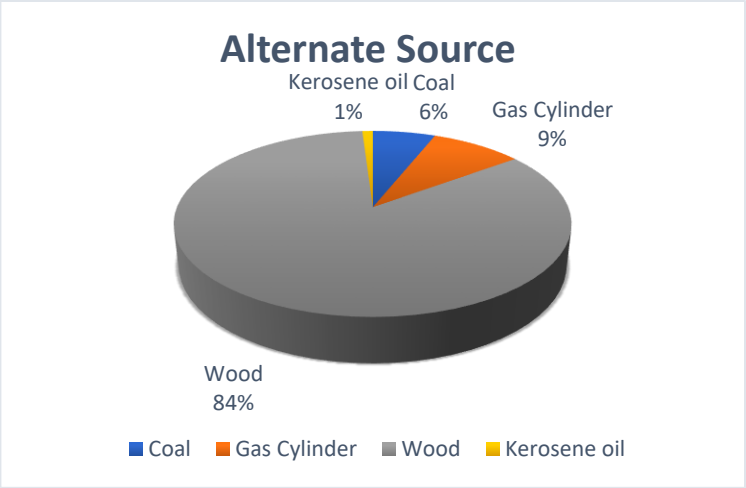


Figure 8-7: Alternate Source

II. Natural Gas Load shedding

In Kotri City, the distribution of daily load shedding hours for natural gas paints a picture of significant disruption for the residents. The majority of the population, representing 28%, experience more than 13 hours of load shedding, severely affecting daily life and productivity. While 8% of respondents are fortunate to have no load shedding, the relief is not widespread. About 1% face 1-2 hours, and 6% each for the 3-4 hours and 5-6 hours categories, indicating a lesser but still notable impact. The 7-8 hours bracket affects 17% of the populace, suggesting that a significant number of households experience prolonged periods without gas. Moreover, 21% endure 9-10 hours, and 14% grapple with 11-12 hours of load shedding daily. This data reflects a community grappling with substantial utility challenges, highlighting the need for infrastructural improvements and more efficient energy management to reduce the frequency and duration of load shedding in Kotri City.

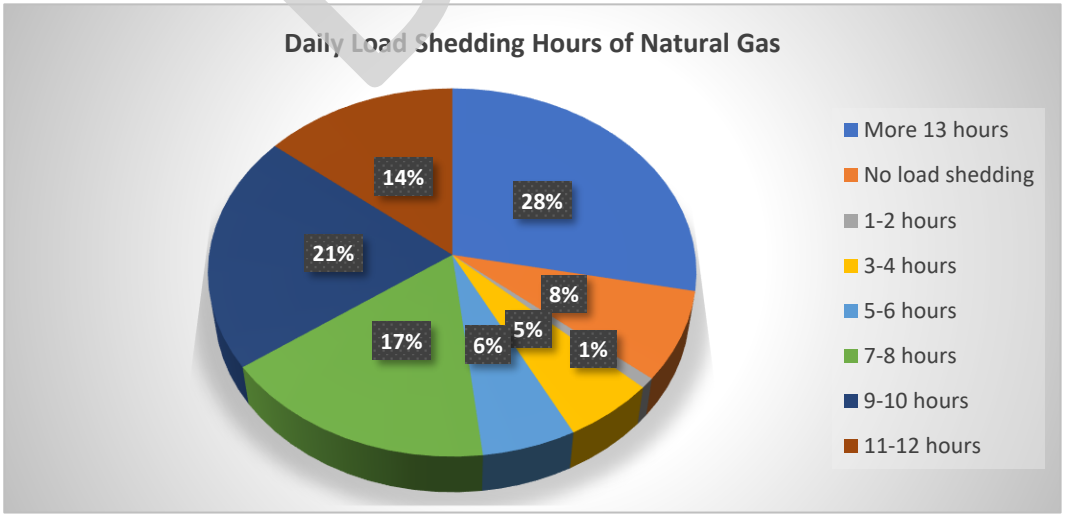


Figure 8-8: Daily Load Shedding Hours of Natural Gas

Draft

The survey data highlights the challenges faced in Kotri City regarding natural gas supply, particularly in terms of coverage, pressure, and load shedding. To address these issues, the following steps are recommended:

- Expansion and enhancement of the gas distribution network are crucial to ensure adequate coverage and pressure.
- Measures to reduce the duration and frequency of gas load shedding are necessary to provide uninterrupted supply.
- Encouraging the use of sustainable and efficient energy sources, such as solar or wind power, can serve as a reliable alternative, especially in areas with frequent load shedding or insufficient gas supply.

Overall, a focused approach towards improving the gas supply infrastructure and managing the distribution effectively is essential for meeting the growing energy needs of Kotri City

Despite the broad coverage, 11.5% of respondents report not having access to natural gas. This suggests the existence of certain areas within the city where gas infrastructure is either lacking or not yet developed.

Dependence on Alternative Energy Sources: In response to limited or no gas supply, or where gas pressure is insufficient, residents turn to alternative sources of energy. Wood is the primary alternative, used by 84% respondents. Gas cylinders and coal are used by 9% and 6% respondents, respectively. A very small number, only 1% respondents, rely on kerosene oil.

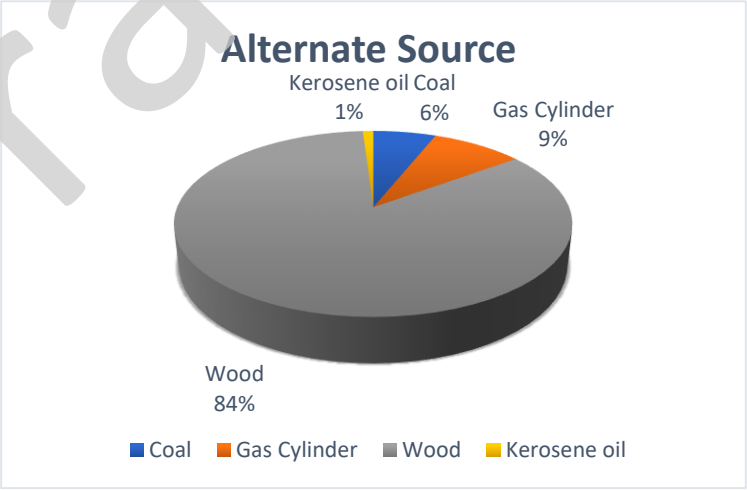


Figure 8-9: Alternate Source

8.3.3 Strategic Development Plan

- Feasibility study for alternate resources available
- Measures to cater Load Shedding of both electricity and gas.
- Measure to appropriately priced the energy resources

Draft

8.4 Communications

The socio-economic survey conducted in Kotri City sheds light on the state of the communication network, focusing on the availability and usage of telephone, mobile, and internet services. The presence of PTCL (Pakistan Telecommunication Company Ltd) in the city plays a significant role in providing these services.

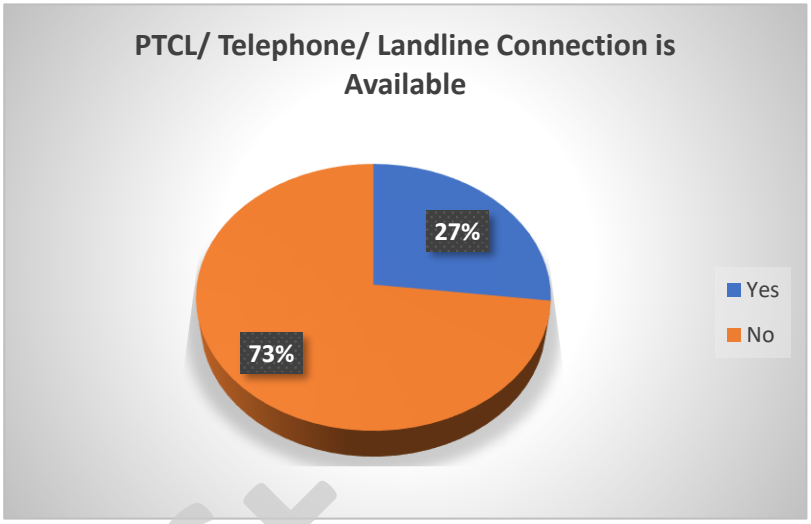


Figure 8-10: PTCL/ Telephone/ Landline connection is available

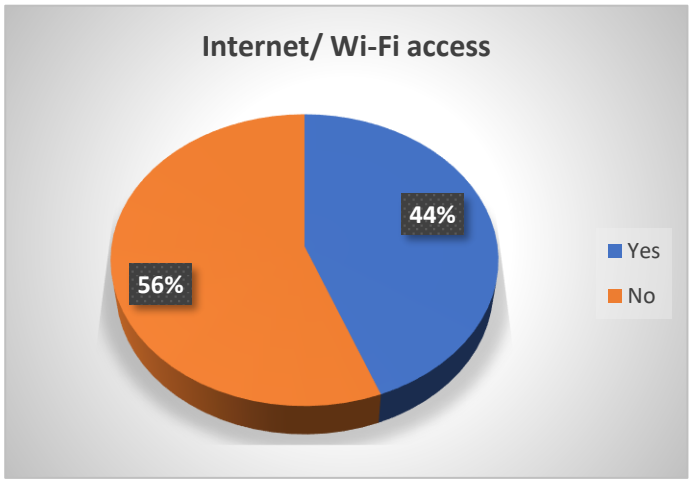
The survey reveals that a majority of respondents, approximately 73% do not have a PTCL/telephone/landline connection. This indicates a shift or preference towards other modes of communication, possibly cellular phones. About 27% of respondents still use landline connections, showing that while limited, landline telephones are still in use within the city.

8.4.1 Internet / Wi-Fi

At present, the internet usage is limited to educated families, and it increases with the decline of illiteracy rate. However, the usage of internet is slightly different from that in the urban cities. Most of them use the internet to enjoy audio and video songs and to watch movies.

The survey takes along the result that about 44% of households have access to the internet/Wi-Fi and a majority, about 55.8% report not having access to the internet or Wi-Fi.

Communication tower in Jamshoro



Internet/ Wi-Fi access

Draft

*8.4.2 **SWOT analysis***

Strength	Weakness	Opportunity	Threats
Information & Communication Technology			
1. The presence of PTCL (Pakistan Telecommunication Company Ltd) in the city plays a significant role in providing these services. 2. Approximately 27% of respondents have access to the internet or Wi-Fi 3. Kotri city shows a clear trend towards mobile communication, with cellular phones being the primary mode of communication.	1. A majority of population, approximately 73% do not have a PTCL/ telephone/ landline connection. 2. Most of the areas lack the coverage of PTCL. 3. Lack of information dissemination regarding agricultural activities, public health, veterinary, disaster forecasting etc. 4. A notable portion of the population (56%) lacks access to the internet or Wi-Fi, emphasizing a digital divide in Kotri city.	1. Expand internet connectivity 2. ICT also serves as one of the most effective means of conveying information in different sectors. 3. Identifying and tapping into emerging markets or industries that require ICT services can be a significant opportunity. 4. Media can play important role in economic development and prosperity. 5. Immediate disaster forecasting through disaster emergency response center.	1. Overreliance on mobile phones for communication could pose a threat in case of network issues, emergencies, or other unforeseen circumstances. 2. Negative cultural and ethical exposure to young minds (youth), if not regulated properly. 3. No check and balance of non-authorized/ non-biometric SIM's usage.

Draft

*8.4.3 **Strategic Development Plan***

- **Long Term:**
  - Expand fiber-optic networks across Kotri city and adjoining rural areas.
  - Establish an ICT park or digital hub for youth innovation and entrepreneurship.
  - Introduce Smart City initiatives (Wi-Fi hotspots in public areas, e-governance platforms).

- **Short-term:**
  - Upgrade mobile towers to ensure 4G/5G readiness.
  - Strengthen PTCL and mobile internet penetration in underserved areas.
  - Launch awareness campaigns for safe internet usage and digital payments.

9. ECONOMIC DEVELOPMENT PLAN

Economy of an area or town plays an important role for its sustainability and further growth. Economy can make a town alive from dead town. Jamshoro, being as Industrial Hub consists of one canal passing through Kotri and Jamshoro i.e. KB Feeder has economic opportunities and issues as well. The progress of economic activities in district depends upon facilitation to labors by using modern techniques now and surely in the future. The district as a whole is well-known due to its characteristic of Industrial engine which serves all over Sindh by using market of Hyderabad, the regional Hub. It is situated on a main regional corridor which connects Karachi and interior Sindh through M-9 motorway.

I. Policy Guidelines for Overall Economic Development

- Creating a better quality of life for the citizens of the district by encouraging private sector to invest in the district.[56]
- Increase farmer's income.[57]
- Improving infrastructure and key services necessary for economic uplift.
- Providing un-interrupted power supply.

II. Inclusion of Poverty Reduction Strategy in Economic Development Plan

The poverty reduction strategy (PRS) is aimed to act as medium-term instrument to address the challenge of poverty in Sindh. One of the interventions of PRS has its foundation resting on poverty reduction at the household level, together with the introduction of an urban programme incorporating a model of urban economic clusters for SME-based enterprise development in small cities and towns, and a model of rural growth centres at meso level that would provide a catalytic effect to the PRS. It has the strength to become a keystone for investment planning in the province, while focusing on Economic Development strategies via PRS lens that will boost the employment opportunities as well as enterprise development in the province.

III. Strategic Plan for Overall Economic Development

- Modernize and revitalize the service sector.
- Implement proactive governance centered on accelerated and balanced economic growth.
- Develop Human resources through capacity building for employment opportunities.
- Reinforce the local governance institutions.
- Modernize local / district / divisional administration.
- Decentralization of governance authorities.
- Involve community participation.

[56] ADP 20017-18 Industries Punjab
[57] ADP 2017-2018 Agriculture Punjab

9.1 Agriculture

*9.1.1**Existing Situation***

District Jamshoro is slightly hotter than surrounding areas in summer and has cool winters. The district is rich in minerals like limestone, gravels and marbles. The Kharif crops produced in the district are rice, cotton, Sugarcane, bajra and maize. The Rabi crops are wheat, Barley, gram, pulses and oil seeds.
Jamshoro District's irrigation network is uniquely characterized by its geographical setting. Lying at the bottom of the Kheerther mountain range and possessing a higher altitude relative to the Indus River, the district does not benefit from a conventional canal system. Instead, its agricultural lands rely predominantly on perennial water sources for cultivation. Additionally, the "katcha" areas along the Indus River are irrigated using river water, a testament to the adaptability of the local irrigation practices.

Agriculture, in Jamshoro, mainly depends upon River water irrigation. However, other modes of land irrigation like river water and tube wells are also used. Irrigation is done mostly through river and tube wells.

The total geographical area of District Jamshoro is 1,235,000 hectares, and land utilization trends indicate relative stability up to 2020–21, followed by a major shift in subsequent years. During 2020–21, the cultivated area stood at 91,731 hectares, current fallow at 24,684 hectares, and the net area sown at 67,047 hectares, showing only minor variation compared to 2019–20, when the cultivated area was 92,492 hectares, current fallow 24,683 hectares, and net area sown 67,809 hectares. However, the updated data from 2021–22 and 2022–23 reflects a substantial change in land use patterns, with cultivated area increasing sharply to 548,429 hectares in 2021–22 and 509,929 hectares in 2022–23, alongside a corresponding rise in net area sown to 236,444 hectares and 266,243 hectares, respectively. During the same period, land not available for cultivation declined significantly from over 1.0 million hectares to 593,593 hectares, while cultivated waste also reduced, indicating conversion of previously unused or constrained land into agricultural use. This pronounced shift suggests a reclassification or expansion of cultivated land, likely driven by improved irrigation coverage, revised land records, or enhanced reporting, rather than gradual agricultural growth alone.

Table 9-1: Land Utilization (Hectares) Jamshoro District

S. No	Type of Cultivated area	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	**Cultivated area**	88,891	86,838	92,492	91,731	548,429	509,929
2	**Current Fallow**	24,681,	24,682	24,683	24,684	119,591	106,660
3	**Net area sown**	64,210	62,156	67,809	67,047	236,444	266,243
4	**Cultivated Waste**	138,689	138,689	138,689	138,689	90,062	92,427
5	**Not available for cultivated**	1,006,245	1,008,298	1,002,644	1,003,406	593,593	593,593
Source: *Development Statistics of Sindh, 2024*							

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Table 9-2: Jamshoro District Crop Production[58]

Sr. No	Crops	Year 2017-18		Year 2018-19		Year 2019-20		Year 2020-21		Year 2021-22		Year 2022-23	
		Area	Production	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
1	Wheat (M.T)	31,587	100,360	35,163	114,569	38,155	116,113	39,181	116,051	39054	105,462	42587	110,372
2	Sugarcane (Bales)	577	25,665	390	16,962	460	24,553	435	18,489	387	16,831	392	15,576
3	Cotton (Bales)	15,823	97,057	11,568	62,674	14,200	74,891	12,201	54,633	13228	76,039	15776	55,146
4	Rapeseed & Mustard (M.T)	349	328	288	270	206	193	233	219	172	211	178	220
Source: Development Statistics of Sindh, 2024													

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The crop data indicates mixed performance across major crops, with wheat showing a generally positive and stable trend, while sugarcane, cotton, and oilseeds display volatility and structural decline. Wheat area increased steadily from 31,587 to 42,587 hectares between 2017–18 and 2022–23, while production peaked in 2019–20 and then fluctuated, suggesting yield pressure likely due to water stress, input costs, or climate variability rather than land constraints. Sugarcane area and production declined consistently over the period, reflecting farmers' shift away from this water intensive and low return crop, possibly due to delayed payments and rising cultivation costs. Cotton shows high instability in both area and production, indicating vulnerability to pest attacks, climate shocks, and market uncertainty, which undermines farmer confidence. Rapeseed and mustard experienced a clear contraction in cultivated area with marginal recovery in production in later years, pointing to low prioritization despite their importance for edible oil security. Overall, the data reflects a gradual move toward food security focused crops like wheat, while cash crops face declining competitiveness, underscoring the need for yield improvement, better pricing mechanisms, and climate resilient agricultural planning.

[58] Sindh Statistics 2022

Given the quantified deficits in agricultural land utilization, fluctuating crop production, irrigation constraints, and climate pressures, the agriculture strategy must prioritize: I. rehabilitation and efficient management of existing irrigation and drainage infrastructure to optimize water availability and reduce waterlogging; II. expansion, stabilization, and diversification of crop production in line with market demand, water availability, and climatic conditions; III. provision of allied agricultural support services, including timely access to quality inputs, extension services, storage, and mechanization; and IV. strengthening farmer capacity through technical training, climate resilient practices, and market linkage support to improve productivity and income security. This phased approach will support agricultural resilience, food security, and sustainable livelihoods across Jamshoro District.

9.1.2 ***Issues***

- Inadequate water supply for irrigation purposes hinders consistent and efficient crop watering, negatively impacting yield.
- The presence of waterlogging and salinity in agricultural lands adversely affects soil quality and crop growth.
- The persistence of traditional and outdated farming methods limits efficiency and hinders the adoption of modern, more productive techniques.
- Farmers often lack timely and accurate market information, making it challenging to make informed decisions about crop selection and pricing.
- Changes in weather patterns and the increasing impact of climate change create uncertainties in farming. Issues like unexpected frosts, heatwaves, and floods can disrupt the agricultural cycle.
- The prevalence of pests and diseases in crops can lead to substantial losses if not effectively managed, requiring access to proper pest control measures.
- Subdivision of agricultural land into smaller plots over generations can reduce the efficiency of farming operations and hinder economies of scale.
- Insufficient storage facilities for crops lead to post-harvest losses and limit the ability of farmers to store produce for better market timing and prices.
- Farmers may face challenges in obtaining necessary information and training on modern farming practices due to limited access to extension services.

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9.1.3 ***SWOT Analysis:***

Agriculture			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Jamshoro district contributes in agriculture sector of Sindh by Producing various food items e.g., bajra, barley, maize, gram, pulses, wheat and cotton. 2. Reliance on perennial water sources and river water.	1. Less revenue generation by local government. 2. Land of Jamshoro District is arid /barren mostly, agriculture production and productivity is not as efficient as in other districts of Sindh province. 3. Inadequate water supply Lack of agriculture credit facilities. 4. Absence of Agriculture research centers. 5. Rice and Sugarcane is not cultivated. 6. Old farming methods. 7. Farmers face challenges in obtaining timely and accurate market information. 8. Insufficient storage facilities leading to post-harvest losses.	1. Agriculture is a strong economic sector it must be utilized to generate revenue and plant new agro based industries. 2. Rice and sugarcane production should be encouraged by using new modern techniques. 3. Outsider investors show interest in agriculture sector. 4. Development along the riverside will be controlled through this master plan. 5. Certain systems should be developed which provide timely market information to farmers.	1. Less efficient local markets. 2. Shortage of agro based products. 3. Limited access to water for irrigation negatively impacts crop yield. 4. Lack of awareness among farmers about new farming technologies. 5. Climate change impacts. 6. Waterlogging and salinity. 7. The prevalence of pests and diseases in crops can lead to substantial losses. 8. Lack of Government support and insufficient policies for farmers. 9. Subdivision of agricultural land.

The need assessment confirms that the agriculture response cannot rely on expansion of cultivated land alone; it must be delivered through a multi-pronged approach: (i) rehabilitation and functional upgrading of existing irrigation infrastructure to ensure reliable and efficient water supply; (ii) adoption of modern farming techniques and improved pest and disease management to boost productivity; (iii) enhancement of storage and market information systems to reduce post-harvest losses and improve farmer decision-making; and (iv) targeted support and training programs to build farmer capacity and resilience against climate impacts. This phased strategy aligns with the district's current cultivated area of approximately 509,929 hectares, net sown area near 266243 hectares, and crop production levels such as 110,372 metric tons of wheat and 55,146 bales of cotton, ensuring sustainable agricultural growth and food security for Jamshoro District.

9.1.4 ***Strategic Development Plan***

I. **Long Term Plan**

- Promotion of agro-based and home-based industries to add value to agricultural products.
- Enhance crop productivity through adoption of modern technologies, mechanization, and improved seed varieties.

- Strengthen agricultural technology dissemination and farmer training through extension services.
- Establish climate-resilient farming practices to reduce risks from waterlogging, salinity, and floods.
- Strengthen agricultural data collection and statistics for better policy formulation.

II. ii. Short Term Plan

- Modernize and revitalize agriculture through pilot projects in crop diversification (fruits, vegetables, and fodder crops).
- Increase food production and ensure supply during emergencies and disasters.
- Improve post-harvest management through construction of warehouses and covered storage facilities in Kotri.
- Introduce quality seed and fertilizer programs to increase per-acre yield.
- Develop farm-to-market roads for timely access to markets and reduction of post-harvest losses.

Projects listed in ADP (2018-2019) include:

i. Sindh Agricultural Growth Project (SAGP) World Bank Assisted
ii. Nutrition Sensitive Agriculture Project Phase-I.
iii. Construction of Office Building for On-Farm Water Management staff

Agriculture interventions will be integrated with broader rural infrastructure planning, focusing on improved irrigation systems, road connectivity for farm-to-market access, enhanced water management to combat salinity and waterlogging, and reliable energy supply for mechanization. This coordinated approach will minimize disruptions during adverse weather events, reduce post-harvest losses, and strengthen the resilience and sustainability of the agricultural sector in Jamshoro District.

9.1.5 ***Economic Development***

Jamshoro district is producing Cash Crops like Sugarcane, Wheat, Rice and Cotton. In addition to the said crops; barley is also grown. The analysis translates that about 67% of arable land used for cultivation of wheat crop only, might be the reason that soil and climate of the region suit to Rice crop, therefore grower and government may focus to reclaim more waste land to convert the same into arable land and priority may be given to Rice and Sugarcane crop.

In order to improve the crop production improvement and intervention from government departments are needed in the following areas:

- Agriculture credit facilities
- Regular supply of irrigation water
- Availability of fertilizer, pesticides and quality seed that results in Improvement in crop yield/acre that in turn increase the crop production for internal consumption & exports
- Installation of tube wells
- Measures to reduce water logging and salinity
- Construction of farm to market roads

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9.2 Livestock

9.2.1 ***Existing Situation***

The livestock sector plays a pivotal role in the economic landscape of Sindh, contributing significantly to the livelihoods of rural communities. According to the Pakistan Economic Survey 2019-20, over eight million rural families, comprising a substantial portion of the population, are actively involved in livestock production. Remarkably, this sector constitutes a major income source, with these families deriving 35-40% of their earnings from livestock-related activities.[59]

Sindh stands out as a key player in Pakistan's livestock sector, contributing a substantial 27% to the country's overall livestock production. The province boasts an impressive population of more than 45 million domestically reared cattle, featuring 18 distinct breeds of goats and sheep. The public sector's extensive infrastructure investments have played a crucial role in fostering the growth of this diverse livestock population. Additionally, Sindh is home to a significant number of buffaloes, and the presence of disease-resistant cattle further enhances the sector's resilience.[60]

Beyond its economic contributions, the livestock sector serves as a multifaceted asset for the province. It not only generates foreign earnings but also fulfills the dairy product requirements, ensures food security, and provides a steady source of daily cash income for the people of Pakistan. During emergencies such as floods or crop failures, the sector proves invaluable in mitigating income inequalities. As a result, the livestock sector is rightly regarded as a secure and sustainable livelihood source for small farmers and the landless poor, playing a crucial role in enhancing economic resilience in the face of various challenges.

The animal population of the district is the highest number of Goats having 414,191 hands followed by Sheep 171,748 heads and Cattle 163,732.

Table 9-3: Number of Livestock[61]

Livestock	Sindh	Jamshoro	%Share
Cattle	6,925,022	163,732	23.0
Buffaloes	7,340,162	118,740	1.6
Sheep	3,958,508	171,748	4.3
Goats	12,572,221	414,191	3.2
Camels	278,424	4,078	1.4
Horses	44,999	870	1.9
Mules	19,512	109	0.5
Asses	1,004,925	29,384	2.9
Poultry	14,135,540	281,818	1.9

[59] Livestock (livestocksindh.gov.pk)
[60] Sindh has 27% share in Pak livestock sector: official (tribune.com.pk)
[61] Sindh District Profile 2021

- **Impact of Flood 2022 on Livestock**

The floods of 2022 had a significant effect on livestock in Jamshoro District, livestock being one of the primary assets of rural communities, suffer greatly during floods due to loss of shelter, food, and clean water. The inundation caused by the floods precipitated substantial loss of livestock, manifesting in fatalities and injuries. Animals succumbed to drowning or became trapped in the swamp of mud and debris, resulting in irretrievable losses for the livestock owners. Floodwater, contaminated with pollutants and pathogens, caused health issues among livestock. The inundation caused by the flood destroyed arable lands and grazing pastures, leading to an acute scarcity of feed for livestock. Large number of livestocks were displaced due to flood, according to the report of PDMA Rehabilitation Department of GoS "Flood 2022 in Sindh" 17,169 livestock were died in District Jamshoro.

Given the substantial role of livestock in Sindh's economy with Jamshoro district hosting 414,191 goats (3.2% share), 171,748 sheep (4.3%), 163,732 cattle (23%), and 118,740 buffaloes (1.6%)—the sector faces critical challenges including vulnerability to natural disasters, loss of shelter and feed, and health risks from contaminated water. The 2022 floods alone caused the death of 17,169 livestock in Jamshoro, highlighting the sector's fragility. The livestock strategy must prioritize: I. rehabilitation and strengthening of shelter and grazing infrastructure to protect assets from flood and environmental hazards; II. improving access to veterinary and health services to reduce disease and mortality rates; III. enhancing feed supply systems and fodder production to ensure consistent nutrition; and IV. promoting capacity building and technical support for farmers to improve productivity and resilience. This integrated approach will safeguard livelihoods, sustain income sources, and enhance the resilience of the 35-40% of rural family's dependent on livestock for their income.

*9.2.2 **Issues and Problems:***

- Landlessness and small holding prevent the farmer to raise livestock on commercial basis mainly subsistence farming
- Limited knowledge and facilities
- Almost for every farmer, livestock farming is a secondary activity so treated as secondary source.
- The increasing urban sprawl and the need to meet food security demands have led to a reduction in areas available for natural grazing and feed production. This encroachment affects the availability of essential resources for livestock, impacting their health and productivity.
- Climate change poses a significant threat to livestock farming through altered weather patterns, leading to droughts or floods that can disrupt feed supply and livestock health. Environmental degradation further exacerbates these challenges, affecting the sustainability of livestock farming.

