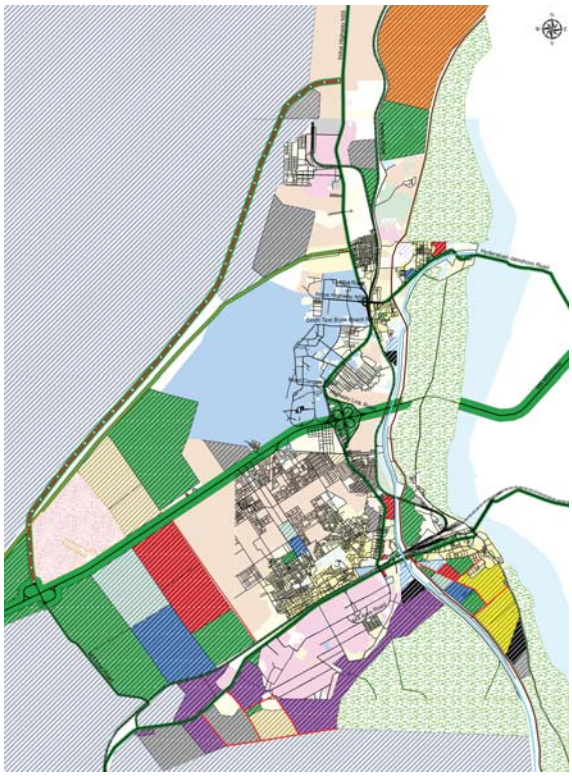
Directorate of Urban Policy Strategic Planning,
P & D Department, Government of Sindh

URBAN POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVT OF SINDH

PREPARATION OF DEVELOPMENT MASTER PLANS OF FOURTEEN (14) DISTRICT HEADQUARTER TOWNS OF HYDERABAD, MIRPURKHAS AND SHAHEED BENAZIRABAD DIVISIONS"

STRATEGIC DEVELOPMENT PLAN REPORT

(2017- 37)



Jamshoro

February, 2021

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TRANSMITTAL LETTER

Urbanization in Pakistan is taking place at a substantially high pace most of which is gravitating to the large cities. The secondary cities have not been able to play their role as the "Engine of Economic Growth" due to lack of public funding in the development infrastructure resulting in lop-sided spatial spread. The hinterland has remained poor facing abject poverty due to less economic opportunities, social facilities and institutional support.

Sindh Government took initiative by establishing Directorate of Urban Policy and Strategic Planning (UPSP) within the Planning and Development Department in 2012, to initiate and ensure planned growth of secondary cities of Sindh province through the preparation of Master Development Plans of District Headquarters Towns. In this phase 14 DHQ Towns of Hyderabad, Mirpurkhas and Shaheed Benazirabad Divisions Viz Nawabshah, Sanghar, Naushahro Feroze, Mirpurkhas, Mithi, Umerkot, Tando Muhammad Khan, Tando Allahyar, Mitiari, Badin, Thatta, Sujawal, Dadu, Jamshoro and one SDG compline taluka Islamkot Town.

Directorate of Urban Policy and Strategic Planning initiated Consultant selection process under SPPRA rules. The consortium of three reputable local Consultants led by EA Consulting (Pvt.) Ltd. including MMP (Pvt.) Ltd. and EMC (Pvt.) Ltd was selected due to their high standing in prequalification and lowest financial bid. The Consultants brought together a highly qualified and experienced team to provide the specialized inputs. The data collection was carried out in the field through a sample socio – economic surveys, questionnaires to various government offices and discussions with the stakeholders. The findings and recommendations were submitted to client for review in seven stages and shared with the stakeholders in workshop for each town. This report is the final Deliverable (Strategic Development Plan Report) of the project.

The volume and spatial spread of the project area did present lot of logistics and data availability problems which were resolved with the support of Client who had pursued actively with the various lines departments to assure all available data to Consultants. The Consultant's team is indebted to the Director General UPSP and his team without their support it would not have been possible to complete this project. The consultant would also like to thank all the district officials for making field exercise productive.

ACKNOWLWDGEMENT

The completion of this assignment would not have been possible without the guidance and support of Directorate of Urban Policy & Strategic Planning, Planning & Development Department, Government of Sindh led by Mr. Faisal Ahmed Uqaili (Director General) and team members Mr. Zulfiqar Kumbhar (Deputy Director Housing/P&DC), Ms. Naila Haq (Deputy Director Environment), Ms. Uzaima Nasir Hilaly (Deputy Director Municipal Finance & Governance), Mr. Nabesh Akhtar (Deputy Director Municipal Services), Mr. Dayal Das Rathore (Assistant Director GIS) and Mr. Gulab Ahmed Tanvari (Assistant Director Planning).

The consultant is also thankful to Ex- Director Generals' UP&SP, Mr. Khair Muhammad Kalwar, Mr. Khalid Mehmood Shaikh, Mr. Muhammad Ali Khoso & Mr. Rafique Ahmed Qureshi and Mr. Mumtaz Halepoto Ex- Director Urban Policy & Planning, UP&SP.

EA Consulting Pvt Ltd acknowledges fair & transparent conduct of Financial Contract Management for this assignment carried out by this Directorate of UP&SP under the management and administration of respective Director Generals and Ms. Uzaima Nasir Hilaly Director Admin, Finance & Management.