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9.2.3 ***SWOT Analysis:***

Livestock & Fisheries			
Strength	**Weakness**	**Opportunity**	**Threats**
1. The city boasts a diverse range of livestock, including cattle, buffaloes, sheep, goats, camels, horses, asses, and mules, contributing to economic diversity and cultural significance.	1. Despite the large livestock population, the region has only one veterinary hospital and 18 veterinary centers, potentially hindering the proper care and health management of animals. 2. Large scale breading has not developed 3. Lack of facilities to industrialize fisheries-based products. 4. Landlessness	1. Production of livestock-based products. 2. Labour force available for livestock growth. 3. The ongoing awareness sessions conducted by the veterinary department present an opportunity to educate farmers on better livestock management practices.	1. Theft and security issues 2. Losses due to Disasters (floods and epidemics). 3. Landlessness and small holding sizes may limit farmers from engaging in commercial livestock farming, impacting the overall development of the sector. 4. Increasing urban sprawl reduces areas available for natural grazing and feed production, affecting the availability of resources for livestock.

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9.2.4 ***Need Assessment***

Kotri taluka, part of Jamshoro district with a livestock population of about **1.22 million large and small animals**, is served by **one veterinary hospital and 18 veterinary centers**, including dispensaries at Jamshoro, Kotri, Sehwan, Petaro, and other locations. These facilities provide treatment, vaccination, and reproductive health services, with **20–30 cases of artificial insemination handled per month**. Medicines and vaccines are generally available and sufficient, and **3–5 awareness sessions** are conducted monthly to guide farmers on livestock health and vaccination. Common diseases include Mastitis, Flu, Diarrhea, Dysentery, UTIs, Laminitis, Meningitis, Foot and Mouth Disease, Mange, and Protozoal infections, with a natural death rate of around **5%**. While the quality of services is rated as good, there is a need for mobile veterinary units, better-equipped field staff, and regular maintenance of centers to meet the needs of the growing animal population.

The need assessment and SWOT Analysis confirms that the livestock sector response cannot rely solely on expanding veterinary infrastructure; it must be delivered through a multi-faceted approach: (i)

rehabilitation and functional upgrading of the existing one veterinary hospital and 18 veterinary centers serving approximately 1.22 million large and small animals in Kotri taluka, including improved safety, medicine supply, and equipment; (ii) expanding outreach via mobile veterinary units and enhanced field staff capacity to ensure wider coverage; and (iii) targeted awareness and training programs for farmers to improve livestock health management and productivity. This phased approach supports both immediate animal health needs and long-term resilience of the sector, safeguarding the livelihoods of the livestock population comprising 163,732 cattle, 118,740 buffaloes, 171,748 sheep, 414,191 goats, and other animals in the district.

*9.2.5 **Strategic Development Plan***

- Improving the production performance of livestock in District through manipulation of different minerals and feed supplements.
- Enhancement of Livestock Production and Productivity through strategic deworming and vaccination.
- Establishment of model livestock farms linked with improved supply chain and value addition.
- Establishing new cattle & dairy farms that lead to increase in number of cattle's and quantity of milk.
- Enhancing Veterinary Services.

Livestock sector interventions will be integrated with municipal infrastructure planning, focusing on improving access to reliable water supply, feed resources, veterinary services, and safe transportation routes. This integration will ensure resilience against floods and climatic challenges, reduce disease risks, and strengthen the overall health and productivity of livestock. Coordinated efforts in infrastructure and service delivery will safeguard livelihoods and support sustainable growth of the livestock economy.

9.3 Fisheries

*9.3.1 **Existing Situation***

Jamshoro District's fisheries sector, significantly influenced by the Indus River and its tributaries, is further enriched by the presence of Manchar Lake. This lake, being Pakistan's largest freshwater body, plays a crucial role in the region's fisheries landscape. The lake's fluctuating water levels and extensive marshlands create varied habitats that support these different fish populations. The lake is not just a biodiversity hotspot but also a significant source of livelihood for the surrounding communities. Traditional fishing practices here are an integral part of the local economy. The 2022 floods in Pakistan, which caused the lake to overflow, highlight the environmental challenges faced by the region. Efforts to manage the lake's water levels, such as making cuts for drainage, are crucial to protect nearby communities while balancing ecological needs.

Between 2020 and 2023, the fisheries sector experienced a sharp expansion in capacity but a serious decline in performance. The number of boats increased from 533 to 1,445 and fishermen from 75 to 2,183, indicating rapid entry into the sector, likely due to economic pressure or improved registration. However,

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annual fish production fell drastically from 1,536 metric tons to just 265 metric tons, revealing a severe drop in productivity. This mismatch clearly points to overcapacity, overfishing, and possible depletion of fish stocks, where more effort is producing far less output. The trend is unsustainable and suggests urgent need for better resource management, capacity control, and reliable data to protect both livelihoods and the ecological health of the fishery.

Manchar Lake's role in Jamshoro's fisheries sector is pivotal, offering both biodiversity and economic benefits. To sustain and enhance this sector, concerted efforts are needed in the following areas:

Table 9-4: Annual Fish Production Fisheries-Water bodies, Fish farms & Production (M. Tons)[62]

Year		2020	2023
1	Number of Boats	533	1,445
2	Number of Fishermen	75	2,183
3	Annual Fish Production (M. Ton)	1536	265

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Given the fluctuating water levels of Manchar Lake and the environmental challenges including flood impacts, the fisheries strategy must prioritize: I. rehabilitation and strengthening of existing fishery infrastructure and habitats; II. enhancement of sustainable fishing practices to maintain stable fish populations; III. provision of support facilities such as safe docking, storage, and processing units with focus on ecological balance; and IV. capacity building and technical training for fishermen to improve productivity and resilience against environmental shocks.

9.3.2 ***Issues***

- To provide the extension services in private sector
- Lease of fishing rights, conservation, management and promotion of fisheries
- Training through open training schools
- Issuance of district angling licenses
- Local publicity and awareness
- Enforcement of fisheries enactment in their respective domain
- Fish seed stock replenishment in natural water bodies in their respective domain
- Aquaculture development activities through modern techniques
- Collection of statistical data of fish and fish resources in their respective domain

[62] Sindh Statistics 2022

9.3.3 ***SWOT Analysis:***

Fisheries			
Strength	**Weakness**	**Opportunity**	**Threats**
1. The presence of the Indus River, its tributaries, and Manchar Lake provides a rich and diverse aquatic ecosystem. 2. Traditional fishing practices are deeply rooted in the local culture, contributing to a strong fishing community. 3. The fisheries sector is a significant contributor to the local economy, providing livelihoods for numerous residents	4. Environmental challenges, such as floods, pose a threat to the stability of the fisheries sector. 5. The sector may lack modern techniques, impacting productivity and sustainability. 6. Limited awareness among the local population about sustainable fishing practices and the importance of conservation.	1. Fishing can enhance economic activities if produced through appropriate industries. 2. Encouraging private fisheries initiatives can boost economic growth. Extending fisheries services to the private sector can enhance productivity. 3. Raising local awareness about sustainable fishing and conservation can garner community support and compliance. 4. Promoting modern aquaculture techniques can diversify species, increase production, and improve economic returns.	1. Insufficient management of fishing rights and practices may lead to overfishing and depletion of fish populations. 2. Climate change and natural disasters can continue to impact the fisheries sector. 3. Inaccurate or insufficient statistical data on fish resources can hinder effective planning and management.

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*9.3.4 **Need Assessment***

There is need to develop and implement a broad-based fisheries policy which is required for accelerated development of the fisheries sector. Government of Sindh has to take measures to modernize the fisheries sector including establishment of farms on district level to promote fish farming.

Need assessment and SWOT analysis confirms that the fisheries sector response cannot rely on policy formulation alone; it must be delivered through a dual approach: (i) strengthening and modernizing existing fisheries management systems including enforcement of fisheries enactments, regulation of fishing rights, fish seed replenishment in natural water bodies, and systematic data collection on fish resources; and (ii) targeted expansion of productivity through private sector extension services, establishment of district level fish farms, open training schools, and adoption of modern aquaculture techniques. This phased approach supports immediate sustainability of aquatic resources while enabling long term growth, livelihood security, and resilience against environmental and climate related risks.

*9.3.5 **Strategic Development Plan***

- Need for extension services in private sector
- Lease of fishing rights, conservation, management and promotion of fisheries
- Local publicity and awareness
- Enforcement of fisheries enactment in their respective domain
- Fish seed stock replenishment in natural water bodies in their respective domain
- Aquaculture development activities through modern techniques
- Collection of statistical data of fish and fish resources in their respective domain

*9.3.6 **Economic Development***

Recommendations

To strengthen livestock and fisheries as sustainable livelihood sources, the following measures are recommended:

Livestock

- Establish modern dairy and meat farms with cold-chain facilities to improve productivity and market linkages.
- Expand veterinary coverage by establishing at least one veterinary hospital in Jamshoro, supported by more centers and mobile clinics.
- Promote feed and fodder development programs to address shortages during dry seasons.
- Support smallholder farmers through livestock credit schemes, insurance, and training.

Fisheries

- Formulate and implement a district-level fisheries policy aligned with Sindh's broader fisheries development plan.

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- Encourage fish farming/aquaculture through training, subsidies, and demonstration projects.
- Support value addition (fish processing, packaging, cold storage) to increase incomes.
- Develop sustainable fishing practices to conserve aquatic biodiversity and ensure long-term productivity.

Fisheries interventions will be integrated with municipal and regional infrastructure planning, particularly water body management, drainage and flood protection systems, farm to market road connectivity, cold storage and fish handling facilities, energy reliability, and enforcement support infrastructure. This integrated approach will enhance conservation and sustainable fishing practices, improve aquaculture productivity through modern techniques and extension services, strengthen value addition and market access, and reduce livelihood disruptions during flood and climate stress events, thereby ensuring long term resource sustainability and economic resilience.

i. Establishment of new Cattle and Fish farms

It is expected that sustainable growth of livestock will be maintained as per objectives of Livestock & Fisheries Department with the participation of private sector. Hence there is possibility for increasing number of livestock and dairy farms to meet the requirement of meat and milk. Similarly new fish farms and poultry farms in the districts need to be established to generate production and income of the people engaged in this business. For this there is proposed the Cattle Farm to south, parallel to new proposed bypass Road. While Fish farms need to be identified by concerned authority to attract the private investment, where water is available.

There is need to develop and implement a broad-based fisheries policy which is required for accelerated development of the fisheries sector. Government of Sindh has to take measures to modernize the fisheries sector including establishment of farms on district level to promote fish farming.

9.4 Industries

9.4.1 ***Existing Situation***

Two out of four talukas have industrial estates in this district. The industrial state in Taluka Kotri consists of 160 factories. This industrial estate employs a large number of people from all over the country. Taluka Thano Bula Khan has an industrial state in Nooriabad along superhighway, which consists of 72 industrial units but where only 42 units are functional employing its inhabitants and outsiders[63] (latest available data). Mining is also a source of income for the inhabitants of this Taluka.

[63] Report on Tranche Condition (2006), Taluka Administration, District Government Jamshoro, Sindh Devolved Social Services Program (SDSSP), Government of Sindh

I. S.I.T.E Kotri

Situated on the right bank of River Indus over an area of 1875 acres Kotri Industrial Trading Estate Limited was incorporated in 1960 on the pattern of Trading Estates of United Kingdom. With all modern infrastructures available on the site and the second largest city of Sindh Hyderabad, across the river, this Industrial Estate has developed into prosperous and progressive Industrial Trading Estate housing all kinds of industries with huge turn over and good profit margin.

Linked with National Highway and the National Railway System, the Estate is connected with all parts of the country as well as the Seaports and Airports.

The Estate located just above 160 kilometers from Karachi is extremely lucrative for setting up industries engaged in the production of varied types of finished goods both for local consumption and export, spinning trade, however, is most prosperous here.[64]

II. S.I.T.E Nooriabad

Nooriabad Industrial Estates is the latest feather in cap of the chain of industrial estate in Sindh situated at midway between Karachi and Hyderabad on the Super Highway in a valley between two seasonal rivers with a huge aquifer on an area of 5741 acres in District Jamshoro. This industrial estate is ideal for setting up all kinds of industries. It is lucrative especially as this Estate enjoys five years tax holiday from the date an industry goes into production. Since there is no custom duty on machinery and other hardware imported to vitalize the industries, a net saving of 40 to 60% on the C & F value is Possible.
The Estate is filling at a very fast pace and already has hundreds of different units in production. Both national and multinational industrialists find this site very attractive and profitable.

Linked with the seaports of Karachi and Port Qasim and the rest of Pakistan, Nooriabad Industrial Estate has huge potential and a very bright future. Its proximity with Karachi is its most attractive feature.[65]

The industrial estates in Kotri and Nooriabad are important components of Jamshoro District's economic framework. SITE Kotri's established infrastructure and strategic location near Hyderabad and Karachi make it a hub for diverse industrial activities. In contrast, S.I.T.E Nooriabad's rapid development, tax incentives, and strategic positioning between Karachi and Hyderabad offer unique advantages for new and expanding industries.

These industrial estates not only bolster the district's economic output but also play a vital role in job creation and industrial diversification in the region. The continued development and expansion of these estates are key to sustaining economic growth and enhancing the industrial capacity of Jamshoro District.

[64] http://www.site.com.pk/wordpress/?page_id=1459
[65] http://www.site.com.pk/wordpress/?page_id=1452

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9.4.2 ***Types*** **of Industries**

Jamshoro District, known for its industrial base, encompasses a diverse array of industries ranging from building materials to textiles, and from food and agriculture to specialized sectors like wire and cable manufacturing. This industrial diversity not only supports the local economy but also provides employment opportunities and contributes to regional development.

Key Industrial Sectors in Kotri

Kotri hosts a diverse array of industrial sectors, contributing significantly to the region's economic development and employment landscape. The industrial spectrum encompasses various manufacturing and production facilities, including textile mills, rice mills, flour mills, and oil mills. Notable companies like Aasa Motor Cycle, AK Food Rice, Al-Karam Rice Mills, and Colgate (Palmolive) Ltd. are key players in the region. The textile industry is robust, featuring several prominent mills such as Agar Textile Mills, Amin Textile Mills Ltd., and Bhanero Textile Mills. The food processing sector is also well-represented, with firms like Appex Feed, Five Star Rice Mills, and Pakistan Flour Mills. Additionally, the area includes enterprises specializing in chemicals, plastics, and pharmaceuticals, such as Excel Industries, Hitech Oil & Ghee, and Glaxo smith Kline Jamshoro. These industries are strategically located along major roads and transport routes, enhancing accessibility and connectivity, which are crucial for efficient operations. Despite some companies being closed or inoperative, the active industries continue to drive the economic engine of Kotri, supporting livelihoods and contributing to regional growth. This vibrant industrial landscape underscores Kotri's role as a significant industrial hub in the region.

Given the concentration of industrial activity in SITE Kotri and SITE Nooriabad, the presence of 232 industrial units of which only 202 are functional, large estate areas of 1,875 acres at Kotri and 5,741 acres at Nooriabad, and challenges related to infrastructure gaps, uneven operational capacity, workforce readiness, and environmental pressures, the industrial strategy must prioritize: I. rehabilitation and upgrading of existing industrial infrastructure including internal roads, drainage, water supply, energy reliability, and waste management systems; II. revitalization of non-functional units through policy incentives, facilitation, and improved access to utilities and logistics; III. strengthening of industrial connectivity with national highways, railways, ports, and urban service networks to reduce production and transport costs; and IV. promotion of skills development, value addition, and environmentally responsible industrial practices to support sustainable employment generation and long-term economic resilience.

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9.4.3 ***SWOT Analysis***

Industrial			
STRENGTH	**WEAKNESSES**	**OPPORTUNITY**	**THREATS**
Industrial			
1. The trade and commerce sector of the Kotri city highlights economic diversity and potential for growth. 2. The informal trade sector plays a vital role in the local economy. 3. SITE Kotri. 4. It includes a diverse range of industries, such as building materials, textiles, food and agriculture, and specialized sectors like wire and cable manufacturing. 5. The vibrant industrial landscape of Kotri highlights its status as a significant industrial hub in the region, showcasing its diverse and robust industrial base.	1. Lack of Industrial estate policy 2. Inadequate infrastructure in industrial zones (roads, power supply, water) affecting productivity. 3. Deficiency of buffer around industrial facilities. 4. water theft and the illegal water connections. 5. land grabbing.	1. Job creation. 2. Infrastructural development in key commercial areas can attract investment and enhance functionality. 3. With infrastructure development, encouragement of small businesses and promotion of local craftsmanship Kotri city can became an economic hub in the region. 4. SITE area is suitable for Textile, pharmaceutical and food industries. 5. International trade opportunities will be generated. 6. Foreign investment	1. Environmental degradation risks from poorly managed industrial activities. 2. Degrade air quality. 3. Labour force is unskilled. 4. Unavailability of labour rights. 5. Security issues. 6. Water contamination to river Indus resources. 7. Encroachment. 8. Floodwater has caused significant damage to industrial infrastructure, posing a substantial risk to operational.

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- **Occupation & Job Opportunities**

Kotri City, incorporating Bolhari MC and Jamshoro TC as well as its peri-urban areas, exhibits a diverse occupational structure, primarily driven by agriculture, trade, skilled and unskilled labor, and professionals, especially in the industrial sector. The city's economic dynamics are also influenced by its proximity to Hyderabad, the second-largest city in Sindh. The following analysis, based on the Socio-Economic Survey, provides a detailed look at the main occupations and monthly income patterns of Kotri City's residents.

The predominant occupation is labor, with 62.9% engaged in this sector. This high percentage indicates a labor-intensive economy. A diverse range of other occupations accounts for 27.7%. The education sector, represented by teachers, constitutes 5.7%. Technical professions like engineering make up 1.8%. These professions are less common, with bankers at 1.4% and doctors at 0.7%.

Table 9-5: Occupation Distribution

S.No.	Occupation	No. of Respondents	Percentage
1	Banker	27	1.4
2	Doctor	13	0.7
3	Engineer	34	1.8
4	Labor	1220	62.8
5	Teacher	111	5.7
6	Other	537	27.7

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*9.4.4 **Need Assessment***

- Vocational training to Women force should be encouraged for establishing cottage industry in the district.

The SWOT analysis confirms that the industrial response cannot rely on new estate development alone; it must be delivered through a multi-pronged approach: (i) rehabilitation and functional upgrading of existing industrial zones, particularly SITE Kotri with over 160 units and SITE Nooriabad with 72 units of which only 42 are operational, focusing on internal roads, drainage, power supply, water management, buffers, and flood protection; (ii) targeted revitalization of non-functional and underperforming units to improve productivity, employment, and utilization of the 1,875 acres at Kotri and 5,741 acres at Nooriabad; (iii) strengthening skills and workforce readiness, given that 62.8% of the working population is engaged in labor while skilled professions account for less than 6%, through vocational training, especially for women and youth; and (iv) enforcement of industrial regulation and environmental safeguards to address water theft, encroachment, pollution risks to the Indus River, and flood related damage. This phased approach supports immediate industrial continuity, job creation, and long-term economic resilience of the district.

9.4.5 ***Strategic Development Plan***

I. Long Term Plan

- Sufficient market infrastructure to ensure optimal value addition
- Heritage saving through empowerment of artisans for development of handicrafts
- Paradigm shift from industrial agriculture to diversified agro ecological Systems
- Provision of infrastructure for establishment of new industries.

II. Short Term Plan

- Support industrial development.
- Modernize and revitalize the service sector.
- Enhancement of colonization in SIEs through provision of missing facilities
- Provision of vocational training and employable skills to the unemployed youth of the district
- Customized lending and micro financing to small industries
- Revitalization of industrial estate

*9.4.6****Economic Development***

- On the basis of projected increase in crop production up to 2045 and present industrial base, there is potential for enhancing the capacity utilization of present units and establishing new industrial units.
- Addition in industrial units suggested may vary as it is dependent upon the production capacity of each unit. As noted earlier, full utilization of Industrial Estates to be accelerated. Improved infrastructure, supply of water and energy need to be stramlined. However, incentives to private investors will be the key element for which Sindh Investment Board and Sindh Small Industries Corporation have vital role to play.
- The increase in industrial growth will obviously contribute towards better economy of the districts with increase in per capita income, reduction in unemployment rate and poverty alleviation.

Industrial development interventions will be integrated with municipal and regional infrastructure planning, particularly access to reliable water and energy supply, internal and external road connectivity, drainage systems, solid waste management, and public safety within industrial estates and production zones. This coordinated approach will support efficient operations, reduce production disruptions during extreme weather events, enhance investor confidence, and ensure sustained industrial growth and employment generation across the district.

*9.4.7****Priority Projects***

i. Revitalization of Industrial Estate of Kotri (located along National Highway Kotri N-5)

At the present, Kotri city is providing sufficient employment through its SITE Kotri. The estate comprises 472 developed plots, out of which 168 units in production. 32 units are sick and 188 open plots and 8 Plots in litigation. Among the plots, 54 are under encroachment. Kotri SITE has industries ranging, Textile, Oil, Flour, Daal, Rice, Food, Poultry, Garments, Pipe, Cotton Waste, Detergent, Plastic Spinning Ice, Automotive.

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There will be a need to take actions with basic aim to retain the situation and attract the future investments.

While revitalizing the SITE Kotri, the industrial zone must be bifurcated through green belts as buffer zone to limit the adverse impacts of industrial pollution on adjoining residential areas.

- **Scope**

The project focuses on the revitalization and sustainable development of SITE Kotri, an established industrial estate that currently comprises 472 developed plots. While 168 units are operational, a significant number of plots remain open, sick, or under encroachment, affecting overall productivity and investment appeal.

Key aspects of the project include:

- Rehabilitation and upgrading of the industrial estate to retain existing industries and attract new investments across sectors such as textile, oil, food processing, garments, automotive, and plastics.
- Implementation of green belts and buffer zones to separate industrial activities from adjoining residential areas, mitigating the adverse effects of industrial pollution.
- Resolution of encroachment and litigation issues to optimize land use and enhance estate management.
- Promotion of environmentally sustainable industrial practices to support long-term economic and urban development.

- **Size**

i. **Geographical Coverage:**
- The project covers the entirety of the SITE Kotri industrial estate, including all 472 plots and surrounding buffer zones.

ii. **Physical Components:**
- Upgrading infrastructure across operational and open plots, addressing utilities, access roads, and environmental controls.
- Establishment of green belts and landscaped buffer zones between industrial and residential areas.
- Measures to address encroachment and legal disputes affecting approximately 54 plots under encroachment and 8 plots in litigation.
- Support facilities to improve industrial operations, such as waste management and pollution control systems.

- **SDG'S Alignment**

I. **GOAL 8 – Decent Work and Economic Growth:** The revitalization of the SITE will lead to increased industrial output, enhanced productivity, and expanded employment opportunities. Encouraging private investment and supporting small and medium enterprises (SMEs) directly

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contributes to SDG 8.3 and 8.5, which emphasize inclusive economic growth, decent work, and productive employment for all.

II. **GOAL 11– Make cities and human settlements inclusive, safe, resilient and sustainable:** Integrating green buffer zones within the industrial estate will help reduce air and noise pollution, improving the urban environment and minimizing negative impacts on nearby residential areas. This directly supports SDG 11.6 and 11.3, which promote inclusive urban development and reduced environmental impact of cities

- **Implementing Authority**

Sindh Industrial Development Board. District Government.

- **Preliminary cost estimate: 200 million PKR Approx.**

Table 9-6 : Economic Development Projects Estimated Cost (Kotri City)

S. No.	Project Name	Estimated Cost in Millions	ADP	Non-ADP	Status	
					Short Term	Long Term
Economic Development Projects						
1	Revitalization of SITE Kotri	**200**	**-**	Non ADP	**Short Term**	**-**

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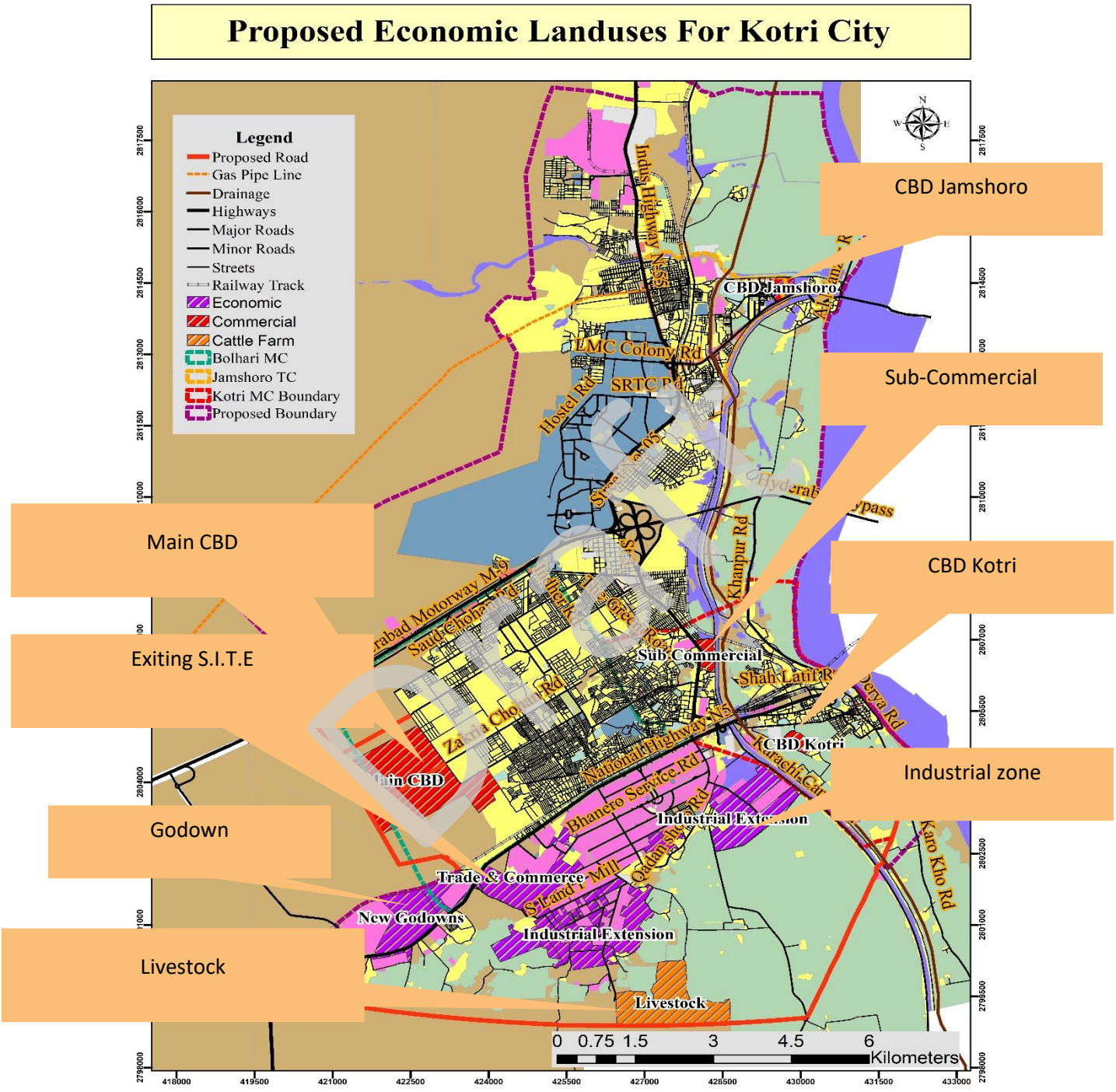
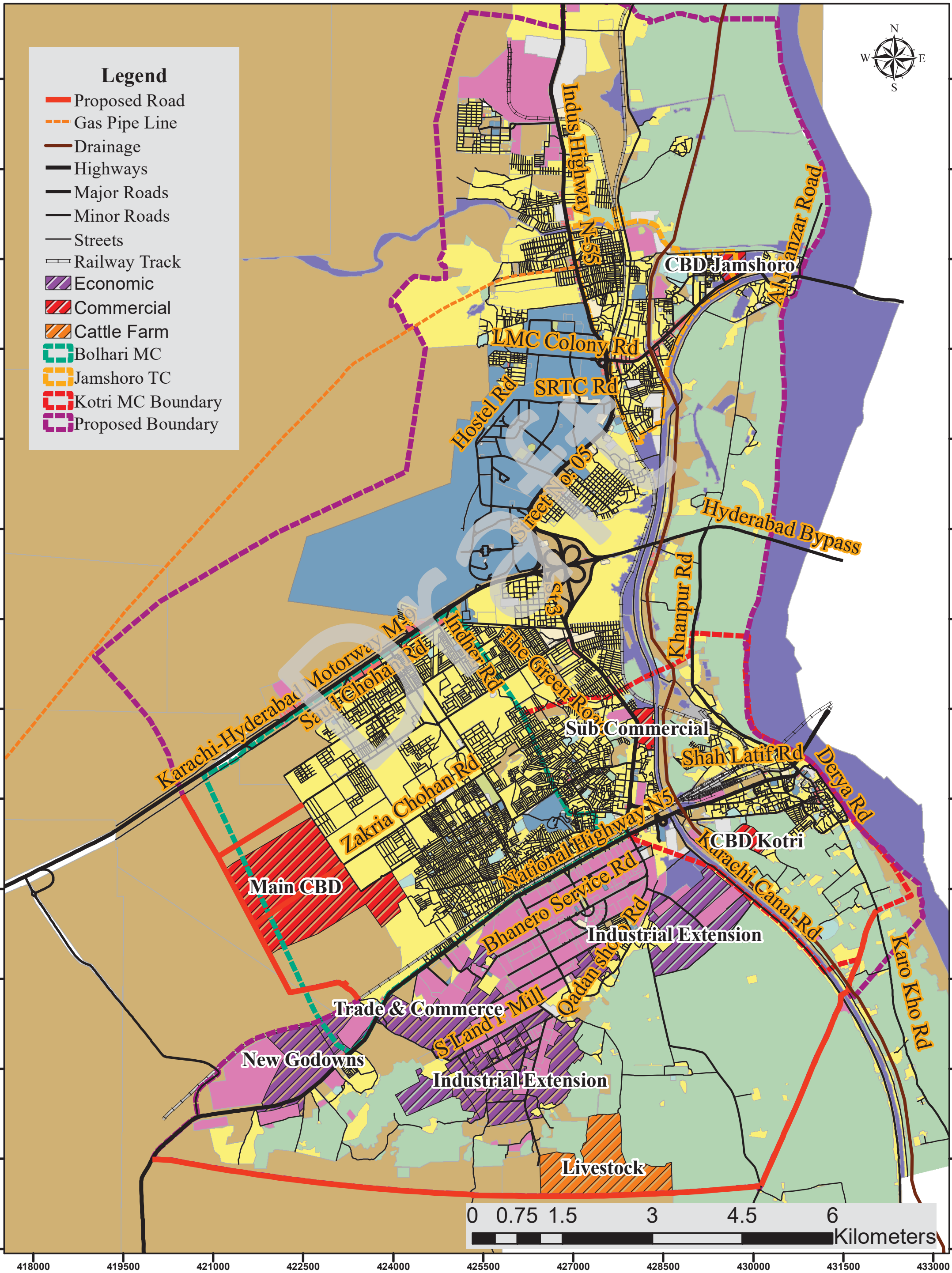


Figure 9-1: Proposal for Economic Landuse for Kotri City

Proposed Economic Landuses For Kotri City



9.5 Trade and Commerce

There is existence of lots of banks in Jamshoro district namely, Agricultural bank Kotri, Sindh bank, National bank of Pakistan, Allied Bank, HBL Kotri city branch. Small Businesses such as A.J Autos, Sakhi Cement Depot. There is also the presence of few general stores. Kotri MC has main commercial hub along the Raswa Mori Road. Bolari MC has main commercial hub along the Hajji Ali Nawaz Chohan Road. Jamshoro TC has main commercial hub near Hyderabad-Jamshoro Road. This area includes super stores, traders, book shops, sports shop, cosmetic shop, restaurants, petrol pumps, cloth centres, chicken shops, etc

Given the dispersed commercial hubs, concentration of trade along three primary corridors (Raswa Mori Road in Kotri MC, Hajji Ali Nawaz Chohan Road in Bolari MC, and Hyderabad–Jamshoro Road in Jamshoro TC), and the dominance of small and informal businesses supported by at least five major banking institutions, the trade and commerce strategy must prioritize: I. upgrading and maintenance of commercial area infrastructure including roads, drainage, street lighting, solid waste management, and reliable electricity to improve business functionality and resilience; II. formalization and support of small and informal enterprises such as auto workshops, cement depots, general stores, and retail outlets through access to finance, banking services, and regulatory facilitation; III. strengthening of commercial clustering and market organization within existing hubs to reduce congestion, improve accessibility, and enhance customer footfall; and IV. promotion of diversified commercial activities and services, including retail, food, fuel, and service trades, to generate employment, improve income stability, and reinforce the role of trade and commerce as a key driver of the local urban economy.

9.5.1 ***SWOT Analysis:***

Trade & Commerce			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Kotri's trade and commerce sector is a blend of traditional markets, a growing informal sector, and a strong industrial trade component. 2. The blend of traditional markets, informal sector, and industrial trade indicates the city's potential for economic growth. 3. Local markets generates employment opportunities. 4. The Jamshoro Chamber of Commerce is a representative body of business community like companies, firms & Traders in the District Jamshoro.	1. Inadequate roads, power supply interruptions, and insufficient water supply in industrial zones can hinder daily operations and productivity. 2. Demise of local agriculture market. 3. Un-planned local business activities. 4. Difficulty in accessing broader markets and challenges in the distribution of	1. Focusing on infrastructural improvements in market areas and industrial zones can address weaknesses and promote economic growth. 2. Promoting local craftsmanship can contribute to the uniqueness of products and attract a broader market. 3. Providing support for small	1. External economic factors and global market trends can impact the city's trade and commerce sector. 2. Economic downturns can negatively affect the demand for industrial

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Trade & Commerce			
Strength	**Weakness**	**Opportunity**	**Threats**
5. Distribution Hub	industrial goods, especially for small and medium-sized enterprises, can limit business growth. 5. Key commercial areas like Shahi Bazar require infrastructural development to enhance their appeal and functionality. 6. The informal trade sector needs better management and support to ensure sustainability and growth. 7. Limited access to finance and credit facilities for small traders and business owners can hamper their ability to grow or sustain their businesses. 8. There may be a lack of training and development programs for local entrepreneurs and traders to enhance their business skills and market knowledge.	businesses, especially in terms of access to finance and training programs, can enhance their growth potential.	goods and services, impacting the overall economic health of Kotri. 3. Intense competition from larger businesses and online marketplaces may threaten the profitability of local traders and artisans. 4. Social and political instability can disrupt business operations and discourage potential investors. 5. Security measures required.

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*9.5.2 **Issues***

- Key commercial areas like Shahi Bazar require infrastructural development to enhance their appeal and functionality.
- The informal trade sector, while vital, needs better management and support to ensure sustainability and growth.
- Limited access to finance and credit facilities for small traders and business owners can hamper their ability to grow or sustain their businesses.
- Local traders and artisans may face stiff competition from larger businesses and online marketplaces, impacting their profitability.
- There may be a lack of training and development programs for local entrepreneurs and traders to enhance their business skills and market knowledge.

From Issues and SWOT analysis the Trade and Commerce response cannot rely on ad hoc market expansion alone; it must be delivered through a coordinated, multi-pronged approach: (i) rehabilitation and functional upgrading of key commercial areas such as Shahi Bazar and other local markets through improvements in access roads, drainage, water supply, power reliability, solid waste management, and security infrastructure to support daily business operations; (ii) structured management and gradual formalization of the informal trade sector, which constitutes a significant share of local employment, through registration support, basic services, and regulatory facilitation; and (iii) targeted support for small and medium traders and enterprises through improved access to finance, business development and training programs, and stronger linkages with distribution networks and the Jamshoro Chamber of Commerce to overcome market access constraints. This phased approach strengthens existing commercial assets, enhances productivity and competitiveness, and supports immediate business continuity while enabling long-term economic growth and resilience of the city's trade and commerce sector.

*9.5.3 **Strategic Development Plan***

I. **Long Term Plan**

- Develop a modern wholesale fruit & vegetable market with cold storage, truck terminals, and logistics facilities at the city periphery.
- Formalize trade clusters (agricultural produce, handicrafts, textiles) with designated spaces, stalls, and organized facilities.
- Strengthen the Chamber of Commerce's role in supporting SMEs, export linkages, and entrepreneurship.
- Establish e-commerce and digital platforms for local artisans, shopkeepers, and agricultural producers to expand regional/national reach.
- Promote Public-Private Partnerships (PPP) for commercial infrastructure, including retail hubs, logistics, and storage.
- Create pedestrian-friendly commercial corridors with organized vending, parking, and utilities.

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II. Short Term Plan

- Upgrade existing bazaars Raswa Mori Road, Shahi Bazar) with façade improvements, signage, footpaths, and waste management.
- Relocate hawkers to designated vending zones to reduce congestion while preserving livelihoods.
- Provide microfinance and small grants for artisans and shopkeepers to strengthen local trade.
- Develop storage and small cold chain facilities for fruits and vegetables to minimize post-harvest losses.
- Improve lighting, drainage, and security in core trade zones.

Trade and commerce interventions will be integrated with municipal infrastructure planning, particularly road access and circulation including key routes like Raswa Mori Road, drainage system, solid waste management, energy reliability, public lighting, parking, and enhanced security measures such as surveillance, controlled access, and improved policing in key commercial corridors, bazaars, and market areas. This integrated approach will reduce business disruption during flood and rain events, improve the functionality and attractiveness of trading spaces, and strengthen service continuity, logistics efficiency, and investor and trader confidence across the city.

*9.5.4 **Priority Projects***

i. Provision for Fruit and vegetable Market

At present, fruit and vegetable trading in Kotri takes place in scattered roadside and congested areas without proper storage, sanitation, or waste management facilities. Farmers and traders face difficulties in handling and selling their produce under unhygienic conditions, while consumers encounter traffic congestion, irregular pricing, and poor-quality goods. These inefficiencies lead to high post-harvest losses and reduced economic returns for all stakeholders.

A dedicated Fruit and Vegetable Market (FVM) offer a sustainable solution by centralizing trading activities in a structured facility equipped with stalls, storage areas, loading/unloading bays, parking, and cold storage units. Such infrastructure would improve handling and distribution, reduce spoilage, ensure food safety, and create opportunities for grading, packaging, and value addition, thereby boosting income for farmers and traders.

The proposed market would also include drainage, sanitation, waste collection, and traffic management measures to minimize environmental and social impacts. Without this investment, Kotri will continue to face problems of unhygienic trading, food wastage, and congestion. Establishing an FVM is therefore a critical step toward ensuring food security, improving livelihoods, and supporting sustainable urban development in the region.

- **Scope**

The project aims to develop a dedicated Fruit and Vegetable Market (FVM) in Kotri to address current challenges faced by farmers, traders, and consumers due to scattered and unhygienic trading conditions.

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The facility will centralize fruit and vegetable trading into a well-structured market that supports efficient handling, storage, and distribution.

Key components include:

- Construction of stalls and vendor spaces designed for organized and hygienic trading.
- Provision of storage facilities, including cold storage units to maintain product freshness and reduce spoilage.
- Development of loading/unloading bays and parking areas to streamline logistics and reduce congestion.
- Implementation of sanitation systems, drainage infrastructure, and waste management to ensure environmental cleanliness and minimize social impacts.
- Incorporation of traffic management measures to ease congestion around the market area.
- Opportunities for value addition such as grading, packaging, and quality control, enhancing income potential for farmers and traders.

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➢ **Size**

i. **Geographical Coverage:**

- The market will be located within Kotri city, serving the trading needs of local farmers, vendors, and consumers.

ii. **Physical Components:**

- A centralized market complex comprising multiple trading stalls and vendor spaces, sized to accommodate the volume of local produce.
- Cold storage units sufficient to preserve perishable goods during peak trading periods.
- Dedicated loading and unloading bays, along with adequate parking facilities for transport vehicles and customers.
- Installation of waste collection points, drainage networks, and sanitation facilities to maintain hygiene.
- Traffic infrastructure to manage the flow of vehicles and pedestrians around the market.

➢ **SDG'S Alignment**

I. **GOAL 2 – Zero Hunger:** The establishment of a centralized Fruit and Vegetable Market in Kotri will strengthen agricultural value chains by reducing post-harvest losses, improving storage and distribution, and ensuring year-round availability of safe and nutritious produce. This directly contributes to SDG 2.1 and 2.3, which emphasize ending hunger, improving food security, and doubling the agricultural productivity and incomes of small-scale food producers.

II. **GOAL 8 – Decent Work and Economic Growth:** The Fruit and Vegetable Market will create direct jobs in market operations, logistics, cold chain management, and retail, while generating indirect

employment in transportation and value addition. This supports SDG 8.3 and 8.5, which promote productive employment, entrepreneurship, and decent work for all women and men.

III. **GOAL 11– Make cities and human settlements inclusive, safe, resilient and sustainable:** The relocation of informal roadside trading into a planned facility will reduce congestion, improve urban mobility, and create a safe, accessible, and organized commercial hub. This contributes to SDG 11.2 and 11.6, which call for sustainable urban transport systems and reduced environmental impacts of cities**.**

- **Implementing Authority: Kotri** Municipal Committee and Private Investors.
- **Preliminary cost estimate:** 700 million PKR Approx.

ii. Provision for Street Hawker

Kotri city is currently facing challenges from unregulated street hawking, particularly along Raswa Mori Road and the N-5 corridor, where vendors occupy roadside spaces and attract vehicles to stop and park, creating congestion and safety risks. Establishing a designated zone for street hawkers offers a practical solution by organizing their activities within a structured, accessible, and well-planned facility. This approach would not only improve traffic flow and pedestrian safety but also enhance the overall urban environment by reducing roadside clutter and ensuring orderly operations. The proposed facility would include properly demarcated vending stalls, pedestrian pathways, parking areas, sanitation blocks, solid waste management systems, and lighting arrangements to provide a clean, safe, and functional environment. In addition, the initiative would support economic activity by formalizing hawkers' livelihoods, enabling the municipal authority to collect revenue through regulated fees or taxes, and fostering a sense of dignity and security for vendors. Without such provision, the issues of congestion, unsafe trading, and lost economic potential will continue. Developing a designated street hawker market is therefore essential for balancing urban mobility, economic inclusivity, and sustainable city management in Kotri.

- **Scope**

The project focuses on the creation of a designated street hawker market in Kotri city to address unregulated hawking along busy corridors such as Raswa Mori Road and the N-5. This facility will organize hawkers' activities in a structured and accessible environment to alleviate traffic congestion, enhance pedestrian safety, and improve urban aesthetics.

Key elements include:

- Development of properly demarcated vending stalls to provide hawkers with clearly defined trading spaces.
- Construction of pedestrian pathways to segregate foot traffic from vehicular movement, ensuring safety and ease of access.
- Provision of regulated parking areas to minimize illegal stopping and reduce roadside congestion.
- Installation of sanitation blocks and a solid waste management system to maintain cleanliness and hygiene.

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- Incorporation of adequate lighting to improve security and facilitate extended trading hours.
- Formalization of the hawking sector through stall licensing, fee collection, and taxation mechanisms, supporting municipal revenue and vendor security.

➢ **Size**

i. **Geographical Coverage:**

- The facility will be located strategically along key congested areas, specifically targeting the Raswa Mori Road and the N-5 corridor in Kotri.

ii. **Physical Components:**

- A marketplace with a fixed number of demarcated vending stalls designed to accommodate current hawker volumes with room for future growth.
- Well-designed pedestrian walkways to ensure smooth and safe movement for shoppers and vendors alike.
- Designated parking zones for vehicles to avoid roadside obstruction.
- Provision of sanitation facilities and waste collection points integrated into the market design.
- Installation of energy-efficient lighting for security and usability during evening hours.

➢ **SDG'S Alignment**

I. **GOAL 8 – Decent Work and Economic Growth:** The formalization of informal street vending will create stable micro-enterprise opportunities, protect livelihoods, and generate municipal revenue through regulated licensing. This supports SDG 8.3 and 8.5, which promote productive employment, entrepreneurship, and inclusive economic growth.

II. **GOAL 11– Make cities and human settlements inclusive, safe, resilient and sustainable:** Relocating informal vendors into structured vending zones reduces roadside encroachments, eases traffic congestion, and improves urban mobility. This directly contributes to SDG 11.2 and 11.6, which emphasize sustainable transport systems and minimizing the adverse environmental impacts of cities.

➢ **Implementing Authority:** MC Kotri, Local Government
➢ **Preliminary cost estimate: 250 million PKR Approx.**

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Table 9-7 : Economic Development Projects Estimated Cost (Kotri City)

S.No.	Project Name	Estimated Cost in Millions	ADP	Non-ADP	Status	
					Short Term	Long Term
Economic Development Projects						
1	Feasibility study for Provision for Fruit and vegetable Market	**100**	**-**	Non ADP	**Short Term**	
2	Procurement for land for Fruit and vegetable Market	**600**	**-**	Non ADP	**-**	**Long Term**
3	Feasibility study for Provision for Street Hawker	**100**	**-**	Non ADP	**Short Term**	**-**
4	Procurement for land for Street Hawker area	**150**	**-**	Non ADP	**-**	**Long Term**

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*9.5.5 **Immediate Action Plan for Core Urban Area***

- **Modernization of Commercial Activity in the Core Urban Area**

To enhance business operations and stimulate investment, it is imperative to streamline and expedite the business licensing and permitting processes, thereby reducing administrative burdens. Additionally, the promotion of digital payment solutions and point-of-sale systems will facilitate transaction efficiency and improve financial management. The integration of smart technologies, such as energy-efficient lighting and advanced security systems, into commercial properties will modernize infrastructure and boost operational efficiency.

The Immediate Action Plan prioritizes the rehabilitation of commercial areas, pedestrian-friendly infrastructure, organized hawker management, and the integration of smart technologies. These interventions aim to strengthen business operations, attract investment, and improve the shopping environment, in line with SDG 8 (Decent Work & Economic Growth) and SDG 11 (Sustainable Cities & Communities).

I. Scope

The modernization plan for commercial activity in the core urban area includes the following key actions:

- **Rehabilitation of Shahi Bazar Area:** Revitalize the Shahi Bazar area by upgrading infrastructure, improving aesthetics, and enhancing the overall shopping experience for visitors.
- **Provision of Pedestrian Facilities:** Develop pedestrian-friendly infrastructure in the main bazaar area, including wide footpaths, safe crossings, to encourage foot traffic and support local businesses.
- **Implementation of Smart Technologies:** Install energy-efficient lighting, advanced security systems, and digital payment solutions to modernize commercial infrastructure and improve operational efficiency.
- **Incident Response and Security:** Develop an incident response plan and install high-resolution CCTV cameras to enhance security in commercial areas. Coordination with local law enforcement and emergency services will be emphasized to ensure a swift response to any incidents.

II. Size

The rehabilitation and beautification of the main commercial area in Kotri will focus on two key corridors Raswa Mori Road and Shahi Bazar.

III. Preliminary cost estimate

Total Estimated Cost: 500 million approx.

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Table 9-8: Rehabilitation of Main Commercial Area – Activity wise cost in Millions

Rehabilitation of Main Commercial Area – Activity wise cost in Millions			
S. No	**Area / Locality / Address**	**Cost in PKR million.**	
		Shopfront Facades	**Security**
	Rehabilitation of Main Commercial (CBD) Area ✓ Rehabilitation & Beautification of main Commercial areas: - Raswa Mori Road - Shahi Bazar - Jamshoro Phattak	350	150
Total PKR Rs. Million		500	

Note:

- Commercial areas will be enlisted in Govt. Agency for all services of Trade, Retail, Marketing, Sale etc.
- All commercial areas security services are associated with combine effort of commercial trade union and local Govt.
- Commercial areas accessibility for daily users and marketers is well defined with ease.
- Provision of pedestrian facility in the Bazaar area.
- Banned heavy vehicles during peak hours.

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IV. Implementation Framework

- **Funding Sources:**
    - Municipal budgets for CBD rehabilitation.
    - Provincial ADP grants for market modernization.
    - **PPP partnerships** for smart technologies (CCTV, lighting, POS systems).
    - **Commercial trade union contributions** for security and facility upgrades.
- **Execution:** Works executed by the Municipal Committee with active participation from bazaar committees and trade unions.
- **Phasing:** First phase to prioritize **Riswa Mori Road** (congestion hotspot), followed by Shahi Bazar.

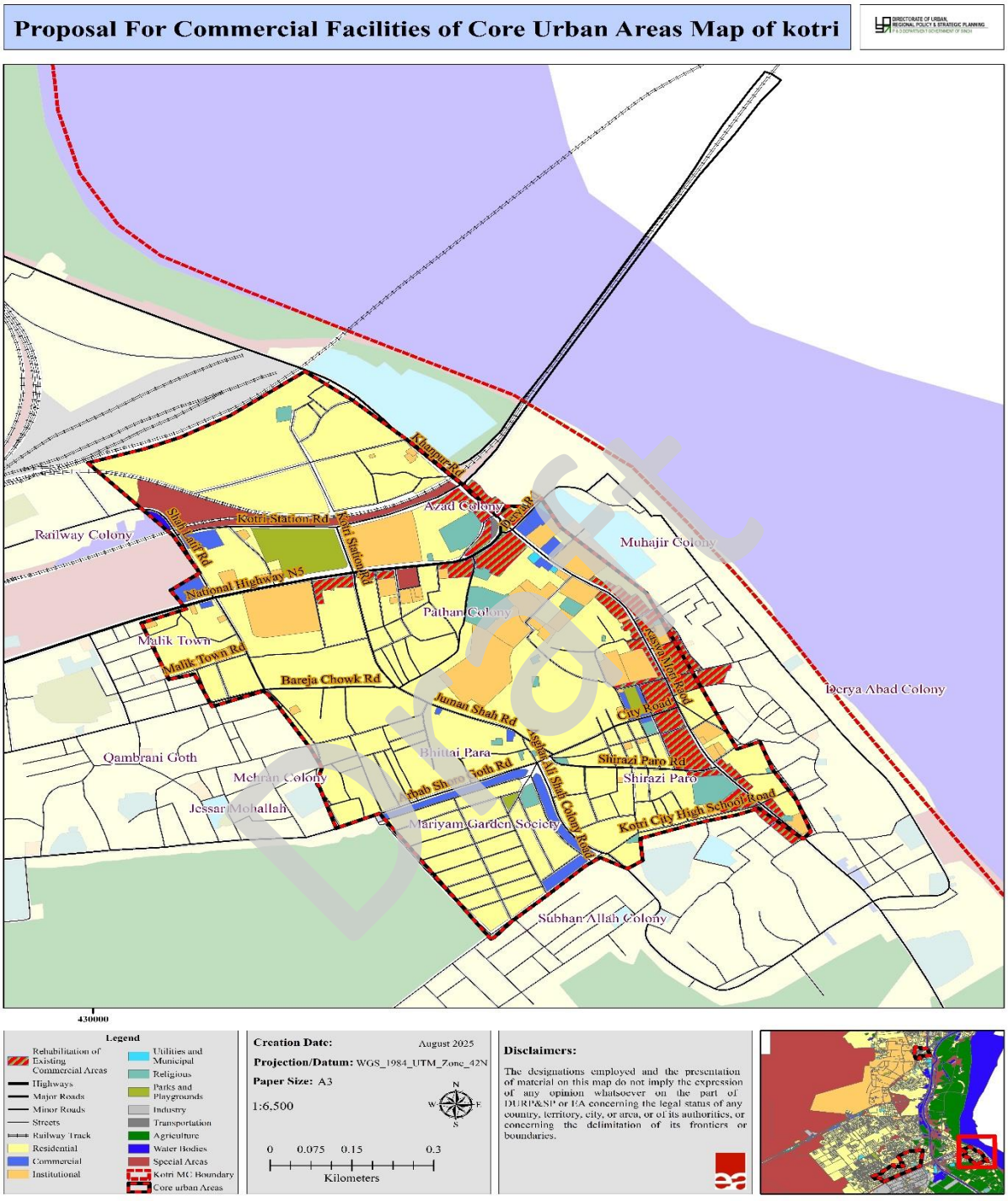
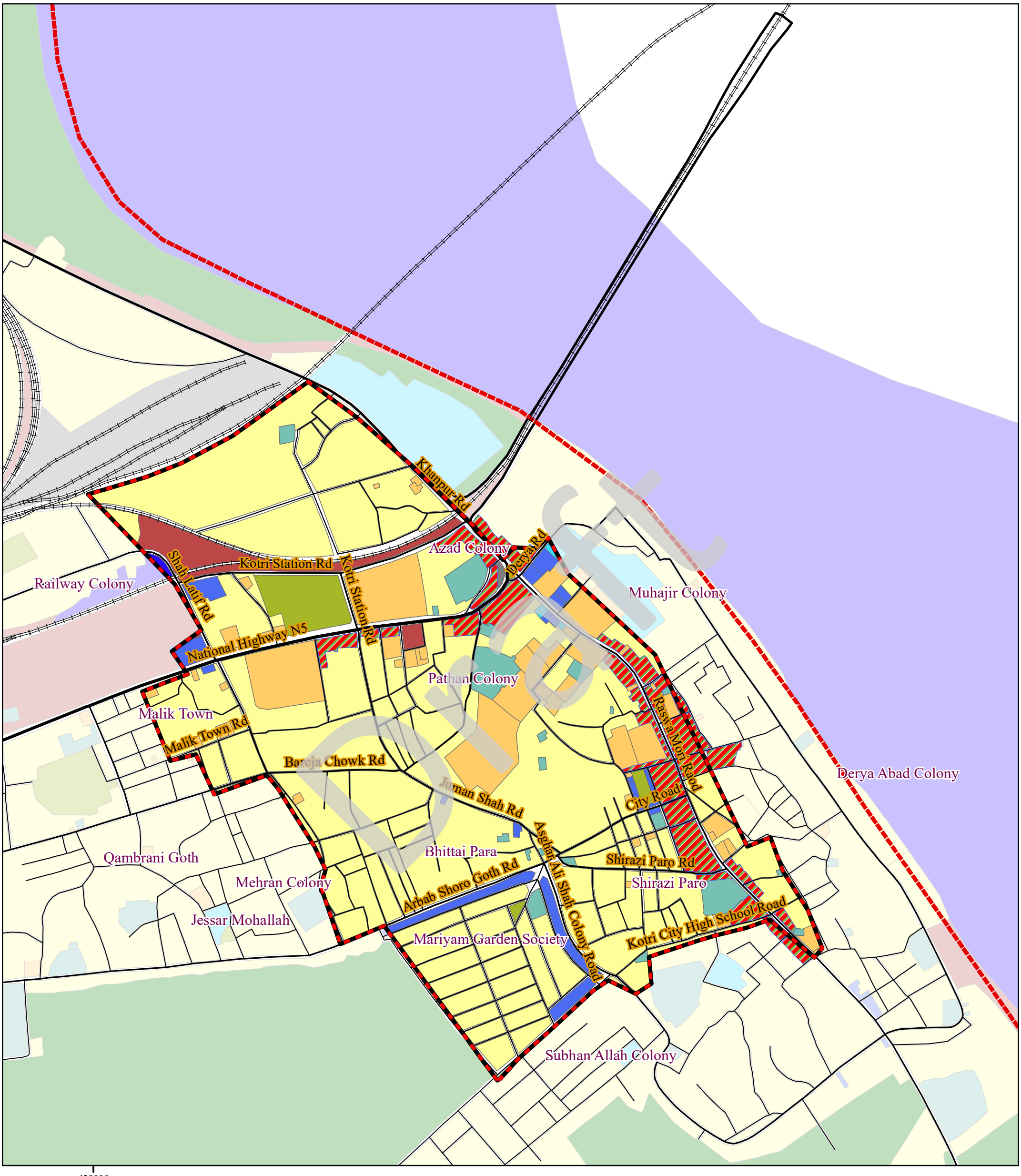


Figure 9-2: Proposal for Commercial Facilities of Core Urban Areas Map of Kotri

Proposal For Commercial Facilities of Core Urban Areas Map of kotri

DIRECTORATE OF URBAN, REGIONAL POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Rehabilitation of Existing Commercial Areas
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Kotri MC Boundary
- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:6,500

N W E S

0 0.075 0.15 0.3

Kilometers

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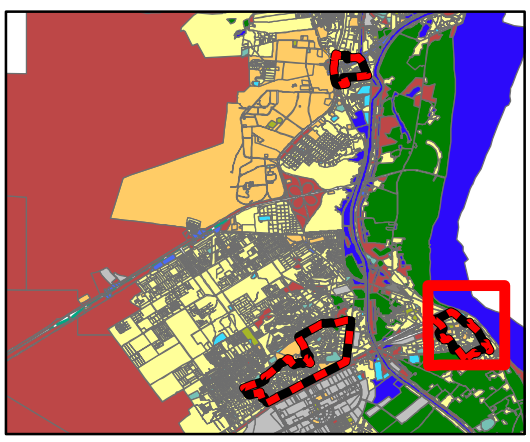