Moreover, the consultant also appreciates the support of all the District &, line Departments officers/ officials for extending their valuable input and coordination during the preparation of this assignment.

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Strategic Development Plan Report – Jamshoro

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ANNEXURES

Annexure – A: Sustainable Development Goals Acceleration Plans

Annexure – B: Atlas

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
DUP&SP	Directorate Of Urban 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
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/litre)
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

EXECUTIVE SUMMARY

A. PROJECT AREA BRIEF

After the independence of Pakistan, in 1947, District Jamshoro remained a part of District Dadu. This area continued to be neglected by the authorities but the gradual process of development has changed this district significantly. In 2004, Jamshoro was made a district after carving it out of district Dadu.

District Jamshoro has its district headquarters at Jamshoro DHQ (Bolari MC, Kotri MC and Kotri TC). This district has four talukas, named: Sehwan, Kotri, Thano Bula Khan and Manjhand. It has 28 union councils and 174 mouzas (revenue village). Out of these mouzas, 139 are rural, 6 are urban, 11 are partly urban and 13 are un-populated mouzas.

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.

District Jamshoro lies in 67° 16" 20' to 68° 27" 37' east longitudes and 24° 58" 14' to 26° 36" 33' north latitudes. This district is bounded by the north with Dadu district, on the east River Indus separates it from Shaheed Benazirabad, Matiari and Hyderabad districts, on the south lies Thatta district, south west Karachi district and on the west Kherthar Range make its boundary, which separates Sindh and Lasbela district of Baluchistan.

B. DEMOGRAPHY:

In 1998 population of the project area (Kotri MC + Jamshoro TC+Bloari MC) was 143,466 souls with an average household size of 6.7. Latest Population and Housing Census of project area reveal that the population of the town has increased to 293,798 with annual average growth rate of 3.84% which indicates a decreasing trend in growth. Projected population of the project area works out to be 624,277 by 2037. Project area has a slow growth in terms of population.

The built-up area of the project area comprises of around 16,711acres of land which is around 43% as compare to consultant's urban boundary which is 38,941acres. The land use analysis indicates that almost 17.2% of total urban boundary area is in use of residential purpose only. 20.7% of the area is covered by agriculture fields.

C. VISION 2037

A vision formulating workshop was carried out with the main stakeholders on November 28, 2018. Collection of opinions expressed produced the following vision;

"The city full filling all the basic needs, such as housing, water supply and sanitation, in clean and sustainable pollution free environment, with education and health for all, along with growth in local and regional economy with increase in employment, incomes and related skills development to emerge as well planned modern city with peace, security and prosperity like some of the best most livable cities in the world."

D. SECTOR WISE ANALYSIS AND PROPOSAL

Based on the evaluation of primary and secondary data, the need assessment has been carried out for a projected population on the basis of 20 years growth projections. The need assessment is based on the Baseline Indicators, Stakeholders Views, Demand vs Need Analysis, NRM with professional judgment and Consultant's own experience and standards used in other developing countries.

1. HOUSING

Housing in terms of affordable home with basic infrastructure and facilities is the basic human need. As per 2017 census population results, project area had household size of 5.6 persons and a total housing stock of 24,042. The major issues in the housing sector are scarcity of developed urban land, poor land administration, housing in dilapidated condition, unchecked growtrh of squatter settlements, shortage of finance, high cost of building material, high housing density causing congestion and lack of basic utilities.

On basis of projected Population for year 2037 the number of households have been estimated around 107,389 out of which additional Housing Requirement will be 56,887.

The strategies for short term plan are; incremental housing schemes, establishment of low-income housing funds and increase number of small size plots. The long term plan includes the development of cost effective approaches, formation of land bank, initiation of an affordable housing programme and formulation of green building bye laws. The priority projects should focus on the land acquisition for low income public housing projects and master planning and infrastructure designing of low income public housing project for additional population. The immediate action plan includes rehabilitation and revitalization of core urban area, regularization of land tenure, urban face lifting program, provision of street lights in residential areas, development of green median and demolition of old buildings.

2. SOCIAL AMENITIES

2.1 Education

Jamshoro DHQ (Bolari MC+Kotri MC+Jamshoro TC) 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.

Jamshoro DHQ has 15,610 children that are enrolled in 50 schools (primary to secondary) with 386 classrooms. The schools are short of 164 classrooms on the basis of 30 students per classroom. 4,208 students are enrolled in 4 high schools with 43 classrooms. The high schools and colleges are short of 62 classrooms on the basis of 30 students per classroom. The issues in education sector involves shortage of classrooms and teachers, low enrolment level with gender disparity, lack of provision of basic and allied facilities and poor condition of schools and colleges. Lack of provision of basic facilities i.e. washrooms, electricity, drinking water etc.

The future need is 9,400 classrooms in schools and 643 classrooms in high schools by the end of plan period in 2037 to achieve the target of 100% enrolment with no gender disparity. The education authorities should

plan gradually by increasing the classrooms in existing schools in high density areas and new schools in low density areas. The spatial distribution of schools and other educational institutions should be that our schools, especially girls school are within easy walking distance. The strategies for short term plan includes the rehabilitation of schools and colleges, eliminate the chances of misuse and encroachments of educational buildings, training programme for teachers, establishment of vocational and skill training centres and rehabilitation/construction of women hostels for teaching staff. The long term plan involves increasing equitable access to quality education, improving the quality of learning outcomes, enhancing the equity of resource allocation, provision of technical education and up gradation of existing universities. The priority projects need to focus on addition of classrooms with allied facilities and basic utilities, improvement in quality of education, training programme for teachers, establishment of vocational and skill training centres and rehabilitation/construction of women hostels. The immediate action plan includes the rehabilitation and up gradation of schools and rehabilitation and upgradation of Government and Training Institute –STEVTA.