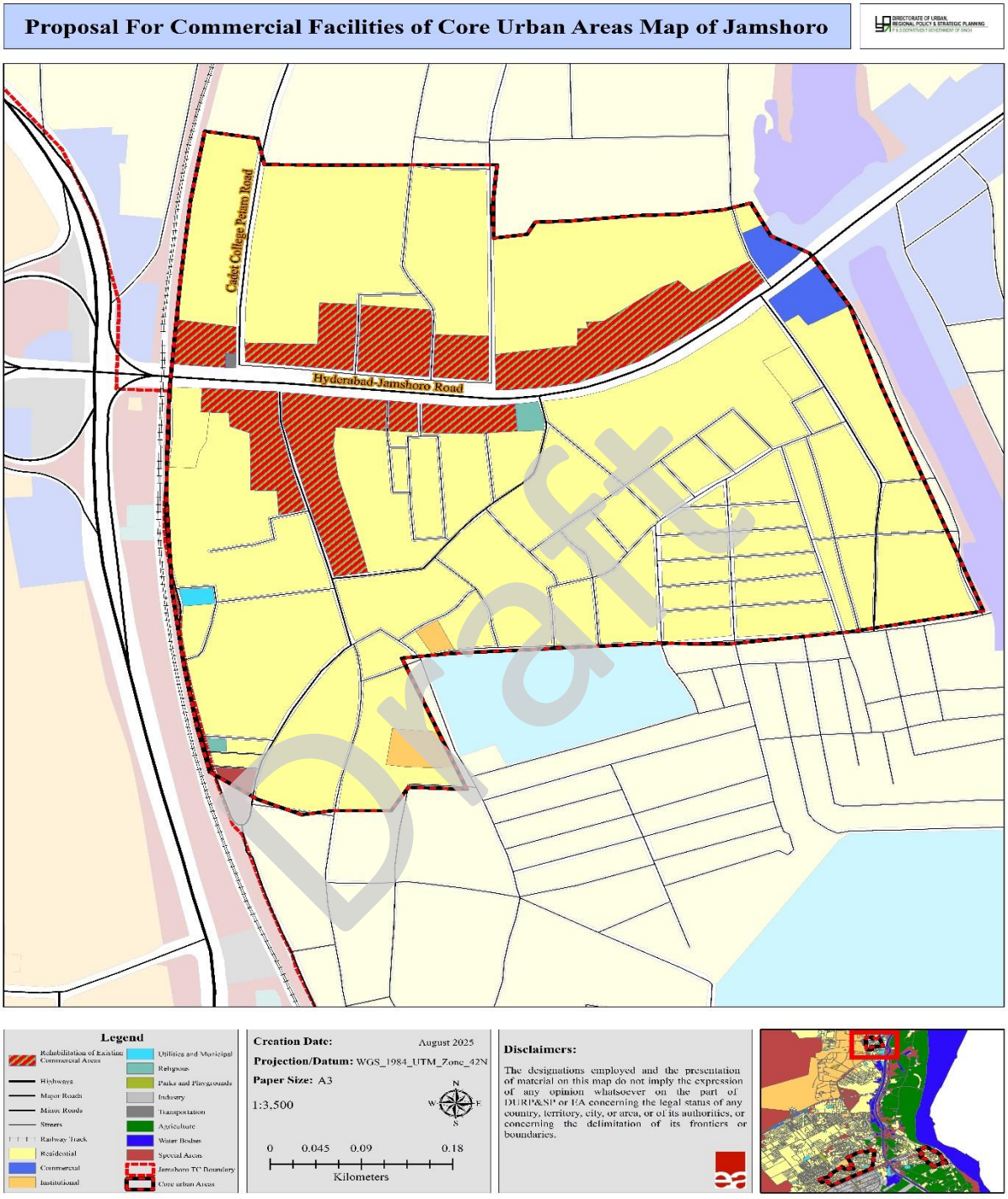

Figure 9-3: Proposal for Commercial Facilities of Core Urban Areas Map of Jamshoro

Proposal For Commercial Facilities of Core Urban Areas Map of Jamshoro

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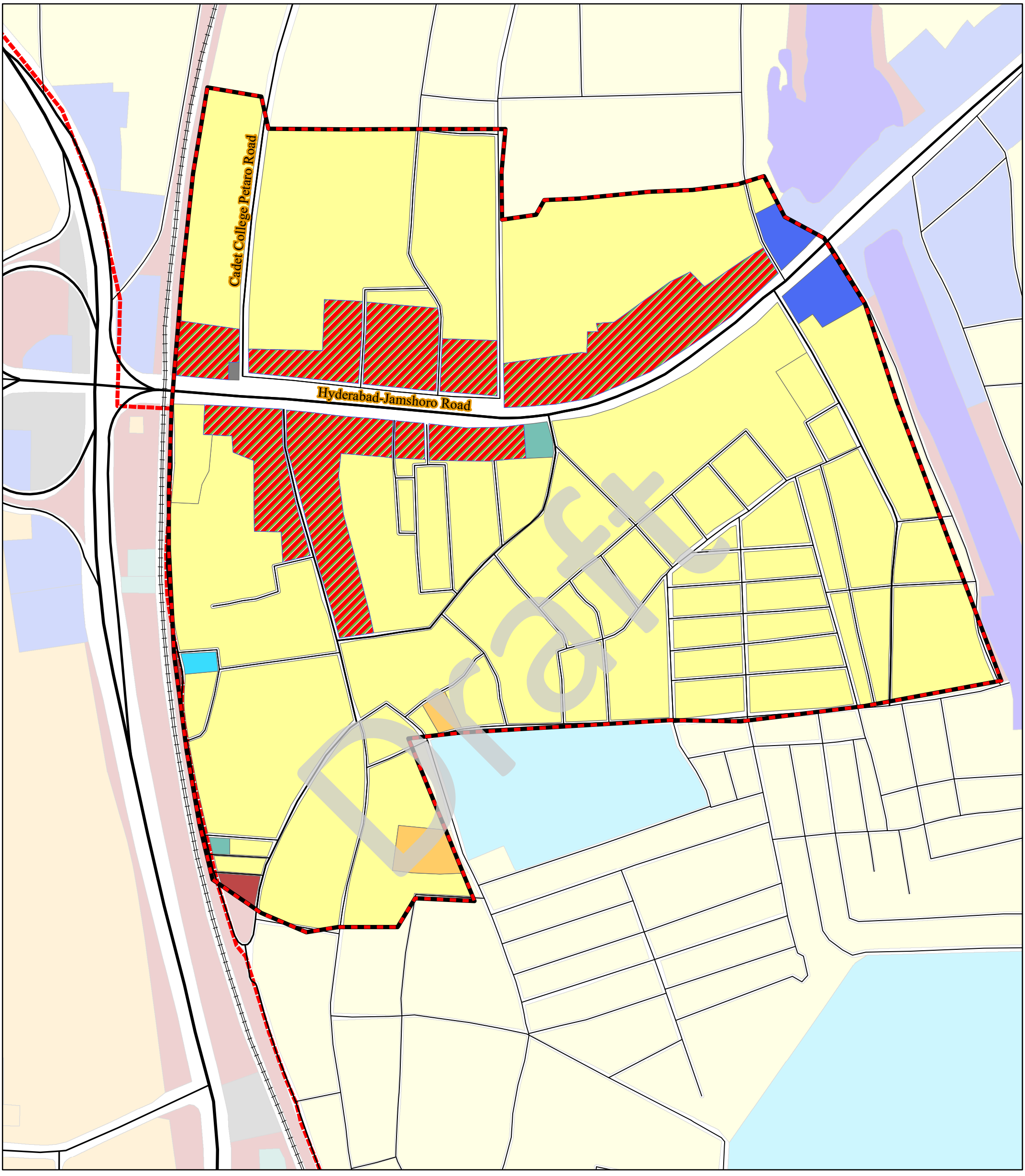

Legend

- Rehabilitation of Existing Commercial Areas
- Highways
- Major Roads
- Minor Roads
- Streets
- Railway Track
- Residential
- Commercial
- Institutional
- Utilities and Municipal
- Religious
- Parks and Playgrounds
- Industry
- Transportation
- Agriculture
- Water Bodies
- Special Areas
- Jamshoro TC Boundary
- Core urban Areas

Creation Date: August 2025

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:3,500

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Kilometers

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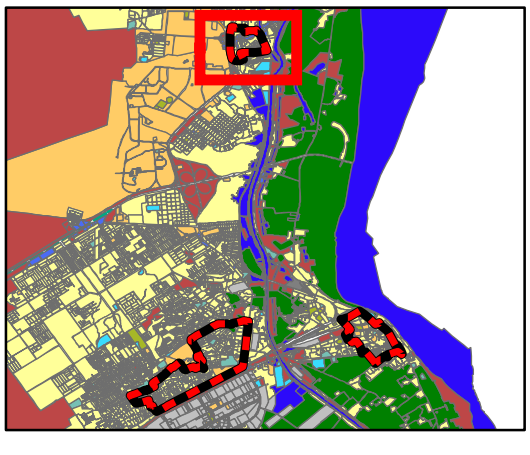

10. ENVIRONMENT

10.1 Existing Situation

The physical environment of District Headquarter (DHQ) Town of Jamshoro District namely Kotri has been described specifically and District Jamshoro in general in this study with respect to the air shed, watershed, geology, soil characteristics, hydrology, and seismicity. Baseline data on the air shed describe the climatic conditions and quality of air. Similarly, baseline data on watershed describe the hydrology and quality of surface and groundwater as well as water availability. Data on Geology, geomorphology, soil characteristics, and seismicity are needed to evaluate the terrestrial resources with respect to agriculture potential and soil characteristics, and stability.

District Jamshoro shares its boundaries with Dadu district on the north, Thatta district on the south, Karachi district on south west, on the east River Indus separates it from Shaheed Benazirabad, Matiari and Hyderabad districts. On the west Kirthar Range runs along the boundary, which separates Sindh from Lasbela district of Baluchistan. The district is administratively subdivided into 5 talukas: Kotri, Jamshoro, Sehwan Sharif, Thana Bulla Khan and Manjhand. Kotri is the district headquarter of district Jamshoro.

10.2 Geography & Soil Topography

District Jamshoro shares its boundaries with Dadu district on the north, Thatta district on the south, Karachi district on south west, on the east River Indus separates it from Shaheed Benazirabad, Matiari and Hyderabad districts. On the west Kirthar Range runs along the boundary, which separates Sindh from Lasbela district of Baluchistan. The district is administratively subdivided into 5 talukas: Kotri, Jamshoro, Sehwan Sharif, Thana Bulla Khan and Manjhand. Kotri is the district headquarter of district Jamshoro.

The topography within 3 kilometers of Kotri is essentially flat, with a maximum elevation change of 29 meters and an average elevation above sea level of 22 meters. Within 16 kilometers is essentially flat (154 meters). Within 80 kilometers contains significant variations in elevation (820 meters).

The area within 3 kilometers of Kotri is covered by cropland (55%) and artificial surfaces (29%), within 16 kilometers by bare soil (53%) and cropland (35%), and within 80 kilometers by bare soil (47%) and cropland (45%).

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10.3 Ecological Baseline

The land in the western part of the district is mostly arid with some vegetation. Due to the hilly nature of the land, cultivation is scarce due to dependency on rainwater. Kirthar mountain range is on the west along the district boundary with District Dadu. From these hills, numerous perennial streams originate that bring rain water to the otherwise dry arid plains.

Irrigated croplands are on the eastern border alongside the Indus River mostly in taluka Sehwan and Kotri. The climate of this district is pleasant. In summer, the northern part (Sehwan) is hotter than other parts of the district. The winters are dry and cold in this district. Due to arid land, harsh weather, scarcity of surface water, the flora and fauna are not very rich and diverse. Kirthar national park, second largest national of the country, is situated in the west of the district. Mahal Kohistan Wildlife sanctuary is also situated in Kirthar National Park.

10.3.1 Flora

Due to arid land, hot weather and scarcity of rain the flora of the district is not very attractive and rich. Most of the floral species belong to the category that can survive in such harsh weather. Commonly found shrubs include Kirir (Caparis aphyla), Khabar (Salvadora oleoides), Thuar (Euphorbia caudicifolia) (desert plant), Khabar (Salvadora persica), Calotropis procera), Lai (Tamarix aphylla), Lawa (Tamarix dioca), Ber (Ziziphus numularia), Sar-kana/kaanhn (Saccharum spontaneum), Gugal (Commiphora wightii). Among trees Lohiro (Tecoma undulate), Kunbhat (Acacia Senegal), Babur/Babul (Acacia nilotica), Baori (Acacia Jacquemontii), Kandi (Prosopis cineraria), Mesquit, devi (Prosopis juliflora) are commonly found. Species of grass and herb found in the region include Lumb (Aristida adscenciones,) Lumb (Aristida funiculate), Bhurt (Cenchrus biflorus), Dhaman (Cenchrus ciliarus), Putar (Chrysopogon aucheri), Poi (Cymbopogon jawarncusa), Dubh (Desmostyches bipinnata), Sain (Lasiurus sindicus), Senor (Rhazia stricta), Jhil (Indigofora oblongifolia), Kandero (Alhaji maurorum).

10.3.2 Fauna

Wildlife

Mammals in the park include Asiatic leopard (Acinonyx jubatus venaticus), Stripped Hyena (Hyaena hyaena), Desert Wolf (Canis lupus), Indian Fox (Vulpes bengalensis), Sindh Wild Goat (Ibex) (Capra aegagrus blythi), Urial (Gad) (Ovis aries vignei), Honey Badger (Mellivora capensis), Indian Pangolin (Manis crassicaudata), Caracal (Caracal caracal), Jungle cat (Felis chaus), Jackal (Canis mesomelas), Chinkara Gazelle (Gazella bennettii), Black Buck (Antilope cervicapra), Hedgehog (Erinaceinae), Porcupine (Erethizon dorsatum), Mongoose (Herpestidae), Cairo Spiny mouse (Acomys cahirinus) and the Rock Mouse (Chaetodipus intermedius).

Birds

Birds may include; Lammegier vulture (Winter Migrant) *(Gypaetus barbatus)*, Bonnelli's eagle *(Aquila fasciata)*, Griffon vulture *(Gyps fulvus)*, Egyptian vulture *(Neophron percnopterus)*, Close-Barred

Draft

sandgrouse *(Pteroclididae)*, Houbara bustard *(Chlamydotis undulata)*, Grey partridge *(Perdix perdix)*, Stone Curlew *(Burhinidae)*, Finche lark *(Ammomanes phoenicura)*, Hoopoe *(Upupa)*, shrikes *(Laniidae)* and Wheatears *(Oenanthe)*. Resident bird species that are commonly found in the area include crows, doves, mynas, sparrows

Reptiles

Reptiles found in the region, are The Rock python *(Python sebae)*, Sindh cobra *(Serpentes)*, Russell's viper *(Daboia)*, Saw scaled viper *(Echis carinatus)*, Sindh krait *(Bungarus sindanus)*, Royal rat snake *(Elaphe obsoleta obsoleta)*, Tortoises, Monitor lizard *(Varanus)*, Sindh Crocodile (possibly extinct) and different species of lizard and chameleon. Other reptiles are getting rare because of aridity which has in general reduced the biodiversity of the area. Indian Monitor lizard (Varanus bengalensis) Wadhi Go/Gioh (reported but not spotted), and Monitor lizard (Varanus griseus) were neither reported nor spotted.

Livestock

Natives maintain herds of cows, goats, and sheep as a source of livelihood because of limited agricultural opportunities. Livestock and ruminants include: Buffalo *(Bubalus bubalis)* Domestic Goat *(Capra hircus)*, Domestic Sheep *(Ovis aries)*; Cattle (*Bos taurus*); Domestic Donkey (*Equusasinus*).

Indus River Riparian Zone

Taluka Sehwan, Manjhand and Kotri are situated along the Indus River. The riverine forest in riverine zone of these talukas have now reduced to small patches due to conversion of these areas to agricultural land.

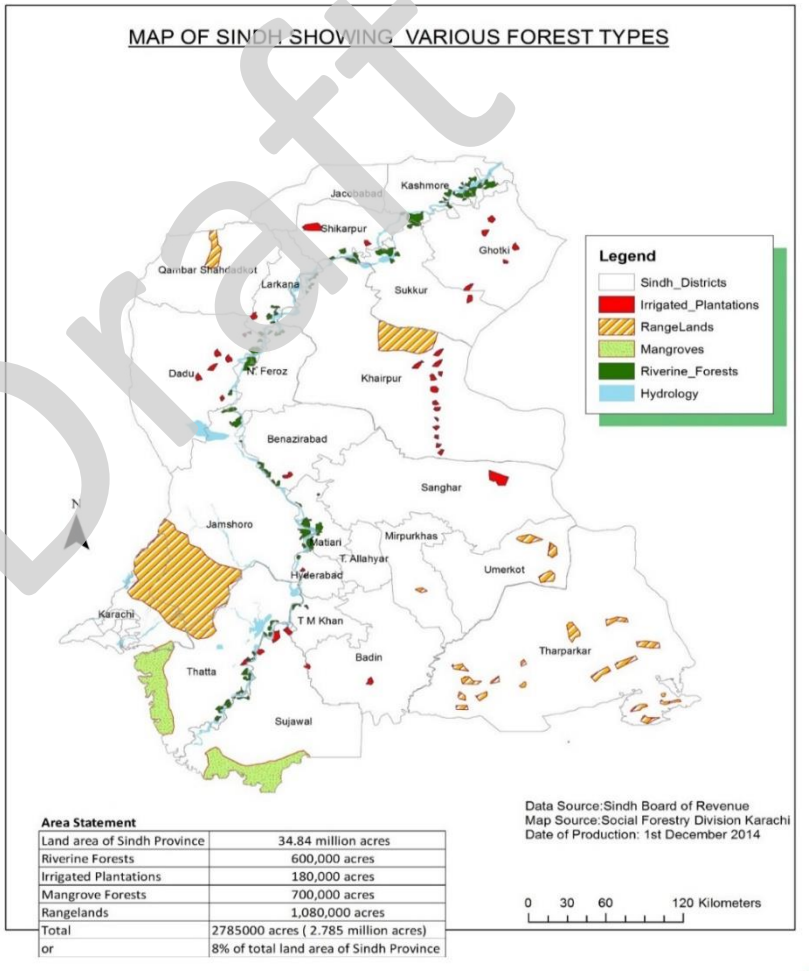

Figure 10-1: Map showing locations of riverine forest and Rangeland in Sindh

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Rangelands

Rangelands are grasslands, shrub lands, woodlands, wetlands, and deserts that are grazed by domestic livestock or wild animals. District Jamshoro has a huge area of land designated as rangeland. It is situated at south-southwest of the district, adjacent to Karachi and Baluchistan.

10.4 Ecologically Sensitive Areas

Kirthar National Park is a huge reservoir of wildlife in the Sindh Province of Pakistan. The Kirthar Range forms the boundary between the lower Indus plains and Southern Baluchistan. The Park is in the Kirthar Mountains between Karachi and Jamshoro Districts of Sindh. It was established in 1974 and stretches over 3,087 square kilometers (1,192 square miles).

Kirthar is a mountain range which consists of a series of parallel rock hill ridges. It is at the elevation of 4,000 feet (1,200 meters) on the South and about 8,000 feet (2,500 meters) on the North. The range lies between Baluchistan and Sindh Provinces of Pakistan. It stretches towards Southward for about 190 miles (300 kilometers) from the river Mula in the central East of Baluchistan to Cape Monze (Muari), Mubarak village near Karachi along the Arabian Sea.

Kirthar National Park spreads on a vast area, in the South-Western side of Sindh. It is the home of historical Ranikot fort as well. This is a dry arid land of huge landscapes of desert with rugged hilly terrain which lies parallel to the nearby hills which entwines in the stony valleys. It is one of the largest national parks of Pakistan where a large number of animals ranging from mammals, birds and reptile species take refuge in the perfect natural environment. In this context, Kirthar National Park is famous for its uniqueness and richness in natural beauty and cultural heritage.

Kirthar National Park is home to two wildlife sanctuaries — Hub Dam Wildlife Sanctuary and Mahal Kohistan Wildlife Sanctuary. Mahal Kohistan Wildlife Sanctuary falls within the boundaries of District Jamshoro.

10.5 Ambient Air Quality and Noise

Monitoring Approach

Five monitoring sites were strategically selected to capture representative air and noise conditions in Kotri City:

1. **Al Madina Chowk Kotri:** bustling commercial zone activity and traffic.
2. **Near Kotri Phattak:** heavy traffic as it serves as an entry point to the SITE.
3. **Near Geo Pharma Chowk in SITE Area:** large-scale industries and a steady flow of large trailer trucks.
4. **Miskeen Colony in Khuda ki Basti:** densely populated area with congestion.
5. **Near Benazir Bhutto Flyover Jamshoro:** – regional traffic inflow.

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Findings

All samples were analyzed against **Sindh Environmental Quality Standards (SEQS)** (November 2023).

- **Air Quality:**
  - Most parameters (CO, NO_2, NO, O_3, PM_{10}, SPM, Pb, SO_2) were within SEQS limits at most sites.
  - **Exceedances identified:**
    - **$PM_{2.5}$:** 89.2 µg/m³ at Muhammadi Chowk (SEQS limit: 75 µg/m³).
    - **CO:** 4.62 mg/m³ at Nafees Filling Station (above SEQS limit).

Noise Levels: The noise level is measured at 62.3 dB(A), which is below the SEQS limit of 75 dB(A), suggesting a relatively peaceful environment with acceptable noise pollution levels.

Implications

- **Air Pollution Risks:** Commercial and transport nodes pose rising risks of fine particulate pollution ($PM_{2.5}$) and CO, with direct health impacts (respiratory, cardiovascular).
- **Noise Pollution:** Chronic noise exceedances in bazaar and bypass areas highlight urban livability issues, linked to stress, sleep disruption, and productivity decline.
- **Spatial Pattern:** Exceedances are clustered in **high-traffic corridors and core bazaars**, suggesting transport management and commercial zoning are critical interventions.

Given the documented environmental conditions of District Jamshoro, including flat topography with varied land uses, arid zones, and ecologically sensitive areas such as Kirthar National Park and riparian zones along the Indus River, the environmental strategy must prioritize: I. protection and restoration of natural habitats and biodiversity hotspots to preserve ecological balance; II. sustainable management of air and noise pollution, especially in commercial and transport corridors exceeding environmental quality standards; III. enhancement of water resource management and drainage infrastructure to mitigate flood risks and support urban resilience; and IV. integration of environmental safeguards in urban planning to balance development with conservation, ensuring long-term ecological health and community well-being.

10.6 Issues and Problems

- Water logging and salinity
- Water Contamination
- Low quality of surface water that is not fit for drinking
- Seismic Risk
- Aging of surface drainage canal system
- Inner city air is polluted by high volume of traffic.

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10.7 SWOT Analysis:

ENVIRONMENT			
Strength	**Weakness**	**Opportunity**	**Threats**
Land			
1. Quite fertile land at some areas suitable for development.	1. Unplanned land uses 2. Limited availability of govt. land for future spatial growth 3. Incomplete development of agricultural land parcels (scattered agricultural growth) 4. Poor administration by agencies monitoring urban growth of the city.	1. If treated through appropriate urban design principals & standards, can be transmitted into mixed land uses and strong activity centres. 2. May increase productivity cultivated at full strength.	1. Land shortage for new development. 2. Slum formation 3. Contamination of land in un-irrigated areas. 4. Land is utilized for the disposal of garbage disposal.
Fresh Water Bodies			
1. River Indus itself is a big water body available.	1. Water contamination due to waste disposal	1. Kotri Barrage can be used for fish farming.	1. Contaminated water is a serious threat for human health 2. Standing water gives birth to diseases 3. Water logging 4. Environmental degradation
Climate			
1. Suitable for producing crops.	1. Rainfall shortages affect the efficiency of river water 2. Ponds contaminated by Industrial effluents put damaging impact.	1. Agricultural practices can be changed in accordance with weather condition for maximum production.	1. Droughts 2. Heavy rains affects agricultural production 3. Heatwaves 4. floods
Air			

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ENVIRONMENT			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Rich Air quality is good for human health, and also keeps ecological balance in atmosphere.	1. Inner city air is polluted by high volume of traffic. 2. Burning of garbage or other disposable effluents also put damaging impact on the air quality.	1. Development planned with respect to air circulation can provide relief to inner city's polluted environment. 2. Community Engagement to reduce air pollution	1. Air pollution 2. Respiratory diseases
Urban Area & Areas Suitable for Urban Development			
1. Land available for future development within town urban boundary.	1. Loss of agricultural land through land development for housing purpose 2. Water logging 3. Unplanned growth inside town. 4. Lack of utility services.	1. Mixed land uses may create activity centers. 2. High density will overcome housing shortages.	1. Land grabbing 2. Slums 3. Unplanned growth 4. Threat to agricultural land 5. Private sector may increase the cost of services.

From SWOT analysis environmental response cannot rely solely on new interventions; that it must be delivered through a multi-faceted approach: (i) rehabilitation and functional upgrading of existing natural and urban systems including water management, pollution control, and soil conservation; (ii) targeted interventions to reduce risks related to water logging, salinity, and air pollution in priority areas; and (iii) sustainable land use planning that balances development pressures with ecological preservation and resource efficiency. This phased approach supports both immediate environmental health and long-term resilience for the community and ecosystems.

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10.8 Policy Guidelines[66]

- Enhancing role of local governments in sustainable management of natural resources
- Conservation of biological diversity, protection and sustainable use of indigenous flora and fauna
- Sustainable Management in Reserved, Protected, Flora and Fauna
- Management of irrigated and linear plantations
- Promotion of indigenous species
- Increase the efficiency of surface drainage.

[66] National Forest Policy 2010

10.9 Strategic Development

i. Long Term Plan

- Drainage can be improved on many sites and is the first thing to consider once a waterlogging problem has been identified. Options might vary from shallow surface drains (ie. Spoon- and 'W'-drains) to more intensive drainage using wide-spaced furrows, to the intensive drainage form of raised beds
- Achieving sustainable development, while overcoming environmental challenges such as land degradation, watersheds and marine fisheries, deforestation, waste management and pollution control, and climate change
- Multi-pronged approach to fisheries management should be adopted that takes account of economic, environmental, and social performance

ii. Short Term Plan

- Ensuring environmental sustainability
- Need of Permits to discharge waste and pollutants into the environment;
- Restoration and maintenance to preserve ecological cycles, functions and services of environment
- Rehabilitate degraded ecosystems and create environmental awareness
- Develop and implement policies that integrate the objectives of conservation and development to reduce pressure and protect environmental values and conserve biodiversity
- Fostering public-private partnerships
- Rehabilitation of Irrigated plantation
- Enhance Rangeland production and planting fodder trees for farmer community
- Improvement and Rehabilitation of Forests Parks
- Afforestation of Blank Reaches along Important Highways

Environmental management interventions in Kotri City and Jamshoro District will be integrated with municipal infrastructure planning, focusing on improving surface drainage, controlling pollution discharge, conserving local biodiversity, and rehabilitating rangelands and forested areas. These efforts will enhance ecosystem resilience, reduce environmental degradation from flooding and drought, and promote sustainable development that balances urban growth with the protection of natural resources across the district.

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11. DISASTER RISK MANAGEMENT PLAN

11.1 Existing Situation

The lands of this district are mostly arid with some vegetation. Due to the hilly nature of the land, cultivation is scarce in this district. Irrigated croplands are on the border alongside the Indus River.

Geologically Jamshoro contains the exposed Cenozoic rocks from Paleocene to Recent Deposits. The Paleocene is exposed in the Ranikot area in the form of Khadro, Bara and Lakhra Formations with clastic and carbonate Lithology. The exposed formation of Eocene age is Laki Formation. Nari Formation of Oligocene age, Gaj Formation of Miocene and Manchhar Formation of Miocene- Pliocene ages are exposed at various localities in the district. The surface is covered by a recent cover of unconsolidated surficial deposits of silt, sand, and gravel.[67]

It starts from Petaro near Jamshoro (start point of M-9 motorway) and terminates near Sehwan. Most of the area is flat while some reaches are rolling. No major agriculture activity was found in this section.[68]

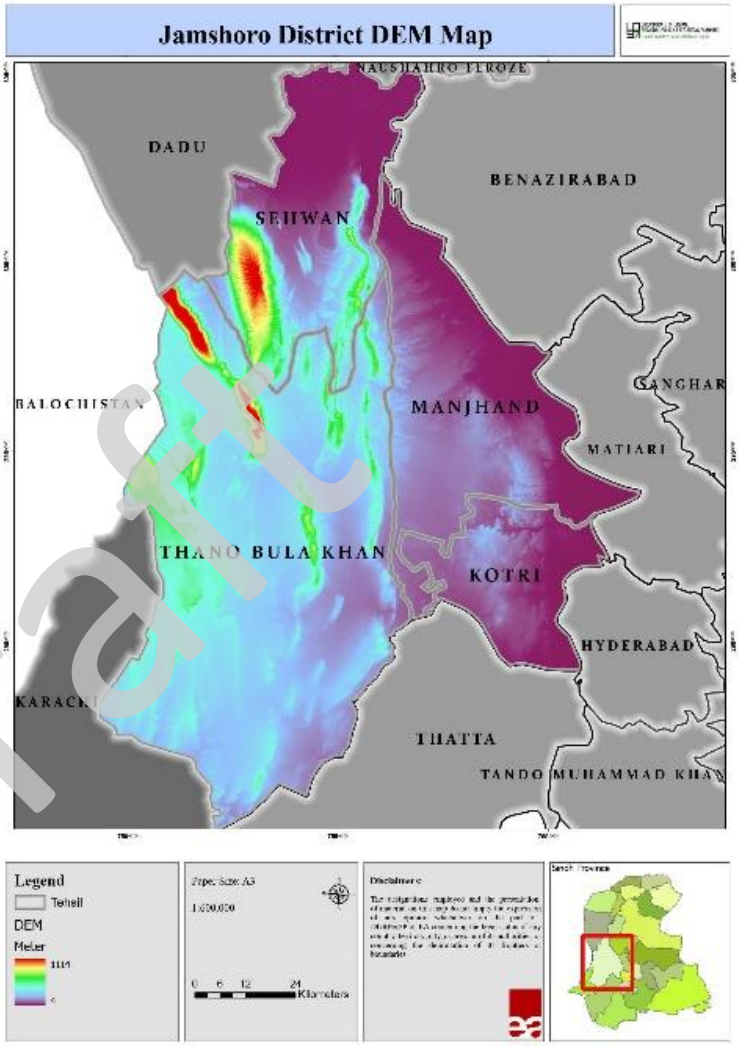

Figure 11-1 DEM Map of Jamshoro

Given the district's arid and hilly terrain, scattered vegetation, and limited irrigated cropland mainly along the Indus River, disaster risk management must prioritize: I. strengthening resilience of infrastructure to withstand geological and climatic challenges; II. improving early warning and response systems tailored to flood, drought, and seismic risks; III. ensuring effective drainage and land management to reduce flood vulnerability; and IV. enhancing community awareness and capacity-building for disaster preparedness and recovery aligned with local environmental and socio-economic conditions.

[67] https://www.scribd.com/document/172676460/Geology-of-Sindh-District
[68] https://www.adb.org/sites/default/files/project-documents/48404/48404-003-iee-en.pdf

Jamshoro District DEM Map

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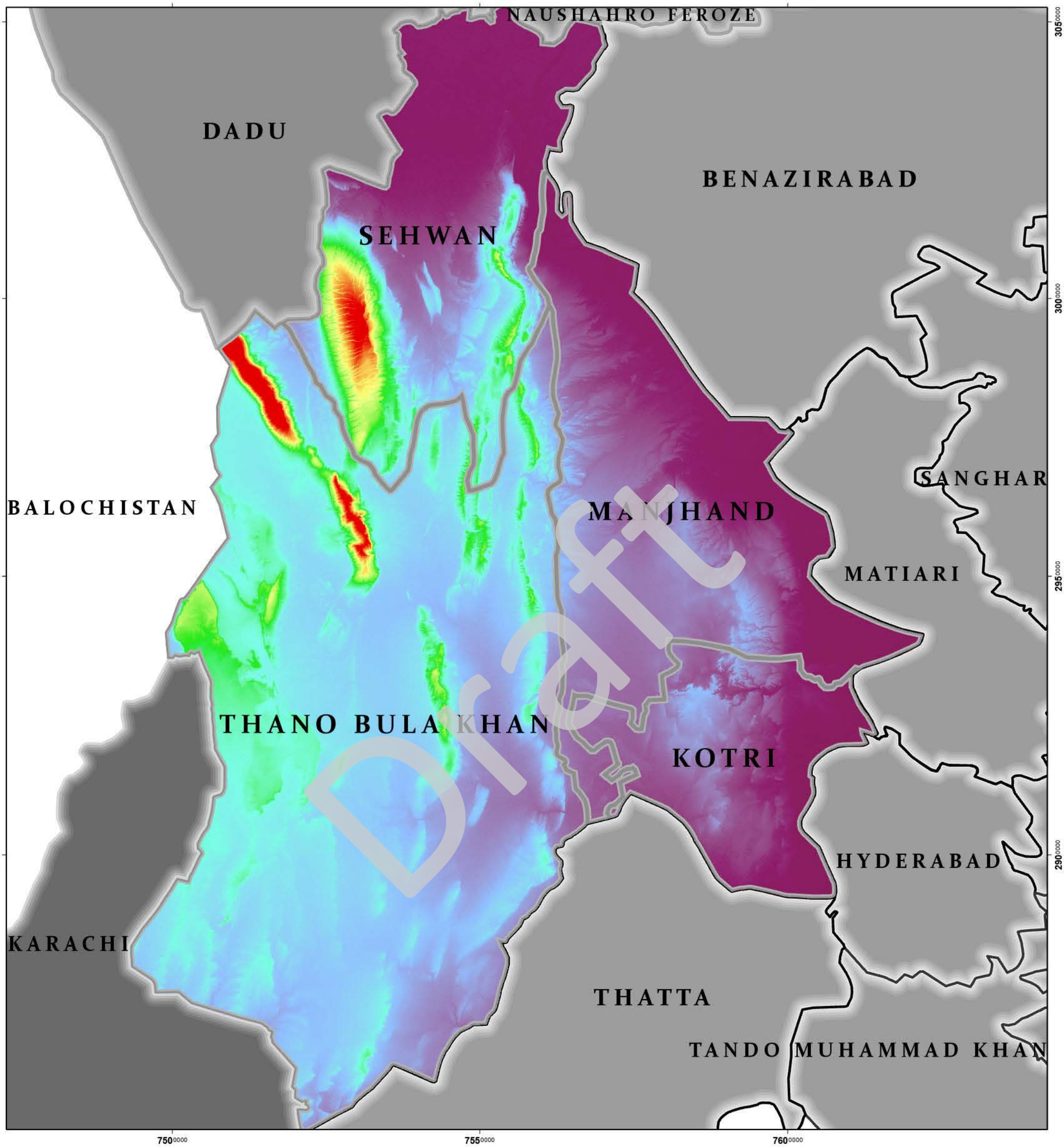

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Sindh Province

11.2 Disasters

11.2.1 Floods/Rains

Jamshoro District was severely affected by the floods and heavy rains of **2010 and 2011**, with the relative severity ranked as **high**. In the **2010 floods**, a population of about **395,700 persons (49% of the district's population)** across **16 union councils** was impacted, with **8 injuries** reported. Around **84,088 houses** were damaged, while **69,421 households** and **553 villages** were directly affected. The agricultural sector also suffered heavily, with **39,133 acres of crop area damaged in 2011**, pushing already vulnerable communities deeper into poverty. The floods exacerbated food insecurity in the district, leaving Jamshoro on the borderline of crisis, as indicators of availability, access, utilization, and stability reflected a dismal situation.[69]

11.2.2 Impacts of floods 2022 in Jamshoro

The 2022 monsoon had equally destructive impacts. At district level:

- **Population:** affected population was 382,295 (38.04%), with 263,286 displaced. 48 deaths, 26 injuries, and nearly 17,169 livestock losses were recorded.
- **Housing:** 61,750 houses were affected, 18,460 homes suffered partial damage and 43,290 fully destroyed.
- **Agriculture:** About 25,527acres (6.26%) of crops were damaged or lost.
- **Livestock:** Thousands of animals drowned or fell sick due to lack of fodder, shelter, and clean water.[70]

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[69] Flood 2010, Disaster Management Apparatus in Sindh, PDMA Sindh
[70] Flood 2022 In Sindh (pdma.gos.pk)

11.2.3 **Flash Flooding**

The area between Indus Highway N-55 and Indus River i.e, Khanpur and area along Indus River in Kotri city i.e, Muhajir Colony and inhabitants living along Derya Band are more vulnerable for floods because of unavailability of embankment and storm water drainage. The area surrounding to Jamshoro Phattak is vulnerable to flood due to unavailability of stormwater drainage

11.2.4 **Flood Risk Areas**

The northern areas towards Jamshoro TC and eastern parts of the MC Kotri, characterized by larger catchment areas, are more susceptible to flooding. The presence of major roads and railway lines in these regions could exacerbate the risk of flooding and waterlogging.

- **Major Roads:** Key roads such as **Indus Highway (N – 55), Karachi – Hyderabad Motorway (M – 9), National Highway (N – 5), Hyderabad – Jamshoro Road, Karachi Canal Road** intersecting the catchment areas and streams These intersections are critical points that might impact water flow and present potential flood risks.

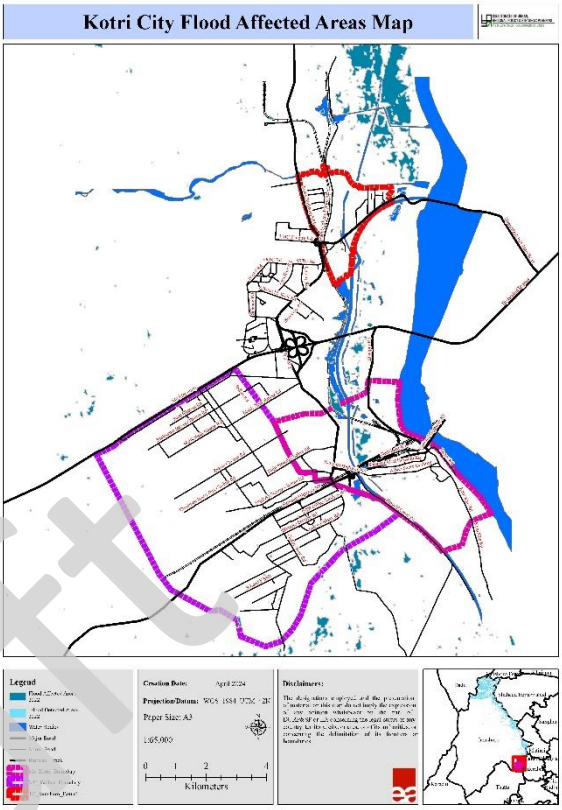

Figure 11-2 Flood Affected Areas in Kotri City during Flood 2022

- **Railway Lines**The map shows abandoned railway line, which play a significant role in the city's drainage patterns and potential waterlogging areas.

11.2.5 **Food Security**

The losses to crops and livestock along with the poor functioning capacity of the markets reduced the expected income of the population of this district. Thus, the floods and rains affected people of the district Jamshoro had to face a number of key challenges to recover their livelihood, agriculture and livestock; directly affecting the food security situation.[71.]

[71] Pakistan Emergency Situation Analysis - District Jamshoro, August 2014 - Pakistan | Relief Web

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Kotri City Flood Affected Areas Map

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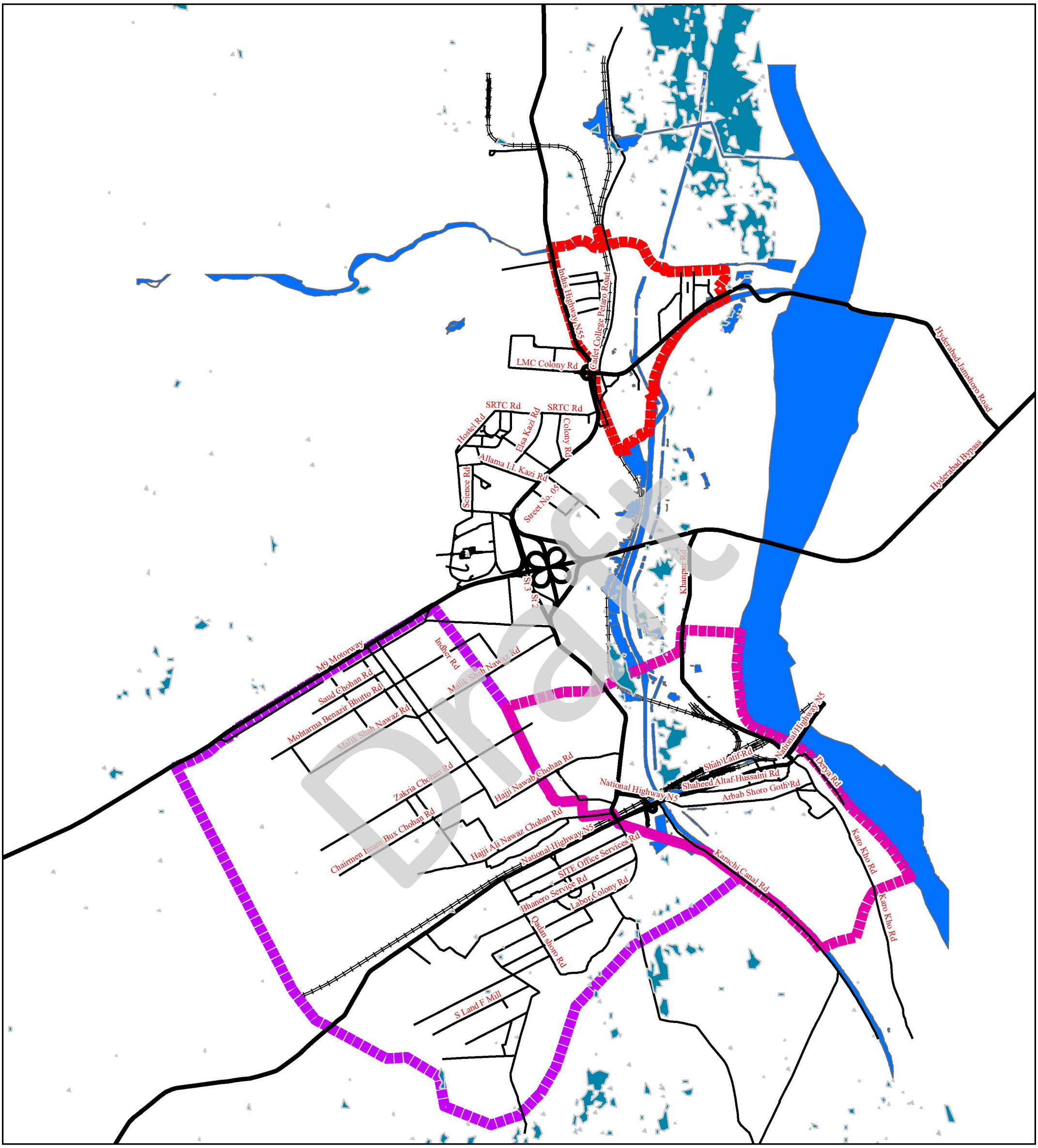

Legend

- Flood Affected Areas 2022
- Flood Detected Areas 2022
- Water Bodies
- Major Road
- Minor Road
- Railway_Track
- Mc_Kotri_Boundary
- MC_Bolhari Boundary
- TC_Jamshoro_Bound...

Creation Date: April 2024

Projection/Datum: WGS_1984_UTM_42N

Paper Size: A3

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Kilometers

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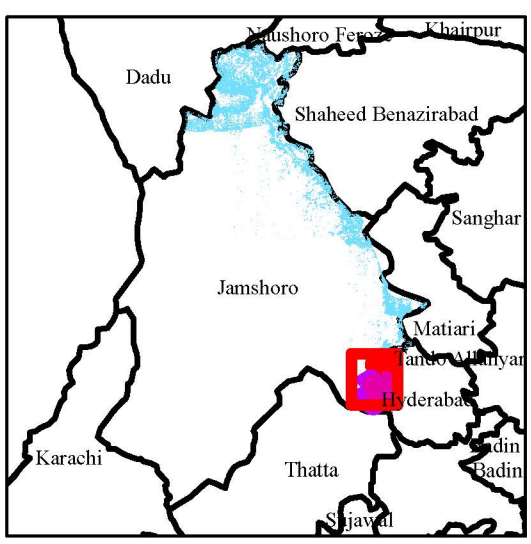

11.2.6 **Earthquake**

The Seismic zoning map of Pakistan (2015) places Jamshoro in Zone 2A and 2B which corresponds to possibility of minor to moderate seismic hazards i.e. probability of earthquakes of intensity (MM Scale) 6 to 7.5.

Accordingly, a seismic risk factor of 0.1 needs to be incorporated in the design for constructions and installations in the coastal zone, for operational basis earthquakes (OBE) pertaining to damage due to moderate level earthquakes.

11.2.7 **Heatwave**

The cause of heatwave in Sindh can include a combination of meteorological factors such as high temperatures, low humidity, and stagnant air masses. Urbanization, deforestation, and climate change can also contribute to the frequency and severity of heat waves in the region.

To prevent heatwaves in Sindh, several measures can be taken, including:

- Implementing heat health warning systems and public education campaigns to increase awareness of the risks of heat waves and ways to stay cool and hydrated.
- Improving access to water and electricity to ensure people have access to cooling systems.
- Implementing measures to reduce greenhouse gas emissions and mitigate the effects of climate change.
- Implementing measures to conserve water and reduce water usage to ensure that there is enough water available for cooling and other essential uses during heatwaves.
- Improving urban design and reducing the urban heat island effect by increasing green spaces and using reflective surfaces to reduce heat absorption.[72]

11.2.8 **Drought**

A drought is generally defined as a period of below-average precipitation in a given region, resulting in prolonged shortages in the water supply. A drought can last for months or years and can have a substantial impact on the environment, ecosystem, and agriculture of the affected region. Sindh is experiencing an increase in the frequency and severity of drought due to a rise in temperatures and a decrease in the amount of rainfall during the summer season. It is rapidly becoming one of the worst disasters in Pakistan as a result of the drought in Sindh. According to the Pakistan Meteorological Department, severe to extreme drought-like conditions have emerged over most of southern Pakistan. Sindh faces moderate to severe drought conditions in 8 districts, the drought hazard analysis showed that the Qambar Shahdad Kot, Shikarpur, Jacobabad, Sanghar, Khairpur, Sukkur, Tharparkar and Umerkot are exposed to very severe drought hazard class. The Sindh Province is historically susceptible to drought. History shows major droughts in the distant past, with more recent dry periods still within living memory. Sindh faced the worst drought situation in 1871, 1881, 1899, 1931, 1942, 1999, 2003, 2020, 2021 and 2022.

The 1999 drought persisted till the year 2002. Around 1.4 million people, 5.6 million cattle head, and 12.5 million acres of the cropped area were affected. The groundwater depleted to 30-40 feet, and the quality

[72] Heatwave - PDMA_SINDH

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became poor. Between October 2020 and March 2021, the impact of La Nina caused below-normal rainfall in drought-prone areas of Sindh (-77.3%). Several districts in the province experience drought conditions which have resulted in increased food insecurity. An estimated 1.8 million people are expected to experience acute food insecurity and 530,000 people emergency levels of food insecurity from March to June 2021 in drought-affected districts, according to the Food Security Sector.

Types of Droughts

- **Meteorological Drought** is the amount of dryness and the duration of the dry period. Atmospheric conditions that result in deficiencies of precipitation change from area to area.

- **Hydrological Drought** is associated with the effects of periods of precipitation shortages on water supply. Water in hydrologic storage systems such as reservoirs and rivers is often used for multiple purposes such as flood control, irrigation, recreation, navigation, hydropower, and wildlife habitat. Competition for water in these storage systems escalates during drought and conflicts between water users increase significantly.

- **Agriculture Drought** mainly affects food production and farming. Agriculture drought and precipitation shortages bring soil water deficits, reduced groundwater or reservoir levels, and so on. Deficient topsoil moisture at planting may stop germination, leading to low plant populations.

- **Socioeconomic Drought** occurs when the demand for an economic good exceeds the supply as a result of a weather-related shortfall in the water supply.[73]

11.2.9 Industrial Disasters

Kotri, being an important part of Jamshoro district, faces potential risks from industrial and petrochemical activities. The district lies close to transport routes such as **pipelines, highways, and railways**, which carry hazardous fuels and chemicals, while fertilizer and processing units within the area further increase exposure to accidents. Pakistan's reliance on imported hazardous chemicals and petrochemicals, combined with inadequate regulation, storage, and transport safety, adds to these vulnerabilities. Risks also arise from petroleum exploration, production, and fertilizer industries, which, if not properly managed, can endanger local communities and strategic installations. To minimize the impact of such emergencies, the establishment of a **National Industrial Disaster Management Contingency Plan (NIDMCP)** is essential, while at the local level Kotri requires strict enforcement of safety measures, occupational standards, and effective emergency response systems.

[73] Drought - PDMA_SINDH

11.2.10 **Air quality**

The Ambient Air Quality Test (15-Nov-2023) highlights satisfactory in Kotri. While most pollutants were within acceptable ranges, PM2.5 levels reached 33.6 µg/m³, that particulate matter is within safe levels, though PM10 is approaching the upper limit. exceeding the Sindh Environmental Quality Standard (75 µg/m³). Persistent noise pollution levels were also satisfactory recorded at major locations (Kotri Phattak, Al Madina Chowk Kotri, Miskeen Colony, Geo Pharma Chowk in the S.I.T.E Area, Benazir Bhutto Flyover in Jamshoro). The exceedances pose severe health risks, including respiratory and cardiovascular diseases, hearing impairment, and neurological stress. Without urgent interventions, air and noise pollution could become a chronic urban disaster for public health.

11.2.11 **Waste Crisis**

Kotri City faces a mounting **waste crisis**. Survey results indicate **72% of residents dispose of waste** informally, while only 21% depend on municipal sweepers, causing environmental degradation and water contamination. Current waste generation is 160647 kg/day (2025), projected to rise to 300,065 kg/day (2045). This type of waste primarily comes from healthcare facilities such as Bilawal Medical College Hospital with 300 beds, Taluka Hospital with 30 beds, and Civil Hospital LUMHS in Jamshoro providing a substantial 700 beds, collectively 1030 beds. The total generation from these facilities amounts to approximately 679.8 kg of hazardous waste per day. Lack of infrastructure, segregation, and disposal systems makes solid waste a growing environmental and health disaster.

11.2.12 **Water Contamination**

Water quality tests from Kotri City show severe microbial contamination, with 4 of 5 samples exceeding TBC toatal bacteria count limits. The pH levels recorded above 8 in these samples. Additionally, the elevated turbidity levels exceeding the permissible limits in two samples indicate the presence of suspended particles or impurities. Residents report objectionable taste in drinking water, further signaling poor quality. This contamination threatens not only human health but also increases the risk of outbreaks of cholera, diarrhea, and typhoid in flood-prone and low-income areas.

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11.3 Public Safety

Public safety is the priorities principal of any governance whether it is Federal, Provincial, Divisional or District.

To spread terror in residents, terrorists mainly focused / target crowded places e.g. educational institutions, stadium, shopping centres, malls, religious centres, institutional setups like press club etc., which are less protected in Sindh especially. Terrorist activities can be performed in any shape but mainly on crowded places.

- **Crowded Places**

  Crowded places will remain an attractive target for terrorists, who have demonstrated that they are likely to target places which are easily accessible, regularly available and which offer the prospect for an impact beyond the loss of life alone (for example serious disruption, or a particular economic/political impact).

- **Identification of Land uses for Potential Terrorists Attack**

  Consultant identified different land uses in Kotri City which are potential crowd pulling places.

Table 11-1 :Potential Terrorists Threat

S. No	Landuse	Terrorist Threat
1	**Education**	Secondary Schools/College/ University
2	**Health**	BHU/Hospitals/Medical Collages
3	**Commercial**	CBD/Mandi/shopping mall
4	**Religious**	Eid Gah / Shrines/Minority Religious Places/Imam Barghas
5	**Government Offices**	District Court/DC Office/SSP Office/District Jail/Police Head Quarter/LEA
6	**Recreational**	Tourism Places
7	**Transportation**	Bus Stop/Railway Station/Airport

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Existing Situation for Public Safety

Public safety remains a pivotal aspect of urban planning and management. Recognizing the vulnerability of crowded places to security threats, including terrorism, the analysis adheres to the National Counter Terrorism Authority's directives and the National Internal Security Policy 2018-2023. This policy underscores a comprehensive approach integrating law enforcement, technological advancements, public awareness, and community involvement.

Kotri City has several public gathering areas that are considered high-risk zones due to their significant foot traffic and importance to the community's daily functions:

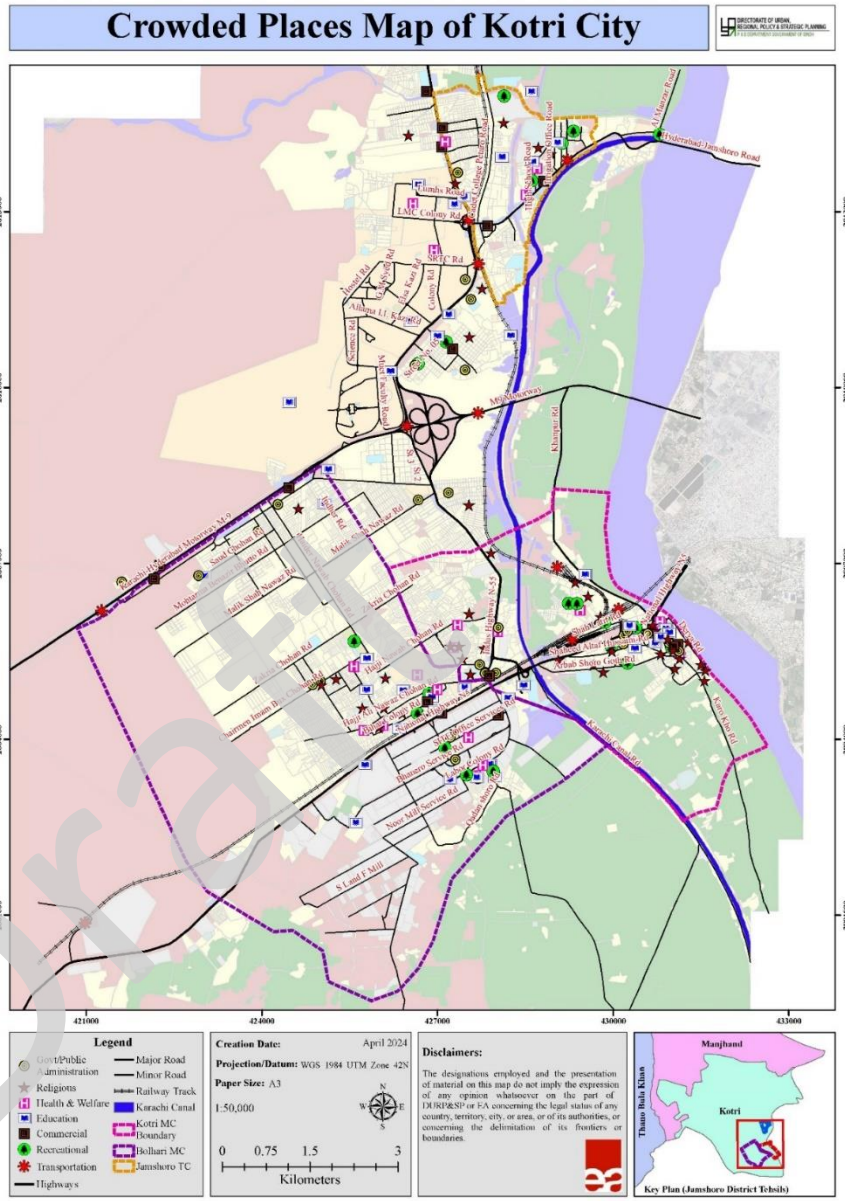


Figure 11-3: Crowded Places of Kotri city

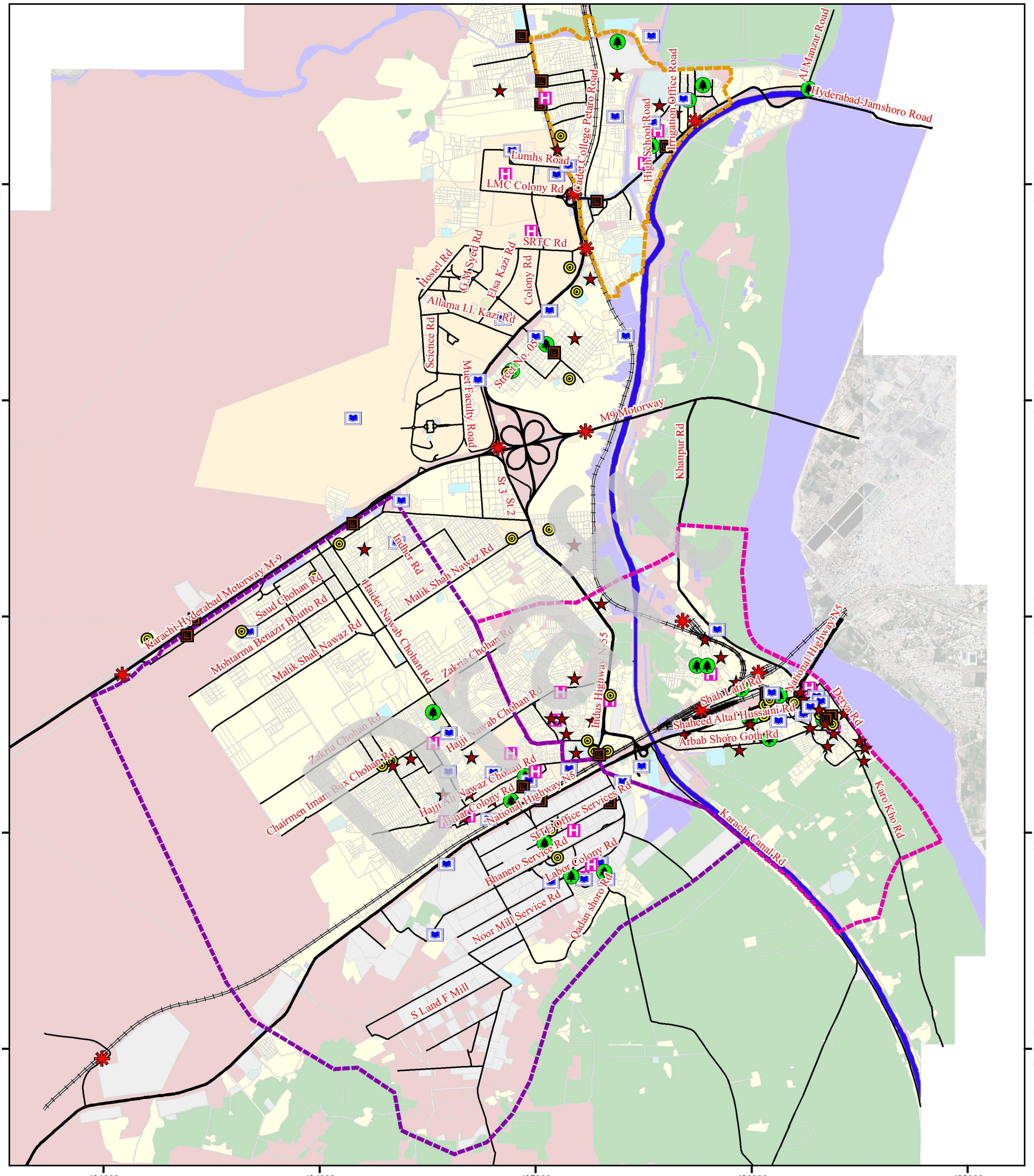
- **Religious Facilities:** Mosques, temples, and churches.
- **Commercial Areas:** Shopping centers, markets, and commercial streets.
- **Educational Institutions:** Schools and universities.
- **Health Facilities:** Hospitals and large clinics.
- **Recreational Areas:** Parks, sports complexes, and community centers.