2.2 Health

In District Jamshoro, There is one civil hospital having 50 beds, 1 specialized hospital having 204 beds, 3 Taluka Hospitals at District having 120 beds and 2 departmental hospital having 69 numbers of beds to serve the district. The other health facilities spread over entire district are 5 RHC (Rural Health Center) having 100 beds, 9 TB Clinics, 20 BHUs (Basic Health Unit) having bed strength of 40, 46 dispensaries having 6 number of beds and 2 M.C.H.C (Mother Child Health Center). The total number of beds are 619.

The major issues are lack of health facilities, lack of diagnostic and other health equipment, difficulty in transferring patients from rural to urban area, vacant posts for doctors and lack of training of paramedical staff. The NRM recommends 2 bed per thousand as the medium term target. On this basis, at present approximately 1367 beds will be required to be provided gradually. According to WHO standards doctor to population ratio is 1:1000 so taking that as reference point currently the short fall of doctors comes out to be 493.

On the basis of NRM recommendation approximately 2867 beds will be required to be provided gradually until 2037. According to WHO standards the future requirement of doctors comes out to be 1248. The strategies for short term plan are; improve access to healthcare facilities, access through ambulance network, availability of skilled workforce, improving functionality of equipment and availability of quality medicines and rehabilitation of BHUs and RHCs. The long term plan includes the extension of teaching hospital, provision and enhancement of Mobile Health Unit, up gradation of BHUs, RHCs and MCHCs, health awareness programmes, research programmes for doctors, provision of diagnostic facilities, ambulance, pharmacy in all hospitals, specialized hospitals and accommodation facilities for doctors and paramedics staff. The priority projects should focus on the extension of Civil Hospital, provision of Mobile Health Unit, provision of quick response ambulance service with all health units, up gradation of BHUs, RHCs and MCHCs, research and development programme for doctors and paramedics staff, provision of diagnostic facilities, ambulance and pharmacy in all hospitals and rehabilitation/construction of veterinary centers. The immediate action plan involves the rehabilitation and up gradation of DHQ Hospital and Civil

Hospital Kotri and provision of MCHS in Mother and Child care Hospital is proposed along the Hajji Nawab Nawab Chauhan Road.

2.3 Recreational/Cultural/Tourism

The Town Sehwan is famous for the shrine of Hazrat Lal Shahbaz Qalandar. Thousands of people from all over the country come to visit (ziarat) and pay tribute to this great Manchhur Lake is also one of the well-known places of Sehwan because it is the largest sweet water lake in the Asian continent.[1] Moreover Ranikot Fort is a historical fort near Sann, Jamshoro District, Sindh, Pakistan. Ranikot Fort is also known as The Great Wall of Pakistan and is believed to be the world's largest fort.[2]
Sehwan Fort, Jamshoro - On the north of Sehwan town are lying the remains of the great fort, to which is said to build of Alexander the Great. In addition Kotri Barrage, also known as the Ghulam Muhammad Barrage, was opened in 1955. It is near Hyderabad and is nearly 3,000 feet (900 metres) long.
Issues include Disappearance of incidental open spaces, Lack of preservation of recreational spots, Lack of planned open spaces, In-active tourist development program and Unavailability of basic facilities for tourism.
The short term plan includes the restoration and maintenance of open spaces, preservation of cultural heritage, construction/rehabilitation of parks, playgrounds and recreational facilities.Long Term Strategies include Provision of 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. Youth development programme and provision of support facilities.

The priority projects includes the construction of recreational facilities at Ghulam Muhammad Barrage Jamshoro and allied facilities, rehabilitation/construction of parks and playgrounds, provision of missing facilities in existing facilities, construction of auditoriums, up gradation of art councils.
The immediate action plan includes: **Kotri (**Rehabilitation of playground i.e. Sachal Cricket Ground **and** Rehabilitation of sports complex i.e. Malik Sikandar Sports Complex)

Bolari(Provision of green spaces**,** Provision of parks**,** Rehabilitation of playground**,** Construction of sports complex along Chairman Imam Bux Chohan Road and **Jamshoro (**Provision of green spaces **,**Provision of parks**,**Provision of plantation area along National Highway-5**,**Provision of urban forest**,** Provision of visual parks)

3. ECONOMIC DEVELOPMENT PLAN

3.1 Irrigation

Since the lands of this district lie at the bottom of Khirther mountain range having high altitude as compared to Indus River, there is no canal system available in this district and only perennial water is available for cultivation. Besides, katcha area, alongside the Indus River, is irrigated with river water.
However, other modes of land irrigation like tube wells are also used. Irrigation is done mostly through river and tube wells.