Institutional & Policy Framework

Disaster risk management in Jamshoro District, including Kotri, is governed by the National Disaster Management Act, 2010 and the Sindh Provincial DRM Policy. At the provincial level, the Provincial Disaster Management Authority provides overall policy direction, while at the district level the District Disaster Management Authority functions as the primary coordinating institution under the chairmanship of the Deputy Commissioner. The DDMA integrates all key line departments including irrigation, health,

Crowded Places Map of Kotri City

DIRECTORATE OF URBAN, REGIONAL POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVERNMENT OF SINDH



Legend

- Govt/Public Administration
- Religious
- Health & Welfare
- Education
- Commercial
- Recreational
- Transportation
- Highways
- Major Road
- Minor Road
- Railway Track
- Karachi Canal
- Kotri MC Boundary
- Bolhari MC
- Jamshoro TC

Creation Date: April 2024

Projection/Datum: WGS_1984_UTM_Zone_42N

Paper Size: A3

1:50,000

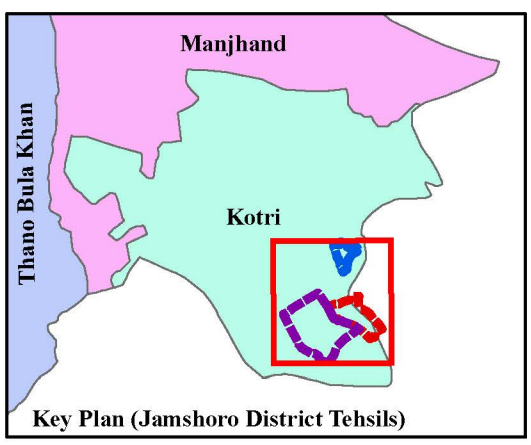
N W E S

0 0.75 1.5 3

Kilometers

Disclaimers:

The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of DURP&SP or EA concerning the legal status of any country, territory, city, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.



Key Plan (Jamshoro District Tehsils)

education, agriculture, livestock, police, social welfare, and works and services, along with representation from the business community, NGOs, civil society, municipal committees, and elected representatives.

Within this framework, municipal committees hold a central role as the immediate service delivery institutions in urban areas. They are responsible for maintaining municipal infrastructure such as drainage, sewerage, water supply, solid waste management, and fire services, all of which are critical for disaster preparedness and response. During emergencies, municipal committees provide frontline support through dewatering operations, restoration of sanitation services, clearance of debris, fire safety response, and ensuring continuity of essential urban utilities. Their close coordination with taluka and union councils allows for rapid mobilization of resources and localized interventions.

The District Emergency Operation Centre supports the DDMA by providing early warning dissemination, monitoring, inter-agency coordination, and public communication. At the local level, taluka administrations and union councils translate district-level policies into community action. Union councils, as the lowest governance tier, engage communities in preparedness, advocate for resources, and support small-scale initiatives such as rainwater harvesting, evacuation planning, and food storage. Community-based organizations complement these efforts by mobilizing volunteers for early warning, first aid, evacuation, search and rescue, and firefighting.

Despite this multi-tiered structure, key challenges persist. Stakeholder participation in the DDMA is often uneven, with limited active involvement from certain departments, municipal authorities, and civil society actors. This weakens coordination, delays rehabilitation, and reduces the effectiveness of early warning systems. Municipal committees, while central to service delivery, frequently lack the equipment, staffing, and financial capacity to sustain disaster management operations, especially in flood-prone and densely populated areas.

Strengthening this institutional and policy framework requires embedding DRM functions across all levels of governance. The DDMA must ensure regular training, simulation exercises, and coordination meetings with taluka administrations, municipal committees, and union councils. Municipal committees need targeted investments in equipment, technical staff, and contingency planning to enhance their ability to respond swiftly to urban disasters. Greater engagement of NGOs, the private sector, and civil society will ensure a more inclusive, accountable, and resilient system.

In summary, Jamshoro's institutional framework for disaster risk management is multi-layered, with the Provincial Disaster Management Authority setting policy, the DDMA ensuring district-wide coordination, municipal committees leading service delivery in urban areas, taluka and union councils implementing actions at the community scale, and CBOs providing the first line of defense. If strengthened and made more participatory, this system can significantly reduce vulnerabilities, improve preparedness, and enhance resilience to floods, droughts, heatwaves, and other hazards that regularly impact Jamshoro and Kotri City.

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The city currently faces challenges in its surveillance capabilities, particularly the lack of CCTV facilities in vital areas. This gap not only affects business operations within local markets by potentially deterring customers concerned about safety but also compromises overall public safety. Furthermore, evaluations of existing security measures have highlighted vulnerabilities, including inadequate surveillance in commercial zones and insufficient emergency protocols in educational settings.

Concerned authorities have not come up with any plan for terrorist's activities / attack to reduce potential threats, incident management, crisis management, business / life continuity and recovery phases.

Proposed Strategy to Counter Potential Threat Measures

Proposed Strategy for Protecting Crowded places from Terrorism is based on strong, trusted partnerships between all levels of government and those responsible for crowded places. It aims to make crowded places as resilient as possible to terrorist attacks while preserving our use and enjoyment of these places. A nationally consistent approach will help achieve this objective in an effective and efficient manner.

The Strategy involves four core elements which provide a structure for building a consistent national approach to protecting crowded places that can be applied flexibly.

- **Building Stronger Partnerships**
- **Enabling Better Information Sharing and Guidance**
- **Implementing Effective Protection Security**
- **Increasing Resilience**

Building Stronger Partnerships

Protecting crowded places from terrorism is not just a job for governments, it is a responsibility shared by the private sector and the community. The success of this Strategy rests on sustainable and strong partnerships between all governments and owners and operators of crowded places, including businesses and local governments.

Trusted relationships between governments and owners and operators of crowded places are fundamental to the effective implementation of this Strategy. The Crowded Places Partnership sets out a range of mechanisms to support this engagement, but none of these replace the ability for all police and intelligence agencies to engage directly with owners and operators when required.

Enabling Better Information Sharing and Guidance

Protecting crowded places from terrorism in an evolving threat environment requires trusted and routine information sharing and guidance between all governments, industry sectors, business, and communities. It is a key responsibility of government to ensure those who own and operate crowded places have access to high quality threat information.

The flow of information between governments and those responsible for crowded places is not one-way. Owners and operators should be willing to share information, advice, and lessons they have learned with governments and their peers. Building a strong and inclusive security culture is a responsibility shared by all.

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Implementing Effective Protection Security

Implementing protective security measures can be a complex process which, if done incorrectly, can be costly and ineffective. Owners and operators have a responsibility to undertake a risk assessment and/or vulnerability analysis of their crowded place, implement the appropriate mitigations, monitor them for effectiveness (including through audits), and review them at appropriate junctures.

- **Guidance**

  Before owners and operators make decisions about protective security measures, they must first understand how attractive their location may be for a terrorist to attack.
  Crowded places encompass a significant range of different locations, venues and businesses. They differ substantially in size and have different levels of risk to manage.

- **Layered Security**

  The goal of layered security is to reduce the likelihood of a successful terrorist attack on a crowded place by building multiple layers of redundancy into a site's security architecture.
  Layered security describes the practice of securing a site by applying multiple layers of complementary protective security measures.

  The following represents some examples of protective security measures that can be used within each layer. Some security measure can strengthen multiple layers. For example, the effective use of security officers can help to delay, detect, deter, respond to, and recover from an attack.

  Deterring a potential terrorist attack can involve the presence of obvious physical and electronic target hardening measures, including:
  - Fencing indicating demarcation;
  - Perimeter security lighting;
  - Warning signs and notices;
  - High visibility security patrols;
  - CCTV cameras;
  - Perimeter vehicle security barriers.

Detecting a potential terrorist attack can occur through visual detection and alert systems, including:
- CCTV cameras;
- Electronic intruder detection systems;
- Reporting of suspicious behaviour by security officers, staff, or members of the public;
- Vehicle screening and searching;
- Canine explosive trace detection;
- Screening—x-ray machines, metal detectors, explosive trace detection, and bag inspections.

Delaying a potential terrorist attack can occur through physical counter-measures and other approaches including:
- Security fences;
- Environmental barriers including water features, natural topography, and vegetation;
- Vehicle security barriers and measures to slow the speed of vehicles;
- Pedestrian and vehicle access control points;
- Trained staff interventions;
- Rapid security officer response.

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Responding to a potential terrorist attack requires a timely and coordinated security response throughout a crowded place's area of control. Important elements of response include:

- Security staff who can respond quickly and possess the requisite training, competence and equipment to deal with or limit the impact of threats to the location;
- Reliable emergency communication systems throughout the location;
- Comprehensive security plans that are understood by all staff and security personnel, regularly exercised, and compatible with local emergency services plans.

Cost and Proportionality

Security measures can be resource intensive, costly and, if not correctly managed and communicated, can alienate staff and the public and significantly disrupt the day-to-day operations of a crowded place. This is why expert specialist advice is essential and why careful consideration and planning is required before implementing any protective security measures. The following principles should underpin all decision-making:

- It is not possible to protect everything, so owners and operators must **prioritise** the highest risk areas of a crowded place;
- All protective security measures should be **proportionate** to the level and type of threat;
- Security is more **cost effective** when incorporated into the design phase of a crowded place.

Reputation

The success of governments and businesses rests on building and maintaining a good professional reputation. Reputation is prone to serious and permanent damage if owners and operators of crowded places give a less than robust, responsible professional priority to protecting people against attack. Being security minded and better prepared could not only deter an attack, it reassures customers and staff that those responsible for crowded places are taking security issues seriously.

Recovery

Recovery from a terrorist attack is the process of rebuilding, restoring and rehabilitating affected individuals, communities, and physical assets. This process usually begins once an incident has been resolved, continues until disruptions have been rectified, demands on services have returned to normal levels, and the needs of those affected have been met.

Increasing Resilience

Even the most the most robust and thorough protective security plan may not stop a terrorist attack on a crowded place from occurring or succeeding. But what well-considered and tested protective security does is reduce both the likelihood of a terrorist attack occurring and the consequences of such an attack.

Resilient crowded places can do more to prevent a terrorist attack, can reduce the damage caused by an attack, and can recover more quickly after an attack has occurred. Building a strong security culture is central to developing resilience to terrorism and other types of criminal activity.

Other elements of building an effective security culture can include:

- Ensuring that security is a permanent feature of executive decision making and agendas;
- Requiring senior management to demonstrate personal commitment to and compliance with security values and standards;
- Understanding commercial, reputational and legal risk that could result from inadequate protective security measures being in place to prevent or mitigate a terrorist attack;

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- Providing staff with clear, succinct and jargon-free guidance about security standards and procedures;
- Promoting good security practice to both staff and visitors by making use of internal communication systems, posters, message boards and newsletters;
- Adopting effective and lawful staff screening processes during recruitment;
- Providing staff training in security practices;
- Exercising all staff in security scenarios;
- Self-initiated security penetration and breach testing;
- Sharing information with staff about security breaches;

Encouraging and rewarding staff for identifying and reporting security vulnerabilities

11.4 Issues and Problems

- Low levels of risk awareness and knowledge.
- Development not "risk conscious" and DRR not yet effectively integrated.
- Insufficient DRR capacity at all levels of society.
- The involvement of the private sector in DRR is as of yet negligible.
- Riverine Flood
- Food Security Problem

The disaster risk management strategy must address the multifaceted vulnerabilities exposed by recurrent floods, droughts, seismic threats, industrial hazards, and environmental pollution in Jamshoro district and Kotri city. Priorities include: (i) strengthening flood resilience through improved drainage, embankments, and early warning systems in high-risk zones affecting over 38% of the population; (ii) enhancing water quality monitoring and contamination control to prevent disease outbreaks in vulnerable communities; (iii) mitigating industrial disaster risks via strict enforcement of safety regulations and emergency preparedness; (iv) managing air and noise pollution to safeguard public health; and (v) implementing comprehensive waste management to counter the growing solid and hazardous waste crisis. This integrated approach will reduce disaster impact, protect livelihoods, and improve overall safety and sustainability for the region's population.

11.5 Policy Guidelines[74]

- Provide training and awareness courses to district, municipal and local authority personals dealing with management of hazard prone areas
- Develop public awareness materials (e.g. posters, brochures, booklets, videos).
- Update media about its role in disaster risk management process and how awareness through media can be broadcasted to local community
- Arrange and conduct need assessments of damages / losses.
- Ensure application of proper mechanism for evacuation and relocation of affected community to safer places.
- Establish Relief Camps with necessary arrangements.

[74] National Disaster Risk Reduction Policy 2013

- Initiate relief and rescue activities in their respective areas with the help of all stakeholders which also include provision of shelter, food, medicines etc. to the affected communities as well as to IDPs who are settled in makeshift Relief camps
- Arrange coordination meetings with health units.
- Mobilize entire health network functioning in the district for situation analysis and need assessments.
- Arrange mobile teams / Mobile Medicine Units for pre-medication of affected communities in all near and remote areas.
- Delegate responsibilities for regular inspection and maintenance of irrigation channels and drains.
- Coordinate and communicate with DDMA.
- Identify and strengthen the vulnerable points in the banks of all canals and drains running through the district.
- DRM plans and initiatives need to be based upon assessments that identify the nature and degree of vulnerability or risk (including the identification of particularly vulnerable groups), that allow prioritizing problems or geographical areas on a rational basis and that inform the design of appropriate and technically sound DRM interventions.
- DRM initiatives need to build upon existing community organizations and relevant coping mechanisms to be sustainable.
- Clearly defined division of roles and responsibilities between different layers of government.

11.6 Strategic Development

The aim of the policy is to advocate an approach to disaster management that focuses on reducing risks – the probability of losing one's life or health, assets and livelihoods.
Some of the objectives in this aspect includes

I. Long Term Plan

- There is a need to have clear arrangements that allow the system to switch into emergency mode and mobilize necessary resources in a timely and effective manner.
- There is need to clarify mutual roles and responsibilities (horizontal and vertical) and coordination arrangements in an updated, multi-hazard national response plan that is based upon current legislation.
- The DSM, PPHI shall also be responsible for providing medical cover to the IDPs in the catchment area of BHUs assigned to them particularly, and will perform their due role in supplementing the overall medical cover provided by the District Health Department.
- National risk assessment would identify highly vulnerable districts and be complemented by higher resolution work at local level to diagnose the underlying causes of risk, explore concrete risk reduction options and inform development planning and prioritization exercises and/ or disaster preparedness planning.

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- DRR needs to address and involve local level actors in high-risk communities to be effective and produce sustainable results.
- There is need to clarify mutual roles and responsibilities (horizontal and vertical) and coordination arrangements in an updated, multi-hazard national response plan that is based upon current legislation.

II. Short Term Plan

- Develop coordination mechanism with PMD for ascertaining flood discharge.
- Develop mechanism for regulation of water discharge into canals, distributaries and drains before onset of monsoon season.
- Develop monitoring mechanism for inspection of embankments, weak parts of drains, IPs (inspection parts) and NIPs (Non-Inspection Parts) of all irrigation channels.
- Provide necessary medical facilities at relief camps.
- Close coordination and communication with DDMA.
- Depending on the calamity, the D.H.O will declare emergency at all medical points/health facilities.
- Detail of medical/paramedical staff at all points requiring medical health cover during any disaster.

Disaster risk management initiatives will be integrated with municipal infrastructure planning, emphasizing flood control through improved drainage, embankment maintenance, and water discharge regulation. Coordination with health services, emergency response, and local authorities will ensure timely evacuation, relief, and medical support. Public awareness, hazard mapping, and stakeholder engagement will strengthen community resilience. This integrated approach will minimize disaster impact, enhance recovery capacity, and maintain essential services during emergencies, fostering long-term safety and sustainability for vulnerable populations.

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11.7 Priority Projects

i. Provision for Emergency Shelter and Disaster Resilience Hub

The devastating floods of 2010, 2011, 2022, and now 2025 have highlighted the growing frequency and severity of such disasters, with climate change further intensifying their impact. These recurring events underscore the urgent need for a designated emergency shelter site.

This project proposes the development of an Emergency Shelter and Disaster Resilience Hub on a strategically located, elevated site that is both resilient to flooding and easily accessible from the main road, with strong connectivity to the major route leading toward Karachi parallel to the M9, which will serve the nebhouring cities and region as well. A feasibility study will be conducted prior to development to ensure suitability and long-term viability.

The hub is planned on a 634-acre site, to be developed in phases. Guided by the Sphere Handbook (2018)[75] and UNHCR Settlement Planning Standards which recommend approximately 45 m² of land per person for

[75] The Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response (Fourth Edition)

planned settlements,[76] the full site will accommodate around ≈57,016 people. In the initial phase, ≈95 acres will be developed to serve approximately 8,550 people. This allocation aligns with the NDMA Pakistan Minimum Standards of Relief in Camp (2024)[77], which emphasize prioritizing essential facilities in the early stages. These will include shelters, washrooms, storage areas, boundary walls, and administration units, Energy-efficient lighting, Fire points & evacuation routes and PWD consideration, while preserving space for future expansion.

The phased approach ensures that immediate humanitarian needs are met in a safe, organized, and energy-efficient manner, while retaining the flexibility to scale up in response to future disasters. Ultimately, this initiative will strengthen the capacity of the district government and relevant authorities to provide timely food, shelter, and disaster management support to affected populations, without disrupting the city's normal operations.

- **Scope**

This project aims to develop a dedicated Emergency Shelter and Disaster Resilience Hub on a strategically selected elevated site in Kotri city to address the urgent need for safe, accessible refuge during increasingly frequent and severe flood events.

Key project elements include:

- Establishment of a phased emergency shelter facility designed to accommodate displaced populations safely and efficiently during disasters.
- Construction of essential infrastructure such as shelters, washrooms, storage areas, boundary walls, and administrative units to support shelter operations.
- Integration of energy-efficient lighting, fire safety points, evacuation routes, and accessibility features for persons with disabilities.
- Location of the hub on a flood-resilient, elevated site with strong connectivity to major transport routes, facilitating quick access for affected communities and emergency services.
- Implementation of a flexible, scalable design allowing phased expansion to meet future disaster response needs.
- Conducting a feasibility study prior to development to ensure site suitability and long-term operational viability.
- Facilities to include shelters, sanitation blocks, storage, boundary walls, administrative offices, lighting, fire safety infrastructure, and accessible pathways.

- **Size**

- The project will be developed on a 634-acre site strategically positioned to serve Kotri and neighboring cities, with excellent connectivity to the main road network, including the major route toward Karachi.
- Initial phase development of approximately 95 acres, accommodating around 8,550 people with essential facilities aligned to NDMA Pakistan relief standards.

[76] Principles & Standards for Settlement Planning | UNHCR
[77] https://www.ndma.gov.pk/public/storage/publications/July2024/uJlDaTd4UluJgi5QUJgP.pdf

- Planned full-site capacity for approximately 57,016 people, based on Sphere Handbook and UNHCR Settlement Planning standards recommending ~45 m² per person.

➢ **SDG'S Alignment**

I. **GOAL 2 – Zero Hunger:** The emergency shelter will facilitate the distribution of food and essential resources to disaster-affected populations, directly contributing to the goal of ending hunger. By providing a safe and accessible space for food distribution, the project aligns with SDG 2.1, which focuses on ensuring access to safe and nutritious food for all people during emergencies.

II. **GOAL 4 – Good Health and well-Being:** Equipped with essential facilities like washrooms and storage, the shelter will help mitigate health risks during disasters, providing clean living conditions for affected communities. This aligns with SDG 3.9, which aims to reduce health risks from disasters by improving living conditions and access to medical care.

III. **GOAL 6 – Clean Water and Sanitation:** The shelter will include necessary sanitation facilities, such as washrooms, to prevent the spread of waterborne diseases. By providing clean water and proper sanitation, the project supports SDG 6.2, which seeks to ensure access to adequate and equitable sanitation and hygiene for all, particularly in emergency settings.

IV. **GOAL 7 – Affordable and clean energy:** Incorporating renewable energy solutions, such as solar-powered lighting, the shelter will ensure access to sustainable energy, even in times of crisis. This aligns with SDG 7.2, which focuses on increasing the share of renewable energy in the energy mix.

V. **GOAL 11 – Make cities and human settlements inclusive, safe, resilient and sustainable:** By establishing a resilient and well-planned emergency shelter, the project contributes to building sustainable, disaster-resilient urban communities. This supports SDG 11.5, which focuses on reducing the number of people affected by disasters and enhancing disaster preparedness and response.

➢ **Implementing Authority:** District Disaster Management Authority (DDMA), Kotri Municipal Committee, Bolhari Municipal Committee, Jamshoro Town Committee.

➢ **Preliminary cost estimate: 350 million PKR Approx.**

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Table 11-2 Disaster Management Projects Estimated Cost (Kotri City)

S. No.	Project Name	Estimated Cost In Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Disaster Management Project						
1	Feasibility study for Emergency Shelter and Disaster Resilience Hub	50	-	Non ADP	**Short Term**	-
2	Procurement for land for Emergency Shelter and Disaster Resilience Hub	300	-	Non ADP	**-**	Long Term

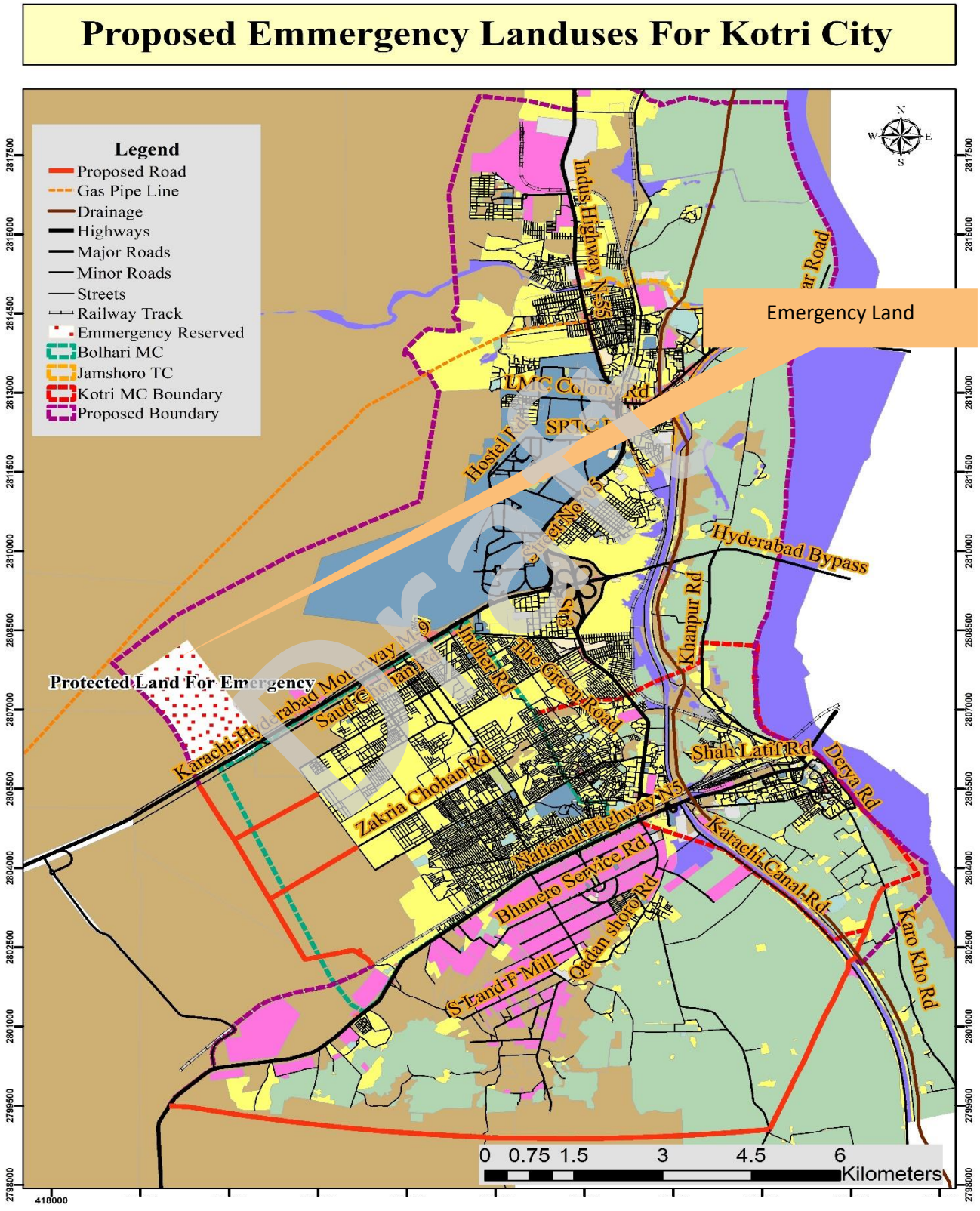
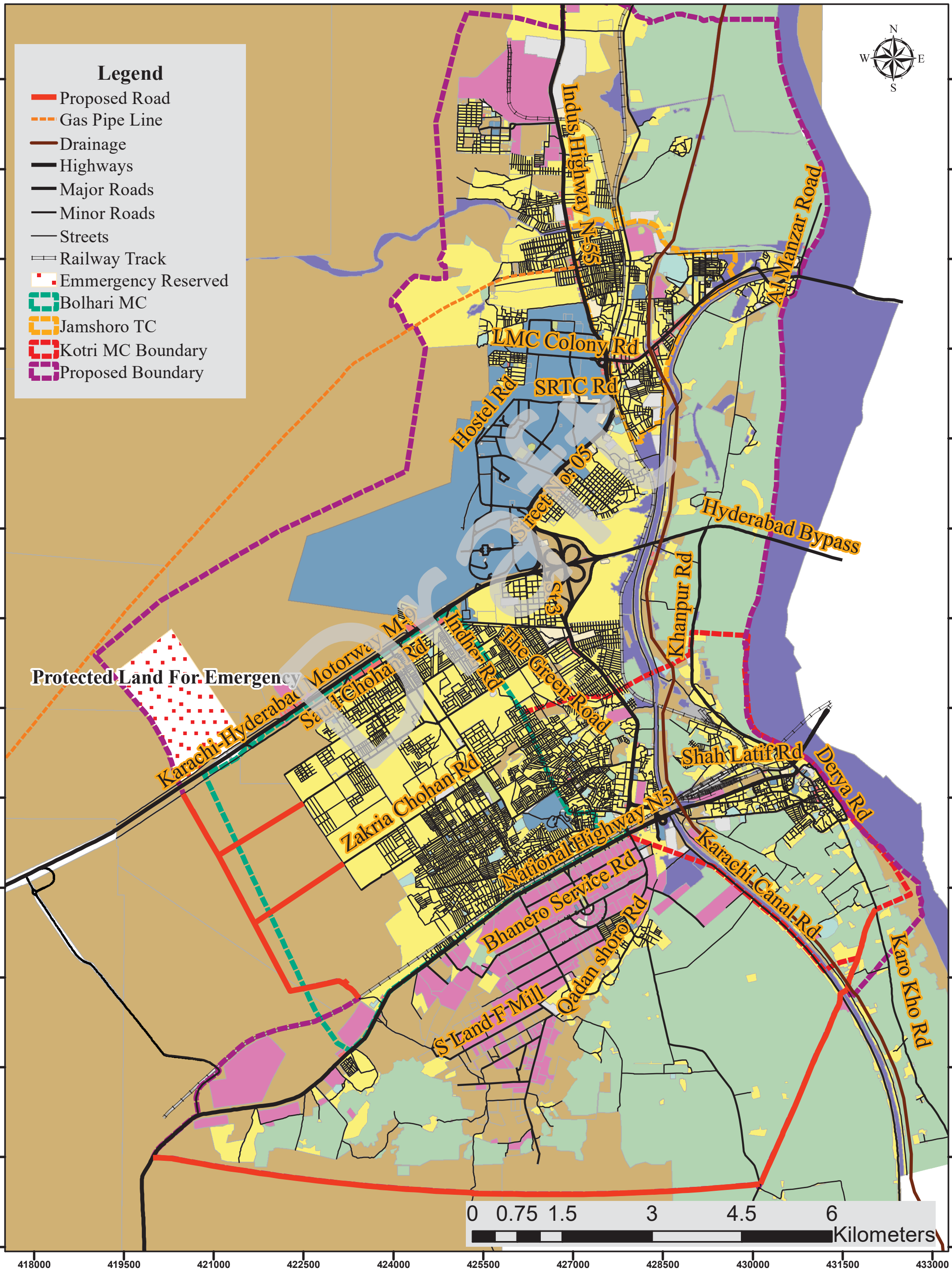


Figure 11-4 : Proposal for Emergency Landuse for Kotri City

Proposed Emergency Landuses For Kotri City



12. CLIMATE CHANGE EMERGENCY CONTINGENCY PLAN

Climate change has become an urgent global concern, posing serious threats to both natural ecosystems and human societies—Sindh being no exception. Characterized by long-term changes in temperature and precipitation patterns, climate change is already disrupting the environmental equilibrium and socio-economic structure of the province. The increasing frequency and severity of extreme weather events—such as floods, droughts, heatwaves, rising sea levels, and erratic rainfall—are clear indicators of this shift.