[1] Report on Tranche Condition (2006), Taluka Administration, Social Services Program (SDSSP), Government of Sindh

[2] https://www.ghoomlo.pk/listing/tags/pakistan/sindh/jamshoro-district/historical-places-in-jamshoro-sindh/

Majority of the mouzas are waterless (barani). Out of the 150 rural mouzas, 76 (51%) are arid, 59 (39%) are irrigated with the help of canals, and 36 (24%) are irrigated through tube wells.

3.2 Agriculture

The major crops produced in Jamshoro District are Wheat and Cotton.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.

The total geographical area of District Jamshoro is 1,235,000 hectares out of this cultivated area is up to 93,000 hectare. Out of cultivable land dividing 2015-16, actually cultivated to 63,000 hectares leaving 30,000 hectares as fallow. Waste land available to 139,000 hectares, whereas, 1,142,000 hectares are not available for utilization.

The major issues includes that the land ownership is much skewed, decrease in land utilization, high price of inputs, absence of farm to market road, lack of agriculture credit facilities, water logging and salinity, unavailability of water in canals, irrigation and drainage problem.

The short term plan includes to modernize agriculture, increase supply and quality of agricultural crops and provision of warehouses. The strategies for long term plan includes the agriculture technology development and enhancing crop productivity. The priority projects need to be focused on agriculture credit facilities, regular supply of irrigation water, availability of fertilizers, pesticides and quality seeds, installation of tube wells, measures to reduce water logging and salinity and construction of farm to market roads. The projects for the economic development plan are same as the priority projects.

3.3 Livestock and Fisheries

District Jamshoro is richly populated area having animal's population 1,221,000 of large and small animals. Animal population of district is highest number of Goats having 414,000 heads followed by sheep 172,000 heads and Cattle 1, 64, 000. There are 18 Private fish production farms working for fish farming in the District, out of which only 5 are functional. The production of fish by annually in district is approximately 2.3 M.tons. There is a single veterinary Hospital and 18 veterinary centers. The major issues are landlessness, limited knowledge and facilities, livestock and fisheries as secondary source of income and insufficient veterinary services. There is need to develop and implement a broad-based fisheries policy which is required for accelerated development of the fisheries sector.

The strategies need to be focused on the improvement of production performance, establishment of model livestock, dairy and cattle farms and enhancing the veterinary services, lease of fishing rights, local awareness, aquaculture development, collection of statistical fish data and enforcement of fisheries enactment. The projects for the economic development plan includes the establishment of livestock and dairy farms, development and implementation of a broad-based fisheries policy for the development of the fisheries sector.

3.4 Industries

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 and providing employment to its inhabitants and outsiders[3.] Mining of marble is also a source of income for the inhabitants of this Taluka.

There are three power plants in Jamshoro District namely: Jamshoro Power Station (Thermal), Lakhra Power Plant (Coal) (Rehabilitation needed), and Kotri Thermal Power Station (Gas).
The short term plan includes modernize the service sector, support industrial development, enhancement of colonization, provision of vocational training and employable skills and micro-financing to small industries. The strategies for long term plan are; sufficient market infrastructure, development of Industrial Estates, heritage saving, shift from industrial agriculture to diversified agro ecological systems and provision of infrastructure for establishment of new industries. The priority projects should focus on revitalization of Lakhra power house as per Thar coal project, Feasibility study for construction of wind power turbines. The projects for economic development plan are; addition in industrial units and full utilization of Industrial Estates to be accelerated.

3.5 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

The priority projects includes the provision of slaughter house, provision of parking, upgradation of old bazaar area, establishment of fruit and vegetable market, specialized wholesale market, construction of building for service industry and provision of cold spaces and warehouses. The immediate action plan focus on modernization of commercial activity in the Core Urban Area of Kotri MC,Bolari MC and Jamshoro TC. Such as modern shopping malls or strip shopping malls to provide residents one stop shopping .This would also provide parking facility and security to the people coming for shopping as well as shop keepers. This would also provide shopping, eating, entertainment especially for children.
An important step towards economic development will be encouragement for establishment of financial services.

4. BASIC UTILITIES

4.1 Water Supply

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 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 SITE-Kotri is discharging treated effluent in KB Feeder after treatment through CETP for which funds were provided by GoS. KB Feeder is supplying contaminated water to the poor residents of the project area

because water filter plant at Kotri is not being used and lying idol. Neither the chlorination nor any type of disinfection is taking place in the plant and merely alum is used for silt settlement.

The present supply as reported by PHED is 8.1 mgd .The issues of water supply are problem of water distribution, damaged supply lines, collapsing of old system, contamination of water, high proportion of non-revenue water, inadequate technical capacity and water is supplied without any treatment.

It is expected that the Jamshoro DHQ will have a population of about 624,788 persons by 2037 and the daily demand of the town will be about 18.7 mgd.

The short term plan includes that the design of water supply pipes should ensure no contamination of water and preference should be given to rehabilitate existing schemes. The strategies for long term plan are; providing access to safe water, exploration and regulation of groundwater, frame a broad policy framework and feasibility study for identification of new water sources. The priority projects should focus on the improvement of water intake works, construction of OH tanks, construction and rehabilitation of existing water supply network, procurement for additional land for water works, construction of RO plants on various locations for the drinking purpose, Installation of hand pumps and tube wells to increase the water supply for town.

The immediate action plan includes the rehabilitation and construction of water supply network, construction of OH tanks and rehabilitation of filtration plant.