Scientific evidence points to human activities, particularly greenhouse gas emissions since the Industrial Revolution, as the primary drivers of climate change. In Sindh, rising temperatures are accelerating glacier melt in the northern regions, leading to unpredictable river flows. While this may temporarily boost water availability, it is expected to result in long-term freshwater shortages, further aggravating the existing water crisis in many communities.

Rising sea levels, projected to increase by 18 to 36 cm under low-emission scenarios and up to 59 cm under high-emission scenarios, pose a significant threat to coastal regions of Sindh, including major urban centers such as Karachi, Thatta, and Badin. These areas are increasingly vulnerable to coastal erosion, saltwater intrusion into freshwater supplies, and the displacement of local populations.

Sindh, the second-largest province of Pakistan, features a remarkably diverse geographical landscape. It includes deserts, wetlands, riverine and mangrove forests, mountainous and hilly regions, fertile agricultural lands, and an extensive coastline. This diverse terrain makes the province particularly susceptible to the wide-ranging impacts of climate change, as evidenced by the increasing frequency and intensity of natural disasters.

Shifting rainfall patterns are expected to bring more intense and frequent downpours from the mid-21st century onward. These changes threaten to worsen urban flooding in cities and disrupt agriculture, a key pillar of Sindh's economy.

> *With the evolving world, the words like global warming, greenhouse effect, CO_2 emission & carbon footprint, relentless use of fossil fuel, rising sea temperature resulting in rising sea levels, heatwaves, glaciers melt down at a faster pace resulting in GLOF (Glacial Lake Outburst Floods), unprecedented and extreme weather conditions, floods and droughts, to name a few, are no more new to us. It's high time now that we should acknowledge these issues to find a way out.*
>
> Source: Sindh Climate Change Policy 2022

As climate change affects both industrialized and developing regions worldwide, Sindh must take proactive steps to address these challenges. The government must mainstream climate adaptation and mitigation strategies into the province's medium- and long-term development plans.
To this end, the Sindh Climate Change Policy 2022, developed by the Environment, Climate Change and Coastal Development Department's Directorate of Climate Change, offers a strategic framework for sustainable socio-economic development. The policy seeks to integrate climate resilience across all sectors,

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enhance the quality of life for Sindh's residents, and ensure that the province fulfills its international obligations, including those under the Paris Agreement.

12.1 Climate Trends and Projections – Key Components

12.1.1 Historical Climate Trends

Climate data for Kotri from 2010 to 2023 shows a stable temperature pattern with predictable seasonal variation. Maximum temperatures typically peak around 42°C during the summer months (May to July), while minimum temperatures drop to about 8–10°C in winter (December to January). Average temperatures remain relatively consistent between 25°C and 30°C across the years, indicating a generally hot climate with mild winters. Although no significant long-term warming trend is visually evident, the intensity of summer heat may still pose challenges for health, energy consumption, and overall urban living conditions.

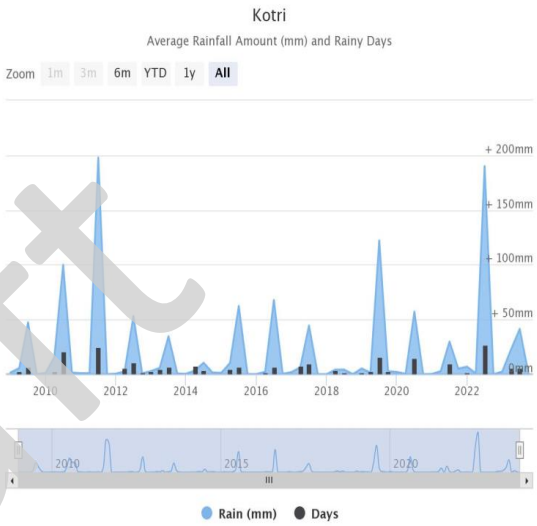

Figure 12-1: Average Rainfall kotri

In contrast, rainfall patterns are highly erratic and unpredictable. Significant rainfall spikes occurred in 2011, 2012, 2020, and 2022, with monsoon months recording over 150 mm of rain, while other years saw very low precipitation, often below 50 mm per month. The number of rainy days remains limited, even during peak monsoon seasons, suggesting a climate prone to dry spells punctuated by sudden heavy rainfall. This variability heightens the risk of flash flooding, especially in low-lying areas, and makes water resource management challenging. To build climate resilience, Kotri must invest in improved stormwater drainage, elevation-based urban planning, and infrastructure capable of withstanding both extreme heat and unpredictable rainfall.

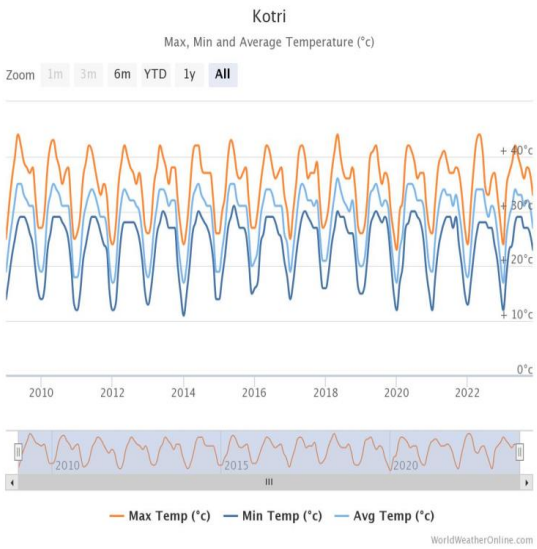

Figure 12-2: Max, Min Average Temperature

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12.1.2 **Expected Precipitation in next 30 years**[78]

The image shows precipitation projections from various climate models across different districts/regions of Sindh, focusing on monthly rainfall changes under different scenarios. The four graphs compare observed and projected precipitation (mm) for various districts of Sindh.

12.1.3 **Precipitation Change in Sindh**

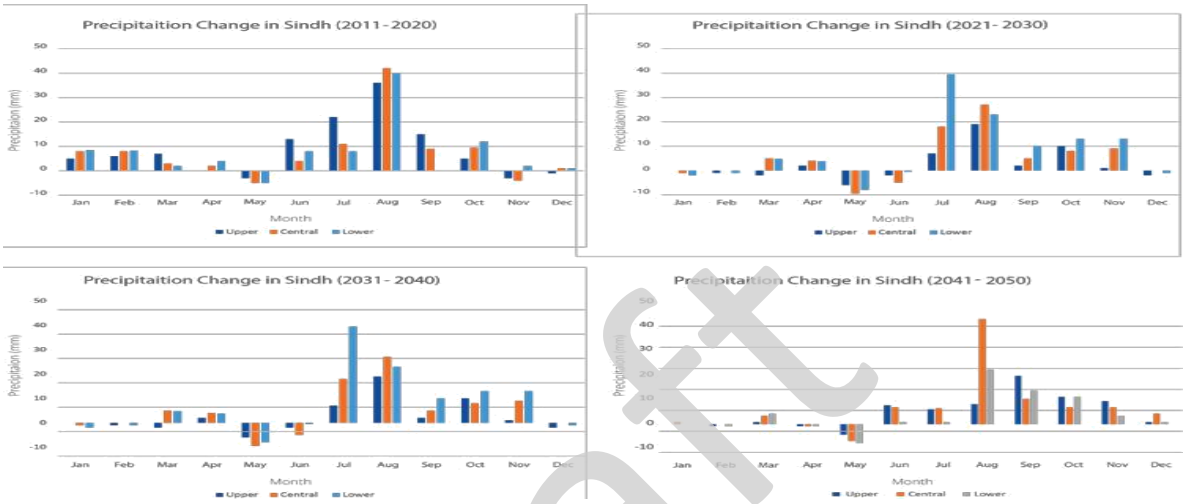

Figure 12-3: Precipitation Change in Sindh from 2011-2050

Precipitation projections for Jamshoro District, where Kotri is located, reveal significant seasonal shifts and increased variability due to climate change. The most prominent trend across the climate models is the intensification of monsoon rainfall, particularly in the months of July and August. These months show sharp spikes in projected precipitation, which exceed historical averages. Such peaks suggest a higher likelihood of intense and concentrated rainfall events, heightening the risk of urban flooding, particularly in low-lying, poorly drained areas like Kotri.

Another key pattern is the high inter-annual variability in rainfall across different model scenarios. Some projections show substantial increases in rainfall, while others predict modest or even reduced precipitation. This indicates a climate future marked by unpredictable monsoon behavior, complicating water resource management and long-term planning. The inconsistency between projections reflects the need for flexible and adaptive infrastructure and disaster preparedness measures.

Outside the monsoon months, the models show little to no increase in rainfall during the rest of the year, suggesting a continuation—or even worsening—of prolonged dry spells. This means Kotri will remain highly vulnerable to drought conditions, groundwater depletion, and agricultural stress, particularly in the absence of reliable irrigation sources.

[78] Sindh Climate Change Policy 2022

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In summary, Kotri is expected to face heavier and more erratic monsoon rainfall, combined with long dry periods and overall increased climate volatility. These trends demand urgent investment in climate-resilient infrastructure, including enhanced stormwater drainage, rainwater harvesting, and early warning systems for both floods and droughts. Proactive adaptation planning is essential to manage the growing risks from these changing precipitation patterns.

12.1.4 Extreme Weather Events

Frequency and intensity of floods, droughts, drought, earth quake are given below in Table 2.

Table 12-1: Hazards Matrix of Jamshoro[79]

Hazard	Frequency	Area Affected / union council	Severity / Force	Year
Riverine floods	Monsoon	Entire district	High	2010,2011
Heavy Rainfall	Monsoon	Entire district	Low	Heavy Rainfall Monsoon Low 2011, 2012, 2013, 2014, 2022
Epidemics	Seasonal	Entire district	Low	Every Year
Drought	Rare	Entire district	High	1999-2002
Earthquakes	Rare	Entire district	Low	2013

The available data clearly outlines the **Hazards Matrix of Jamshoro**, offering an overview of both natural and human-induced risks, along with their frequency, geographical reach, severity, and historical occurrence. Riverine floods, occurring mainly during the monsoon season, are marked as high in severity and have impacted the entire district, with significant events in 2010 and 2011, posing serious risks to lives, infrastructure, and agriculture. Flash floods, while also linked to the monsoon, are less intense and typically affect the western parts of the district. Similarly, heavy rainfall is a recurrent monsoon phenomenon that, despite its low severity, affects the whole district, causing localized flooding and stressing infrastructure during years such as 2011 to 2014 and 2022.

Jamshoro also contends with persistent, lower-intensity hazards. Epidemics occur seasonally and district-wide with low severity, but their annual recurrence indicates ongoing health system vulnerabilities. Drought, though infrequent, is a high-severity hazard, with a major episode recorded from 1999 to 2002, significantly impacting agriculture and water resources. Earthquakes have occurred rarely, with a low-severity event documented in 2013, pointing to some seismic risk. Additionally, transport accidents and fires are frequent but low in severity, happening every year, possibly due to infrastructure challenges and limited emergency preparedness. Overall, Jamshoro experiences a combination of severe and chronic risks, particularly during the monsoon, highlighting the urgent need for robust disaster risk management, early warning systems, and climate-resilient infrastructure planning.

[79] Provincial Disaster Profile - PDMA_SINDH

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Table 12-2: Comparative Overview of 2010 and 2022 Floods in Sindh		
Indicator	**2010 Flood[80]**	**2022 Flood[81]**
Total Affected Districts	17	24
People Died	411	1,093
People Injured	1,235	8,422
Houses Damaged	879,978	2,087,186
Roads Damaged (km)	8,467	8,463
Cropped Area Affected (ha)	1,043,500	3,777,272

A comparison of the 2010 and 2022 flood events in Sindh clearly illustrates the escalating severity of climate-induced disasters. In 2022, not only did the number of affected districts increase to 24 from 17, but human casualties also surged—with over 1,000 deaths and more than 8,000 injuries. Housing damage more than doubled, affecting over 2 million homes compared to under 900,000 in 2010.

Interestingly, while road damage remained relatively constant at around 8,460 kilometers, the scale of agricultural devastation was far greater in 2022, with nearly 3.8 million hectares of cropped area affected—almost four times that of 2010. This has serious implications for food security, rural livelihoods, and economic stability.

Table 12-3: Impacts of 2022 Flood on Jamshoro[82]	
Human Deaths	50
Animal Deaths	17,169
Population Affected	382,295
Displaced Population	263,286
Full House Damaged	43,290
Crops Damaged (Acres)	25,527

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The 2022 floods inflicted severe damage across Jamshoro District, leading to widespread human and economic losses. A total of 50 people lost their lives, and the livestock sector suffered greatly, with 17,169 animal deaths reported. The floods affected over 382,000 individuals, displacing approximately 263,000 people and causing extensive housing damage, with 43,290 homes completely destroyed.

The agriculture sector also endured heavy losses, with more than 25,500 acres of crops damaged, worsening food insecurity and threatening the livelihoods of farming communities. These statistics underscore the urgent need for climate-resilient infrastructure, enhanced disaster preparedness systems, and robust long-term recovery strategies to minimize the impacts of future climate-related disasters in Jamshoro.

[80] Annual Flood Report 2010 of Ministry of Water & Power, GoP
[81] Flood 2022 in Sindh by PDMA, GoS
[82] Flood 2022 in Sindh by PDMA, GoS

12.2 Governance and Institutional Framework

To tackle the challenges posed by climate change, Pakistan has implemented various adaptation measures at both the national and provincial levels.

Climate change is a global issue and poses significant challenges for thinkers, planners, policymakers, and professionals worldwide. It is expected to affect nearly every sector of Pakistan's economy. The Ministry of Climate Change (MoCC) is the primary institution responsible for climate change in Pakistan. It was established following the 18th constitutional amendment in 2010, which resulted in the dissolution of the Ministry of Environment due to the devolution of powers to provincial governments. While environmental matters now fall under provincial jurisdictions, climate change remains a federal issue, as it requires a national response and representation in international climate negotiations.

In recent years, Pakistan has taken several policy and planning initiatives related to climate change, outlined as follows:

12.2.1 National Level Actions

Category	Details
Institutional Evolution	- 2010: Ministry of Climate Change (MoCC) formed after constitutional amendment. - Environment is a provincial matter; climate change remains federal.
Legislation	-1983: Pakistan Environmental Protection Ordinance. -1997: Pakistan Environmental Protection Act.
Research & Institutions	- 2003: Global Change Impact Studies Centre (GCISC) established. - 2005: Environmental Policy Framework based on 1997 Act.
Climate Change Policy	- 2008: Task Force on Climate Change by Planning Commission. - 2012: National Climate Change Policy (NCCP) launched. - 2013: NCCP Implementation Framework.
International Commitments	- 2007: Bali Action Plan – NAMAs introduced. -2015: INDC submitted for COP21. - 2021: Updated NDC—50% emissions reduction by 2030 (with support).
Key Developments	- 2017: National Climate Change Act passed. - Green Climate Fund: USD 249M adaptation/mitigation projects. -2023: National Clean Air Policy. -Vision 2025: Low-carbon economy. - 2014: Billion Tree Tsunami restored 350,000 ha land.

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12.2.2 **Provincial Level Actions (Sindh)**

Category	Details
Directorate General of Climate Change (DoCC)	-Established:2022. - Operational: March 2022. - Liaison between federal government, international bodies, and provincial departments.
Environment, Climate Change & Coastal Development Department	- Formed in 2016 to manage climate, environment, and coastal issues.
Sindh Environmental Protection Agency (SEPA)	- Ensures environmental and public health safety. - Conducts research on pollutants and regulates their use.
Sindh Environmental Protection Act (2014)	-Passed in 2014. - Legal framework for pollution control, environmental protection, and sustainability.
Sindh Climate Change Policy (2022)	-First official climate policy by DoCC. - Notified on July 7, 2022.
Sindh Provincial Action Plan for Climate Change (2018)	-Promotes renewable energy (solar, wind). -Integrated disaster risk management. - Health adaptation (heat, water-related diseases).

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12.3 Institutional Response and Resilience Initiatives in Sindh

To tackle the growing climate and disaster risks, several key initiatives have been undertaken by the Government of Sindh. The **Sindh Resilience Reduction Unit (RRU),** operating under the Planning & Development Department (P&DD), is a pivotal body in mainstreaming Disaster Risk Reduction (DRR) and climate resilience into provincial planning. RRU coordinates with government entities, development partners, and humanitarian agencies to promote resilient infrastructure, inclusive development, and the integration of DRR and climate change adaptation (CCA) into sectoral plans. It also supports the Sindh Resilience Strategy and DRR integration into Annual Development Plans (ADPs), working closely with PDMA Sindh, UN agencies, the World Bank, ADB, and various NGOs.

In response to the 2022 floods, the **Sindh People's Housing for Flood Affectees (SPHF)** was established to lead the Sindh Flood Emergency Housing Reconstruction Project (SFEHRP). With a target of building 2.1 million disaster-resilient houses by June 2025, this $1.5 billion initiative emphasizes inclusive recovery by granting housing ownership rights to women. SPHF utilizes a public-private partnership model and digital systems for transparent beneficiary management. As of early 2025, more than 200,000 homes have been completed, with 700,000 under construction. It also partners with local NGOs to ensure that housing solutions are sustainable and culturally appropriate.

Climate resilience is defined as the capacity for a socio-ecological system to: (1) absorb stresses and maintain function in the face of external stresses imposed upon it by climate change and (2) adapt, reorganize, and evolve into more desirable configurations that improve sustainability of the system, leaving it better prepared for future climate change impacts. "Resilience: The emergence of a perspective for social-ecological systems analyses". Global Environmental Change. 16: 253–267.)

Moreover, the **Sindh Flood Emergency Rehabilitation Project (SFERP),** financed by the World Bank and managed by the P&DD, aims to rebuild critical infrastructure, restore livelihoods, and enhance climate preparedness. The project focuses on repairing flood control systems, roads, and water supply schemes, while also expanding emergency response services such as SERS 1122. In addition to livelihood support and livestock assistance, SFERP emphasizes a “build back better” approach and incorporates gender-sensitive training on GBV, SEA, and child protection. A strong grievance redress mechanism further ensures that affected communities have access to timely support and feedback channels.

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12.4 Action Plans

Infrastructure and the built environment in Kotri and the wider Jamshoro District are among the most climate-vulnerable sectors, particularly in the face of recurring and intensifying natural disasters. Strengthening this infrastructure is critical—not only to reduce the risk of human casualties during extreme events but also to improve the resilience of local communities to the broader, long-term impacts of climate change.

While Kotri's urban centers face mounting climate-related risks, rural and peri-urban settlements across Jamshoro are equally, if not more, exposed to hazards. The increasing frequency of unseasonal torrential rains, riverine and flash floods, heatwaves, and droughts severely threatens both physical infrastructure and socio-economic stability. These risks extend to transport and communication systems, power distribution networks, irrigation canals, water and sanitation infrastructure, as well as public and private buildings, including homes, schools, healthcare facilities, shrines, animal shelters, local markets, and guest accommodations.

To safeguard Jamshoro's built environment—especially in vulnerable towns like Kotri—it is urgent to prioritize climate-resilient infrastructure development. This includes revising and enforcing building codes and construction standards that can withstand future climatic shocks. Hazard risk mapping and zoning should be conducted across the district to guide safe urban expansion and land-use practices. Moreover, it is vital to increase awareness and promote the use of resilient construction techniques among contractors, developers, communities, and local government officials.

Proposed Urban Resilience Action Plan for Kotri District are as follows:

12.6.1 Institutional Strengthening & Governance

#	Initiative/Actions	Aspect	Responsibility	Time Frame
01	**Establish a District Climate Resilience Task Force**	Adaptation	Deputy Commissioner	**Short Term**
	A dedicated multi-sectoral body under the Deputy Commissioner to coordinate planning, implementation, and monitoring of all climate resilience activities.			
02	**Integrate Climate Adaptation into District Development Plans**	Adaptation	Deputy Commissioner	**Short Term**
	Ensure that all major urban development, agriculture, infrastructure, health, and education initiatives include climate risk assessments and mitigation strategies.			
03	**Decentralize Climate Decision-Making**	Adaptation	Deputy Commissioner	**Short Term**
	Empower Union Councils with localized adaptation planning and emergency response training.			

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12.4.1 Climate-Smart Infrastructure Policy

#	Initiative/Actions	Aspect	Responsibility	Time Frame
01	**Adopt & Enforce Climate-Resilient Building Codes**	Adaptation	SBCA	**Short Term**
	• Mandate heat-resilient and flood-safe designs for new public buildings, schools, clinics, and housing schemes—especially in flood-prone zones. • Enforce zoning regulations that restrict dense construction in low-lying flood-prone areas.			
02	**Climate-Proof Roads & Utilities**	Adaptation	District Administration	**Short Term**
	Allocate funds and update design standards for roads, bridges, and electrical infrastructure using climate-resilient materials and drainage systems.			

12.4.2 Climate Zoning and Risk-Based Land Use Planning

#	Initiative/Actions	Aspect	Responsibility	Time Frame
01	**Define climate-sensitive zones for targeted planning**	Adaptation	District Administration and PDMA	**Short Term**
	• Develop zoning maps indicating flood-prone, heat-prone, and safe zones. • Allocate land use based on risk: restrict development in high-risk zones, promote green areas in heat-prone zones, etc. • Propose zoning codes and building regulations tailored to each climate zone.			

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12.4.3 Flood Risk Management & Drainage Planning

#	Initiative/Actions	Aspect	Responsibility	Time Frame
01	**Topographic and Hydrological Mapping**	Adaptation	District Administration and PDMA	**Short Term**
	Conduct detailed elevation surveys and watershed mapping using GIS and DEM to identify natural drainage pathways and low-lying accumulation zones.			
02	**Drainage Networks**			**Short Term**
	Construct /rehabilitate engineered drainage channels in low lying areas. Elevate critical infrastructure (pumping stations, hospitals, schools) slightly above base flood elevations. Install non return valves in sewer systems to prevent back flow during floods. Develop retention ponds to store excess rain water.			
03	**Design and Construction of Surface Drains**			**Short Term**
	Develop and construct open surface drains (lined/unlined) in waterlogged zones, ensuring connectivity to existing natural outfalls or ponds.			
04	**Integration with Road and Urban Infrastructure**			**Short Term**
	Align drainage planning with road, housing, and public facility development to ensure all new construction includes integrated stormwater management.			
05	**Community Engagement & Early Warning**	Adaptation	PDMA and Deputy Commissioner	**Short Term**
	• Train local communities in flood preparedness, water conservation, and emergency response. • Train communities in evacuation procedures, first aid, and emergency response protocols. • Form neighbourhood WASH and resilience committees to monitor drainage and sanitation. Integrate DEM data with GIS-based urban planning tools for real-time water and terrain monitoring.			

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12.4.4 Water Resource Management

#	Initiative/Actions	Aspect	Responsibility	Time Frame
01	**Adopt & Enforce Climate-Resilient Building Codes**	Adaptation	PHED	**Short Term**
	Introduce a permit and monitoring system for tube wells to control over-extraction and incentivize efficient irrigation methods.			
02	**District Water Resource Master Plan**	Adaptation	PHED	**Short Term**
	Prepare a long-term strategy addressing surface water use, groundwater recharge, water harvesting, and drought management. Rehabilitate the KB Feeder and pipelines for efficient distribution.			
03	**Water Pricing & Revenue Reform**	Adaptation	Municipal Committee	**Medium Term**
	Introduce Tiered Water Tariffs and Meter-Based Billing Policy			
04	**Mandate Water-Saving Infrastructure in Urban Planning**	Adaptation	SBCA and Municipal Committee	**Short Term**
	Update municipal bylaws to require: • Rainwater harvesting in all new buildings. • Greywater reuse for parks and non-potable usage.			
05	**Public-Private Partnerships (PPP) for Water Services**	Adaptation	Municipal Committee	**Short Term**
	Enable PPPs for: • Meter supply and maintenance • Wastewater treatment & reuse • Awareness campaigns and leak detection systems			

12.4.5 Resilient Agriculture & Livelihoods

#	Initiative/Actions	Aspect	Responsibility	Time Frame
01	**Establish a Climate-Smart Agriculture Policy**	Adaptation	Agriculture Dept.	**Short Term**
	• Promote Climate-Resilient Crops Support the adoption of drought- and flood-tolerant seed varieties and climate-smart cropping calendars. • Expand Agro-Advisory Services Deliver real-time weather and crop guidance through mobile SMS, radio, and extension workers. • Enhance Livestock Resilience Provide preventive vaccinations, establish fodder banks, and deploy mobile veterinary clinics during climate events. • Rehabilitate Irrigation Infrastructure Rebuild and climate-proof canals, watercourses, and tube wells to ensure reliable irrigation. • Introduce and scale up drip irrigation and water-conserving techniques among farmers. • Regulate Agrochemical Use Introduce farmer training on integrated pest management and limit overuse of harmful chemicals to prevent groundwater contamination.			