4.1.1 Sewerage and Drainage

The major issues identified are damaged lines, over-flowing sewage water on streets, improper maintenance of sewerage facilities, informal settlements, poor condition of sewer system and no waste water treatment plant. Sewerage water flows at 70% of the water supply therefor presently against the water demand of 8.81 mgd the sewerage water flows is 6.16 mgd.

By 2037, 13.12 mgd sewage will be generated against the estimated water supply of 18.7 mgd. The strategies for short term plan are; priority given to un-served areas, need based interventions, use of gravity flow systems, acquire land and provide proper sewage treatment plants leading up to recycling of treated affluent for landscaping, etc. The long term plan includes the provision of improved services, sewage treated before discharging, construction/rehabilitation of WWTP and land acquisition for stabilization ponds. The priority projects need to focus on the construction/rehabilitation of drains and WWTP, and rehabilitation of waste water disposal stations. The immediate action plan involves the removal of existing waste water collection pond, construction of WWTP, and interconnections of open nallis with underground sewers.

4.1.2 Solid Waste Management

Some of the major issues are shortage of machineries, lack of properly organized waste collection system, no proper arrangement for the disposal of infectious waste and segregation of organic waste. The current (2017) population of the Jamshoro DHQ (Kotri MC, Bolari MC and Jamshoro TC) as 293,798 the total municipal solid waste load arising in the municipality is approx. 132,209 kg or 132.20 tons per day.

The strategies for short term plan are; develop an efficient solid waste management, effective and efficient collection system, segregation practice for bio-medical waste collection system and encourage on-site reuse and recycling. The long term plan includes the community and private sector involvement, public awareness and education and implement waste minimization. The priority projects should focus on the feasibility study for feasibility study for solid waste management mechanism, construction of central composting plant and procurement process for landfill site. The immediate action plan includes recycling and segregation of solid waste, separate collection of bio-medical waste and introduction of waste recycling plant.

5. INFRASTRUCTURE

5.1 Energy

The power supply is through HESCO-WAPDA transmission system. WAPDA has 3 power plants in region specifically; Jamshoro Power Station, Lakhra Power Project and Kotri Power Station are the key power units in this district. The power supply from HESCO HT feeders 220KV is stepped down to 11KV at grid stations and distributed to consumers via power main transformers which further reduce the voltage to 420V/220V as required by the individual households.

Some of the major issues are less public awareness regarding fuel conservation, scarcity and high price of alternate fuel sources, lack of maintenance of power plants, circular debt and theft of electricity.

The strategies for short term plan need to focus on the upgradation of the transmission and distribution process and improvement of streetlight network. The long term plan includes the development of low cost energy production systems, achieving fuel efficiency, adopting new technologies, addition of sub-stations and encourage energy efficient building construction. The priority projects should focus on the upgradation of grid stations, promotion of energy efficient appliances, feasibility study for alternate energy sources, and revitalization Lakhra power house as per Thar coal project and feasibility study for construction of wind power turbines. The immediate action plan focus on the usage of Arial Bundle Cable wires, installation of streetlights.

5.2 Gas Supply

Out of 539 houses surveyed 87% had the gas available to them.13% of the houses having no gas availability. Household not having natural gas are using coal, wood, gas cylinder and kerosene oil. The strategies need to be focused on feasibility study for alternate resources available, measures to cater load shedding and measures to appropriately price the energy sources.

6. TRANSPORTATION

Jamshoro has significant connectivity with surrounding towns as well as other parts of the country through the regional and national road network. A National Highway (Indus Highway, N55) and Motorway (M-9) connect Jamshoro with Karachi and other major cities of the Province.
The City is also linked with the national network of Pakistan Railways through Karachi railway line via Kotri. Jamshoro is connected to Quetta via Kotri. It also connects to Dadu railway line through a railway station present in Jamshoro. There are no major Bus and Truck stands within the project area. Inter-city buses are

very limited and do not operate with regulations or proper stands. Inter-city buses are over loaded due to high number of passengers using public transport. Illegal bus and Qinqui stands of public transport are evident in project area and passengers prefer this mode of transport over buses.

The issues include poor condition of roads, traffic congestion, unavailability of traffic signals, absence of street lighting, encroachments and drainage issues on road.

The strategies for short term plan are; Environmental Impact Assessment (EIA) as mandatory requirement,expansion of railway station, improve road design, prevent encroachments, rehabilitation of farm to market roads, reduce traffic growth and congestion. The long term plan includes create Traffic Engineering Bureaus (TEBs), declaring private vehicle free zones, satisfy mobility needs, implementation of Axle Load Management, dualization of main arteries and improving geometry of roads.

The priority projects should focus on the rehabilitation of major roads, feasibility study for widening of sehwan-jamshoro road (N-55), installation of traffic signals and solar street lighting, Construction of Jamshoro bus terminal.

The immediate action plan includes: Dualization and rehabilitation of Roads, Construction and rehabilitation of monuments, encouragement of pedestrian Movement and installation of street furniture, the restoration of footpaths and right of way of roads by removing encroachments, improvement of road pavements, and development of tree lined medians, removal of existing bus stops.

7. ENVIRONMENT AND DISASTER RISK MANAGEMENT

7.1 Environment

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. The Seismic zoning map of Pakistan (2015) places Jamshoro in Zone 2A.

The major issues are water logging and salinity, water contamination, low quality of surface water, seismic risk, aging of surface drainage canal system and polluted air.

The strategies for short term plan includes to ensure environmental sustainability, need of permit to discharge waste, preserve ecological cycles, increase rangelands production, provide recreational facilities, create environmental awareness, conserve biodiversity and fostering PPP. The long term plan includes the improvement of drainage, sustainable development while overcoming environmental challenges and

multi-pronged approach to fisheries management. The priority projects should focus on the rehabilitation of irrigated plantation, enhance rangeland production, rehabilitation of forest parks and afforestation. The immediate action plan involves enhancing local tress plantation.

7.2 Disaster Risk Management

District Jamshoro is one of the oldest districts of Sindh. It was hit by 2010 and 2011 rains/ floods. River Indus, after receiving water from five of its tributary rivers, causes floods in the northern and southern parts of Sindh province.
These districts on the right and left banks of River Indus are prone to severe threat when River Indus is in high flood. The districts in the lower Sindh, prone to riverine flooding, include Dadu, Jamshoro and Thatta on the right bank of River Indus and Tando Muhammad Khan, Matiari and Hyderabad on the left bank of the river. The length of River Indus along the province is 750 kms long.

The major issues are low level of risk awareness, not “risk conscious” development, insufficient DRR capacity, negligible involvement of private sector, riverine flood and food security problem.

The strategies for short term plan includes to develop coordination mechanism with PMD, develop mechanism for regulation of water discharge, develop monitoring mechanism, provide necessary medical facilities, coordination with DDMA and emergency declaration at all medical points. The long term plan involves the arrangements that allow the system to switch into emergency mode, clarify mutual roles and responsibilities, DSM and PPHI shall be responsible for providing medical cover to the IDPs, National risk assessment would identify highly vulnerable districts and DRR needs to involve local level actors. The priority projects should focus on the identification and declaration of “disaster affected” areas, DRM strategies should be based upon clear assessments of disaster risks, vigilance of canals, ensure smooth flow of water, prompt dewatering of stagnant water, HESCO should ensure uninterrupted supply of electricity, arrangement of medical teams, fumigate the area, emergency set up of relief camps and ensure sanitation and cleanliness.

E. IMPLEMENTATION

Presently, different proposals or schemes belonging to their respective sectors are identified by the departments and also incorporated separately in the Annual Development Programme (ADP). This creates a lot of problem as there would not be any harmony in the development of the city, as one scheme may create difficulties and problems for the other. It is necessary that all the public service sectors work together as a package that would result in proper development of the town.

The Government of Sindh would take responsibility of implementing various development proposals by utilizing its maximum resources and by engaging various public offices of government of Sindh, established in town. The concerned agency must ensure that the overall process must go after following themes of implementation process. The overall implementation process to be carried out in coordination with Town Planning and Urban Development Standards (Frameworks) in which redevelopment will be phased to prioritization.

Government may seek technical assistance from all the line department i.e. DUP&SP, Town Planning Department, Municipal Corporation, secretariat of Commissioner and Deputy Commissioner. A committee

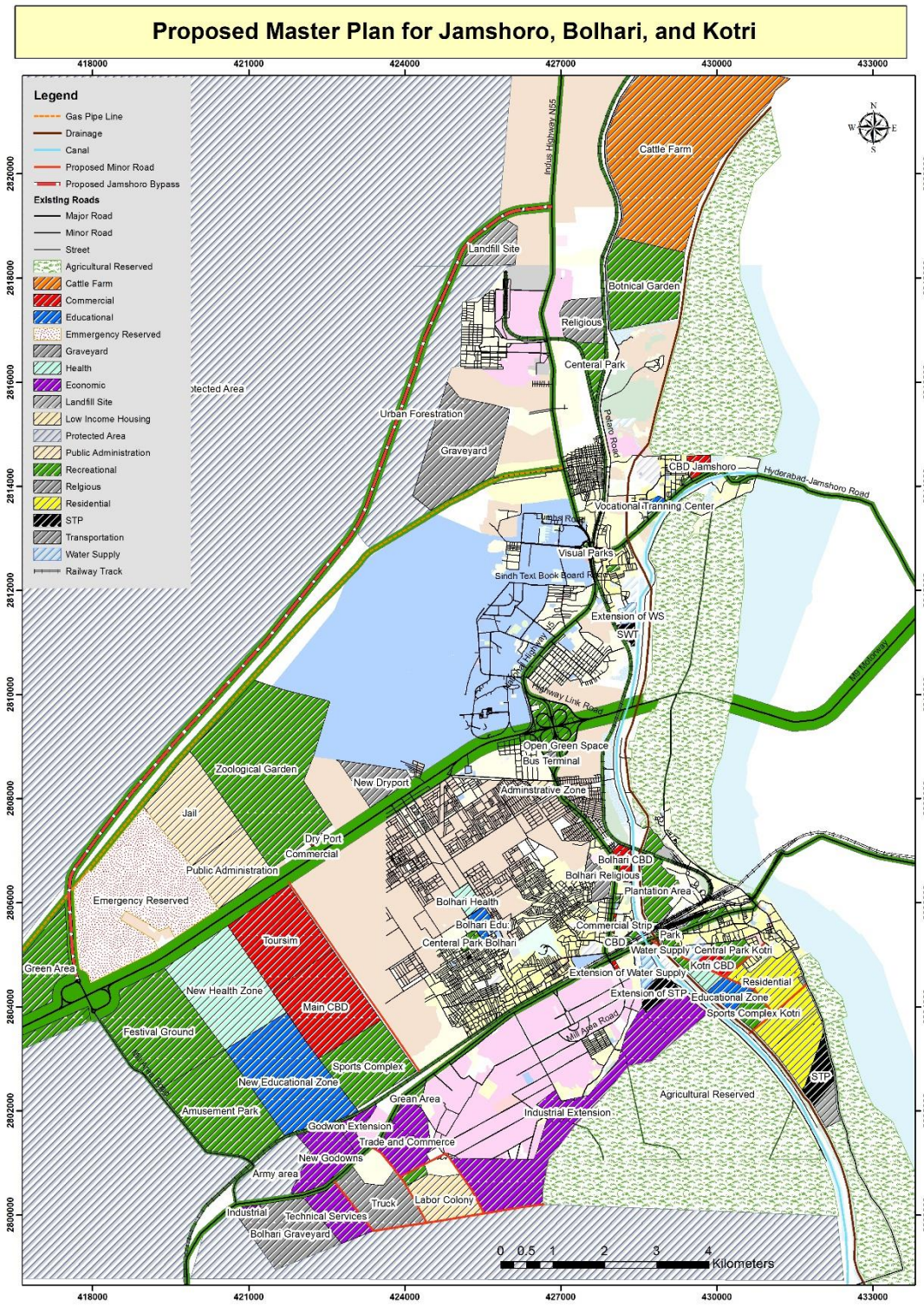
would be formed as the "Project Management and Implementation Unit" (PMIU) to implement on the Strategic Development Plan. The "Project Management and Implementation Unit" will mainly consist of qualified town and urban planners supported by other technical staff; architects, project managers, engineers, finance officers and any other technical staff expert in their relevant fields.