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12.4.6 **Energy System Resilience**

#	Initiative/Actions	Aspect	Responsibility	Time Frame
01	**Green Corridors & Urban Foresting**	Mitigation	Municipal Committee	**Short Term**
	Develop green belts along main roads and establish mini urban forests in towns like Kotri, Jamshoro, and using native drought-resistant trees.			
02	**Rooftop & Vertical Gardens**	Adaptation	SBCA	**Short Term**
	Incentivize households and commercial buildings to develop rooftop or vertical gardens to reduce surface heat and improve air quality.			
03	**Solar Energy for Public Services**	Mitigation	Energy Dept.	**Short Term**
	Install solar panels on key public buildings and streetlights to reduce load on the local grid and ensure essential services remain functional during power cuts			
04	**Energy Efficiency Awareness**	Adaptation	Municipal Committee	**Short Term**
	Community campaigns on reducing power usage and energy-efficient appliances can help mitigate overload.			

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13. SUSTAINABLE DEVELOPMENT GOALS

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.[83]

13.1 Sustainable Development Goals (SDGs) National Framework

The Planning Commission of Pakistan with the support of the United Nations Development Programme (UNDP) has developed a national framework for the SDGs after extensive deliberation and consultation with stakeholders at provincial and divisional levels.[84] In this framework, existence of strong interlinked, and progress on certain targets depend on achievement of others. Under the framework, baseline for 17 goals, 169 targets and 242 indicators were prepared and prioritized according to short-term, medium-term and long-term perspectives to yield better results in efficient and timely manner. In view of resource constraints and institutional capacities, the national targets for these goals have been set lower than global level following a more pragmatic approach.

13.2 Government of Sindh Vision[85]

Government of Sindh has spearheaded efforts to support the mainstreaming, localization, and implementation of the 2030 Agenda through a support project for SDGs implementation in Sindh, jointly funded by the Government of Sindh and United Nations Development Programme (UNDP), with the aim to address socio-economic challenges in the province and steer it in a progressive direction towards achievement of SDGs. Under the project, a SDGs Support Unit has been established in Planning & Development Board, with effect from May 2017. The Unit works in coordination with the National SDGs Unit, which has been established in the Ministry of Planning, Development and Reform as well as Federal and Provincial Parliamentary Task Forces, Core-Group on SDGs Thematic sub-Committees. The Unit's work is guided and reviewed by the Provincial Technical Committee, Project Board established at the Federal level and Sub-Committee on the SDGs of the National Economic Council.

- **SDG'S IN SINDH**[86]

The SDGs Support Unit Sindh is working with line departments of Government of Sindh, as well as UN Agencies, civil society organizations, academia and the private sector to integrate the strategies and policies with the 2030 Agenda, contributing towards accelerating progress in Pakistan. Specifically, the Unit undertakes activities under following four pillars to support SDGs implementation in Sindh.

[83] THE 17 GOALS | Sustainable Development

[84] Government of Pakistan – Sustainable Development Goals (SDGs) National Framework: Summary for the National Economic Council (NEC), Planning Commission, Ministry of Planning, Development & Reforms, March 2018.

[85] Sindh-SDGs-Framework.pdf

[86] Sindh-SDGs-Framework.pdf

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Table 13-1: Four Major Outputs of the Mainstreaming, Accelerating, Policy Support for SDGs in Sindh project led by SDGs Support Unit Sindh			
Policies and Plans Mainstreaming SDGs in local development Plans and strategies clearly delineating the resource requirements.	Data Reporting Strengthening coordination, reporting and monitoring mechanisms for SDGs	Financing Financing flows increasingly aligned with 2030 Agenda	Innovation Supporting integrated and innovative approaches to accelerate progress on SDGs on priority areas.

In April 2017, the P&D Board constituted a Core Group on SDGs to oversee formulation of the SDGs Framework for Sindh. The Core Group on SDGs has members representing government departments, academic institutions, private sector organizations, civil society organizations, and UN agencies. The SDGs support Unit Sindh, under the guidance of the Core Group on SDGs, has developed this framework, which will serve as a roadmap for mainstreaming and localization of SDGs in the province and enable institutions and stakeholders to accelerate achievement of Sindh's priority SDGs. The framework will also be a useful resource for provincial policymakers and development planner, development partners, civil society organizations, academia and anyone involved in the implementation and monitoring of the SDGs. The framework is presented as a living document – one that will evolve over time and will be updated/improved based on new data as well as feedback and lessons learnt from implementation of interventions to achieve the SDGs.

13.3 Localization of SDGS[87]

"Localization" is the process of considering subnational contexts in the achievement of the 2030 Agenda, from the setting of goals and targets, to determining the means of implementation and using indicators to measure and monitor progress. Localization of the SDGs also means using the agenda 2030 framework to translate national development priorities as per provincial and local level needs. Accordingly, the localization of the SDGs has remained one of the priority areas of the post 2015 discussions.

In Pakistan, there is a strong need for such localization efforts to go beyond the national level by incorporating location specific peculiarities. In the post 18th Amendment Constitutional Dispensation, localization has become the most critical element of an effective implementation mechanism for SDGs. In the current devolved governance structure, Pakistan needs effective coordination mechanisms through which national and provincial plans and actions could be synthesized by sharing experiences and best practices.[88]

[87] Sindh-SDGs-Framework.pdf
[88] SDPI, Post 2015 Development Agenda- National Dialogue on Strengthening Capacities and Institutions Pakistan Consultation Report (Draft) December 2014

As part of proactive efforts to localize the SDGs, Pakistan has established Federal SDGs Support Unit, housed in the Planning Commission, while provincial SDGs Support Units (in each provincial Planning & Development/Board) have been established in all provinces (and regions). In this context, the Government of Sindh has also established the institutional structures to support localization and implementation of the SDGs in the province including six SDGs Thematic Sub-committees constituted in line with the prioritization criteria of the SDGs set by the GoS.

Pakistan's development framework (Pakistan Vision 2025) also has similarities with the SDGs framework and focuses on the areas of social and environmental sectors, which have become the provincial subjects after the 18th Constitutional Amendment. As such, most of the SDGs' targets now fall under the preview of the provinces. This calls for localization and ownership of the SDGs at the provincial level and needs to be considered as key to the SDGs achievement. This also requires repositioning of the provincial governments as the SDGs focal tier and to develop Provincial SDGs Frameworks in which the targets are aligned with local priorities to cater to the requirements in the context of resources at the local level.

13.4 Integration of sustainable development goals (SDGS) into the strategic development plan for kotri city

In accordance with the Terms of Reference (TOR), the Strategic Development Plan (SDP) for Kotri city integrates the Sustainable Development Goals (SDGs) into the city's development framework. Seven SDGs have been prioritized at the national and provincial levels—Goal 2: Zero Hunger, Goal 3: Good Health and Well-Being, Goal 4: Quality Education, Goal 6: Clean Water and Sanitation, Goal 7: Affordable and Clean Energy, Goal 8: Decent Work and Economic Growth, and Goal 11: Sustainable Cities and Communities. For each of these goals, a dedicated Implementation Plan matrix has been developed. These matrices map the SDG targets and indicators against the baseline survey results of Kotri City, identify gaps and challenges, and propose strategies through the SDP to achieve compliance. Each matrix also references relevant policies and frameworks at the national and provincial levels, ensuring alignment between local planning, Sindh's sectoral strategies, and Pakistan's commitments under the 2030 Agenda. Collectively, these seven implementation plans provide a comprehensive roadmap for mainstreaming SDGs into urban planning, guiding both immediate actions and long-term monitoring.

It is important to note that while this report provide the structured SDG Implementation Plan, further technical details and sector-specific interventions are elaborated in companion reports, including the Strategic Development Plan (full volume), Economic Development Plan, Immediate Action Plan (IAP), Priority Projects Report, Disaster Management Plan, and Climate Change, Resilience & Adaptability Plan. Together, these reports provide a comprehensive roadmap for mainstreaming SDGs into urban planning, guiding both immediate implementation and long-term monitoring.

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Table 13-2: SDG & SDP Sector Linkage

SDG	Relevant SDP Sectors	Key Focus Areas
Goal 2 – Zero Hunger	Agriculture, Economic Development	Food security, climate-smart agriculture, value chains, farmer livelihoods
Goal 3 – Good Health & Well-Being	Health, WASH, Disaster Risk Management	Healthcare access, disease prevention, sanitation in health facilities, emergency preparedness
Goal 4 – Quality Education	Education, Social Infrastructure	School rehabilitation, inclusive education, vocational/technical training, gender equity in education
Goal 6 – Clean Water & Sanitation	WASH, Environment, Urban Infrastructure	Safe water supply, wastewater treatment, stormwater drainage, hygiene awareness
Goal 7 – Affordable & Clean Energy	Energy, Municipal Services	Renewable energy (solar, wind), energy efficiency, clean cooking fuels
Goal 8 – Decent Work & Economic Growth	Economic Development, Industry, Trade	Skills training, agro-processing, women-led enterprises
Goal 11 – Sustainable Cities & Communities	Land Use, Urban Planning, Transport, Housing, DRM	Planned urban expansion, flood risk reduction, solid waste management, resilient housing, inclusive public spaces

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Monitoring note: Each sector chapter specifies outputs, outcome indicators, and timeframes. These roll up into the city's SDG indicator set and will be reported annually to the Provincial SDG Unit.

13.5 Reference to Separate SDG Implementation Plan

The Strategic Development Plan (SDP) for Kotri provides the overall framework for integrating the Sustainable Development Goals (SDGs) into local development. However, the detailed analysis, sector-wise proposals, and implementation matrices for each SDG are presented in a **separate SDG Implementation Plan Report** (standalone volume).

This approach avoids duplication while ensuring coherence. The SDP highlights the alignment of key development priorities with the seven selected SDGs, whereas the SDG Implementation Plan provides:

- Detailed baseline analysis and survey findings.
- Sectoral gaps and challenges.
- Target-to-indicator mapping for each SDG.

- Implementation matrices with responsible institutions, timelines, and monitoring mechanisms.

In summary, the SDP ensures alignment of spatial and sectoral strategies with the 2030 Agenda, while the standalone SDG Implementation Plan provides the technical depth, implementation matrices, and monitoring framework necessary for operationalizing these commitments.

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14. URBAN LAND MANAGEMENT

Urban areas throughout the developing world are experiencing a problem in the supply of adequate and affordable serviced land to meet the housing needs of their rapidly expanding urban populations. As a result, low-income groups who are mostly denied access to land due to shortfall in supply are forced to either seek for residential land through illegal means or to crowd into existing low-income settlements, creating slum conditions. In Sindh, the shortfall in land supply arises not from the lack of virgin land but partly from the lack of resources, capacity to service the lands and land ownership by landlords and make them ripe for development and also partly from the use of ineffective and inappropriate land and landuse policies and practices.

"Land management" is defined as an activity on the ground, using appropriate technologies in the respective land use systems. It is known by different names in different parts of the world; basically, all are land management tools. In Pakistan land management is not being practiced till yet because of non-absence of policies / framework. Strong land owner opposition to forcible land acquisition, combined with extremely limited fiscal capacity has left the urban local bodies (ULBs) with very few options to develop well-planned and serviced urban land. Land pooling and reconstitution (LPR) is a tool that addresses both these issues by allowing the land owners to share the gain in the land value post provision of infrastructure and services. In lieu, the land owners pay betterment charges and contribute a part of their land to fund the infrastructure and services.

14.1 Goals

As towns in Sindh, including Kotri, strive to position themselves as centers of production, trade, and employment, effective urban land management is critical. The overarching goals are:

- To ensure efficient spatial structures, with well-connected transport systems and serviced land supply.
- To provide adequate infrastructure, affordable housing, and urban amenities that enhance liveability.
- To support urban regeneration, the development of new industrial and commercial districts, and foreign direct investment.
- To safeguard the environment through planned land allocation for parks, green buffers, and hazard-prone zones.
- To strengthen social overhead capital, including housing, education, and healthcare facilities.

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14.2 Objectives

As towns in Sindh, including Kotri, strive to position themselves as centers of production, trade, and employment, effective urban land management is critical. The overarching goals are:

- To ensure efficient spatial structures, with well-connected transport systems and serviced land supply.
- To provide adequate infrastructure, affordable housing, and urban amenities that enhance livability.
- To support urban regeneration, the development of new industrial and commercial districts, and foreign direct investment.
- To safeguard the environment through planned land allocation for parks, green buffers, and hazard-prone zones.
- To strengthen social overhead capital, including housing, education, and healthcare facilities.

14.3 Urban Land Management in Kotri

Kotri reflects the broader provincial challenges of urban land management:

- Absence of a Provincial Framework: There is no comprehensive Sindh-level policy guiding urban land use and land pooling. As a result, planners and development authorities approve projects without adequate assessment of transport or utility impacts.
- Infrastructure Stress: Approved housing and commercial schemes have intensified traffic congestion, water shortages, and sewerage system failures.
- Conflict with Agriculture: Allocation of fertile agricultural land for industrial and residential use has discouraged farming and reduced agricultural output in the region.
- Land Rights and Governance Issues: Corruption, weak land records, and bureaucratic inertia have impeded land redevelopment and reallocation.
- Inadequate Land Use Planning: Land use plans have not been updated to meet the demands of post-industrial development, creating mismatches between planned and actual urban growth.

To address these issues, the public sector must take a proactive lead by:

- Establishing a provincial urban land management framework that promotes sustainable urban growth.
- Introducing land pooling and reconstitution models to increase serviced land supply while protecting landowner interests.
- Integrating transport, utilities, and land use planning to reduce congestion and ensure efficient infrastructure use.
- Safeguarding agricultural zones while earmarking specific areas for industrial and commercial development.

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- Promoting transparent land governance through digitized land records, cadastral surveys, and participatory land use planning.

14.4 Land Pooling and Reconstitution

Simply put, in LPR, a number of small holdings are pooled together, a part of land is taken from each plot for provision of infrastructure and public facilities and the rest returned to the original land owners. It is basically a land management tool and is used all over the world under different names with slight modifications in their working.

14.5 Land Management Techniques

The strategies available for access to urban land could be through Guided land development for large areas; Land pooling and reconstitution; Land reconstitution / redevelopment; Acquisition for public purpose under the Land Acquisition Act, 1894; Joint Sector Model of land assembly and development; Transferable Development Rights (for built up areas); Saleable FAR and mixed-use concept (for regeneration of inner city); Land Pooling and Redistribution Scheme.

A. Land Acquisition Act, 1984

In Pakistan, the Land Acquisition Act, 1984 gives the right for Government authorities to acquire parcels of land for the implementation of development projects. The origin of the practice of land acquisition by public entities in Subcontinent goes back to 1824, when the British Government of India instituted regulations to facilitate urban land public acquisition from private owners. In fact, the obligation for owners to give up their land had to find a legitimate justification. The initial reason advanced to acquiring the land against their will was the need for constructing public buildings in Bengal provinces. These regulations enabled the British government to take possession of the land for the construction of roads and canals. From 1850 on, the scope of these laws was extended to other provinces in order to facilitate the operation of further infrastructure projects such as railways.

The Land Acquisition Act was edited in 1984. It harmonized and consolidated previous regulations into one single act, applicable within the whole British India. After Pakistan's independence in 1947, the Pakistan Government started using this act as a tool to purchase land at a lower price than that on the regular market, as it was meant to be used in the public interest. Several amendments have been made on this act, but its procedures have not changed.

B. Land readjustment / pooling

Land readjustment / pooling Land re-adjustment is a process whereby a public authority assembles numerous small parcels of raw land without paying compensation to the owners. The authority then sub-divides such assembled lands for urban use returning most of the building sites to the original owners in proportion to the value of their land contribution and permitting them the right of alienating such sites. The authority retains a portion of the assembled lands, applying them partly to provide civic amenities such as roads, parks and gardens or schools, and the remainder land for public sale to recover the cost of development. Thus, land re-adjustment acts as tool to achieve unified control over large areas of land and as an instrument of financing public service installations in the process of planned urban growth.

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C. Guided Urban Development

The concept of Guided Urban Development (GUD) emerged in response to ad hoc, uncontrolled urban development with no regard to infrastructure services. It also aims to secure a limited availability of urban land for economically weaker sections. GUD has been practicing in India and developing world. The objectives of the scheme are as follows:

- Ensure provision of serviced plots for low-income families at affordable prices (approximately 75% of total plots to be reserved for EWS / LIG); and
- Provide incentives to the land owner / private developer to participate in the provision of low-income shelter by guaranteeing fair return on investments (profit of 20-30%).

The challenges faced in Sindh Province, particularly in Kotri City, highlight the need for effective urban land management strategies. The introduction of tools like Land Pooling and Reconstitution, along with other techniques, aims to address issues of land supply, infrastructure development, and sustainable urban growth. The emphasis on public-private partnerships and the role of the public sector in planning and formulating strategies reflects a comprehensive approach to achieving sustainable urban development in the region.

i. Land Revenue Laws:

- **Sindh Board of Revenue Act 1957**: Governs the organization and functioning of the Board of Revenue, which plays a key role in land administration.
- **Sindh Land Revenue Act 1967:** Focuses on the assessment and collection of land revenue, determining land ownership, and related matters.
- **Sindh Land Revenue Rules 1968:** Provides detailed rules for the implementation of the Land Revenue Act.

ii. Land Acquisition Laws:

- **Land Acquisition Act 1894:** Outlines the procedures, compensation mechanisms, and dispute resolution processes for acquiring land for public purposes.

iii. Land Disposal Laws:

- **Sindh Disposal of Urban Land Ordinance 2002:** Regulates the sale, lease, or transfer of urban land within the limits of cities, towns, or municipalities by the government or its agencies.

iv. Land Planning Laws:

- **Sindh Town Planning Act 1915:** Focuses on the planning and regulation of urban development, including zoning, land use, and building standards.
- **Sindh Regulation and Control (Use of Agricultural Land for Non-Agricultural Purposes) Rules 1994**: Deals with regulating the use of agricultural land for non-agricultural purposes.
- Sindh Environmental Protection Act 2014: Addresses environmental concerns related to land development.

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- **Sindh Master Plan Authority Act 2020**: Likely establishes an authority for master planning to guide the spatial development of the province.

The outlined laws cover a wide spectrum of aspects related to land management in Sindh. From revenue collection to land acquisition, disposal, and planning, these legal frameworks are essential for maintaining order, ensuring fairness, and promoting sustainable development in the use of land throughout the province. They provide a foundation for responsible land governance and urban development.

The challenges faced in Kotri City haphazard land conversion, weak enforcement of zoning, and inadequate infrastructure in approved schemes highlight the urgency of adopting **modern land management tools**.

- **Land Pooling and Reconstitution** can make serviced land available without the heavy fiscal burden of compulsory acquisition.
- **Guided Urban Development** can ensure inclusive housing supply and protect low-income groups.
- **Provincial Legal Frameworks** need harmonization to integrate LPR and GUD into master planning.
- **Public–Private Partnerships (PPPs)** should be promoted for financing and implementing urban expansion schemes.

Together, these tools provide a pathway for planned, equitable, and sustainable growth in Kotri, aligning with broader provincial objectives of urban transformation.

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14.6 Strategic Development Plan

The Strategic Development Plan for urban land management in Kotri City aims to ensure the efficient supply of serviced land, planned urban expansion, and inclusive access for housing, commerce, and industry. The plan emphasizes legal reforms, institutional strengthening, and innovative land management tools to promote sustainable urban growth.

I. Short-Term Plan
   - Conduct a City Survey & Cadastral Survey (priority action):
     - Digitize land parcels, ownership, and tenure records using GIS and satellite imagery.
     - Resolve overlaps, encroachments, and disputed lands by preparing an authentic cadastral map of Kotri City.
     - Link land records with Sindh Board of Revenue and Municipal Committee for transparency.
   - Pilot Land Pooling & Reconstitution (LPR) in peri-urban Kotri City.
   - Develop GIS-based Land Information System (LIS) integrating land use, transport, and utilities.
   - Enforce building regulations and zoning bylaws in city core to control haphazard development.
   - Reserve serviced plots for low-income housing in all new schemes.

- Establish Ward Development Committees for monitoring encroachments.
- Conduct land and building audits to identify underutilized or illegally occupied plots.

II. Long-Term Plan

- Introduce Transferable Development Rights (TDRs) for densification and regeneration of inner-city areas.
- Develop peri-urban agriculture protection zones to secure food systems while planning controlled expansion.
- Launch PPP-based industrial and commercial zones, ensuring proper infrastructure and access roads.
- Establish a city land bank to acquire and manage land for future public amenities, roads, and social infrastructure.
- Institutionalize Land Pooling & Redistribution Schemes as a standard model for urban expansion.
- Redevelop inner-city katchi abadis through mixed-use redevelopment models (with saleable FAR and cross-subsidization).
- Promote regional-level land management under the Sindh Master Plan Authority, linking Kotri City with Hyderabad, Karachi, and Dadu.
- Achieve sustainable urban expansion with adequate green spaces, resilient housing, and climate-smart infrastructure.

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15. IMPLEMENTATION STRATEGY

The successful implementation of the Strategic Development Plan (SDP) for Kotri City is contingent upon a robust and realistic implementation strategy. This section outlines the institutional, legal, and financial mechanisms required to translate the plan's vision into tangible outcomes. The strategy is designed to be a practical and phased guide for all stakeholders, ensuring the plan's objectives are met through a coordinated and accountable approach.

15.1 Process of Implementation

Implementation of the SDP requires careful prioritization, phasing, coordination, budgeting, and monitoring. The key steps include:

- Determining priorities within and among sub-plans and proposed projects.
- Sequencing activities through short-, medium-, and long-term phasing.
- Linking projects to budget availability and financing sources.
- Preparing a master implementation schedule with progressive cost tables.
- Assigning activities to responsible institutions and qualified managers.
- Establishing a monitoring and reporting system to track progress and maintain public transparency.

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15.2 Institutional Framework and Setup

A clear and empowered institutional framework is essential for effective implementation. The proposed setup is designed to align with existing governance structures while addressing key gaps in coordination, technical capacity, and a unified mandate.

Primary Implementation Authority (City Level):

Proposed Body: The **Kotri Urban Development Authority (K-UDA)**, operating under the legal cover of the Sindh Master Plan Authority Act 2020.

Role and Mandate: To serve as the central coordinating and executive body for the SDP. Its comprehensive mandate includes:

- Spearheading land use planning and development control.
- Conducting project appraisal and preparing statutory documents (e.g., PC-1s).
- Directly implementing key projects identified in the Short-Term Action Plan.
- Acting as the primary liaison between local, district, and provincial government agencies to ensure seamless coordination.

Realistic Setup & Phased Establishment:

- **Phase 1 (Immediate):** The K-UDA will be established as a specialized, empowered unit within the existing Municipal Committee. It will be headed by a dedicated Director, with a core team comprising an Urban Planner, a Civil Engineer, a GIS Specialist, and a Financial Analyst. This structure allows for the immediate commencement of priority tasks while the institutional capacity is built.
- **Phase 2 (Long-Term):** The unit will progressively evolve into an autonomous authority with its own funding mechanisms and legal powers, provided its initial performance meets established benchmarks.

15.3 Coordination and Collaboration

District Coordination Committee (DCC): Headed by the **Deputy Commissioner**, the DCC will be the central forum for all SDP-related activities at the district level. Its members will include the Director of K-UDA and all relevant district-level officers from departments such as Irrigation, Health, Education, and Agriculture. The DCC's mandate is to ensure horizontal coordination, resolve inter-departmental conflicts, and provide administrative oversight.

Provincial Liaison: The K-UDA will report to the Sindh Master Plan Authority, which will serve as the primary provincial-level oversight body. This ensures that the SDP's implementation remains aligned with provincial goals and facilitates the allocation of funds from the Planning & Development Department, Sindh.

15.4 Provincial-Level Alignment:

- **Sindh Master Plan Authority (SMPA):** Approves the Master Plan and ensures alignment with provincial strategies.
- **Planning & Development Department (P&D), Sindh:** Facilitates project appraisal, funding allocations (ADP/PSDP), and liaison with donors.
- **Sindh Local Government Department (LGD):** Oversees municipal committees, providing policy guidance on urban services.

Roles and Responsibilities:

- **Deputy Commissioner:** Administrative oversight and chairing of DCC.
- **Kotri Municipal Committee, Bolhari Municipal Committee and Jamshoro Town Committee:** Operation and maintenance of core municipal/Town services (solid waste, drainage, sanitation, minor roads).
- **Public Health Engineering Department (PHED):** Planning and execution of water supply and sewerage projects.
- **Line Departments:** Health, Education, Irrigation, and Agriculture to implement sectoral proposals.

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- **Community-Based Organizations (CBOs):** Mobilization, monitoring, and grassroots participation.

15.5 Legal and Policy Basis

Implementation of the SDP will be grounded in existing laws and frameworks:

- **Constitution of Pakistan (1973):** Provides the supreme legal basis for planning, development, and land acquisition.
- **Sindh Master Plan Authority Act, 2020:** Legal basis for preparation, approval, and enforcement of Master Plans.
- **Sindh Local Government Act, 2013 (amended 2016):** Governs municipal committees and urban service delivery.
- **Regional Interim Building & Town Planning Regulations – 2018:** The specific, currently active regulations for building control and town planning that will be enforced by the K-UDA.
- **Sindh Land Revenue Act, 1967 & Rules, 1968:** Governs land records, ownership, and revenue administration.
- **Land Acquisition Act, 1894:** Provides mechanisms for land acquisition for public purposes.
- **Other Relevant Frameworks:** Sindh Environmental Protection Act (2014), Sindh Sanitation Policy (2017), Sindh Drinking Water Policy (2017), and National Reference Manuals for planning standards.
- **Regional Interim Building & Town Planning Regulations – 2018**

15.6 Approval and Enforcement:

- **Plan Approval:** Sindh Master Plan Authority.
- **Development Control:** K-UDA and Municipal Committee (zoning, NOCs, building regulations).
- **Monitoring:** District Coordination Committee, with oversight by P&D Department Sindh.

15.7 Implementation Mechanism and Phasing

Implementation will follow a phased and pragmatic approach:

Phase 1 – Short-Term (1–3 years):

- Establish K-UDA within Municipal Committee.
- Conduct cadastral and city survey to digitize land records.
- Launch pilot Land Pooling & Reconstitution (LPR) project in peri-urban fringe.

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- Begin Immediate Action Plan (IAP) projects (solid waste, drainage, core infrastructure).

Phase 2 – Medium-Term (4–10 years):

- Institutionalize LPR as standard urban expansion model.
- Operationalize GIS-based Land Information System (LIS) for planning decisions.
- Implement Priority projects in commercial, industrial, and housing sectors.
- Begin large-scale infrastructure upgrades (water, sewerage, roads).

Phase 3 – Long-Term (10–20 years):

- Redevelop katchi abadis through mixed-use regeneration.
- Integrate Kotri City into regional growth corridors (Hyderabad–Karachi axis).
- Advance climate-resilient housing, green mobility, and flood protection measures.

16.5 Funding Sources and Mobilization

Public Sector:

- **Annual Development Programme (ADP):** Provincial funding for infrastructure and utilities.
- **Public Sector Development Programme (PSDP):** Federal funding for large-scale or strategic projects.
- **Municipal Budgets:** Maintenance, ward-level works, and minor capital projects.

Donor Agencies & Development Partners:

- World Bank, ADB, UN-Habitat, and bilateral donors for WASH, climate resilience, and institutional strengthening.
- Project-specific technical assistance and concessional financing.

Private Sector & PPP Models:

- **Sindh PPP Node:** Institutional mechanism to structure PPPs in infrastructure, housing, and utilities.
- **Land-Based Financing:** Revenue from LPR schemes and sale of developed plots.
- **Private Investment:** Incentives for builders/developers via streamlined approvals and zoning certainty.

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15.8 Stakeholder Guidance and Capacity Building

Government Institutions:

- Clear mandates defined for K-UDA, MC/TC, DCC, and SMPA.
- Training on urban planning tools, GIS/LIS systems, and project management.

Private Sector & Developers:

- Predictable regulatory environment to attract investment.
- Capacity building on PPP processes and compliance with zoning/building codes.

Community & Civil Society:

- Public hearings and participatory planning processes.
- Community-based monitoring of services and projects.
- Awareness programs on housing, WASH, and disaster preparedness.

The Implementation Strategy provides a structured pathway from planning to execution. By embedding SDPs into provincial frameworks, strengthening local institutions, diversifying funding, and engaging stakeholders, Kotri City can achieve sustainable, inclusive, and resilient growth. The proposed strategy ensures that the Master Plan moves beyond a vision document into a practical instrument for long-term transformation.

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