The "Project Management and Implementation Unit" shall supervise and coordinate respective urban developers involved in development activities, conduct monitory audits, prepare evaluation and impact reports. Planning and development department Government of Sindh shall lead "PMIU" to implement Master Plan.

F. STRATEGIES FOR FUTURE DEVELOPMENT

The strategies focus on revitalization of the affordable housing, provision of basic facilities, efficient transportation and communication, energy efficient technology, active service sector, implementation of pro-active governance, develop human resources, facilitate social infrastructure, reinforce the local governance institutions, modernize administration, preservation of heritage, sustainable environment, develop tourism resources, involve community participation and implementing Public-Private Partnership.

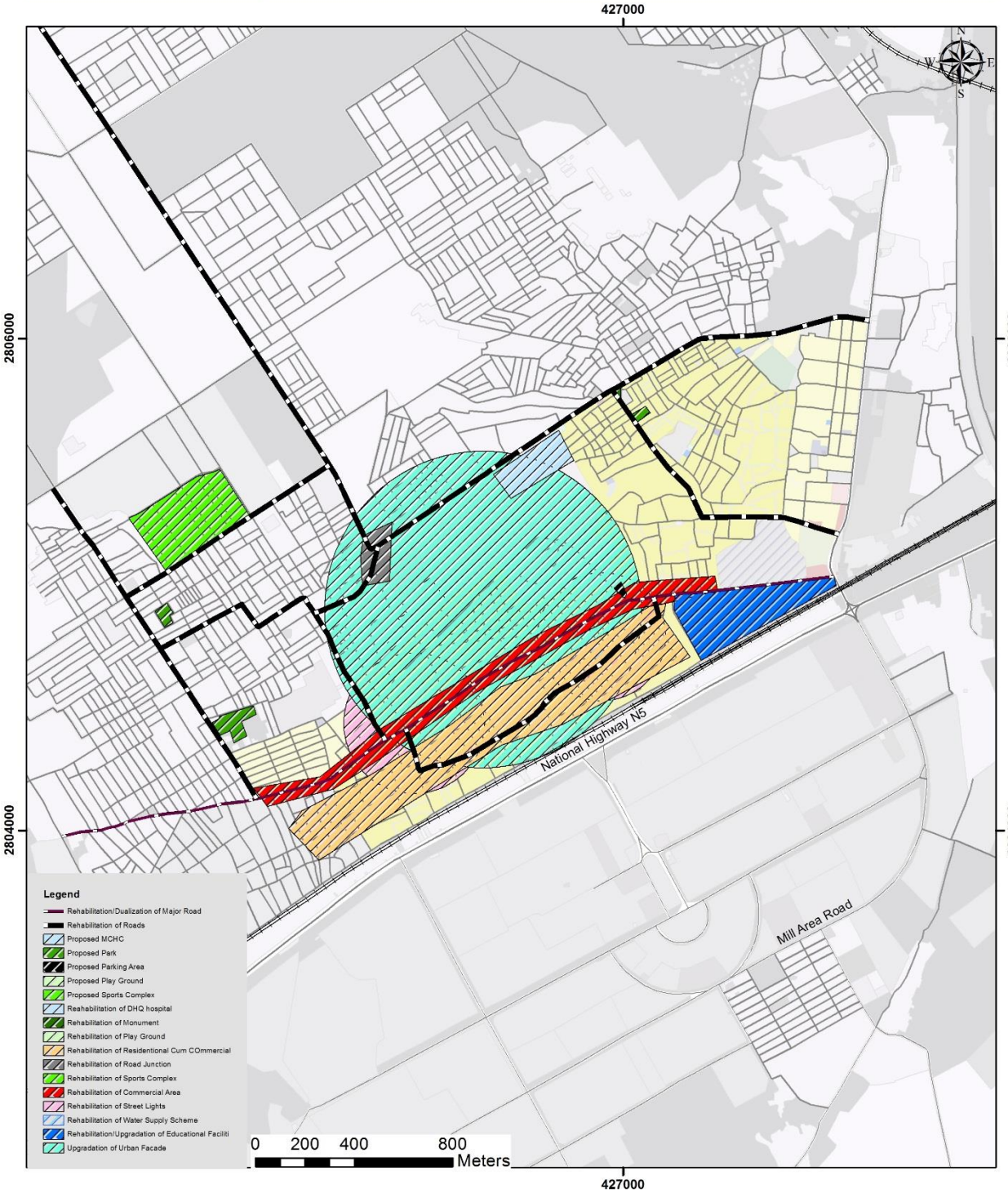
G. MASTER PLAN PROPOSALS



H. Immediate Action Plan for Core Urban Area

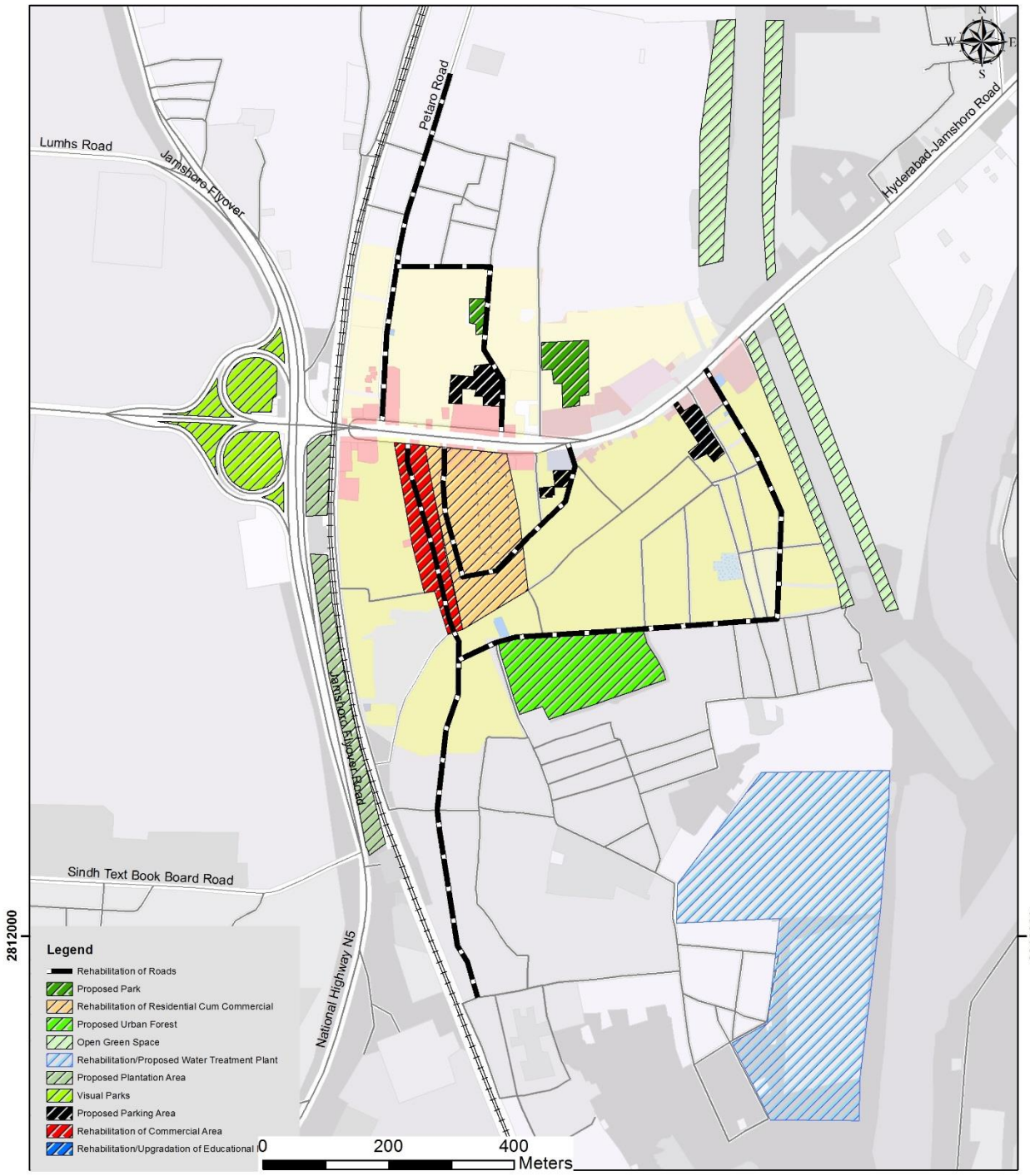
1. Bolhari

Proposal for Core Urban Area of Bolhari

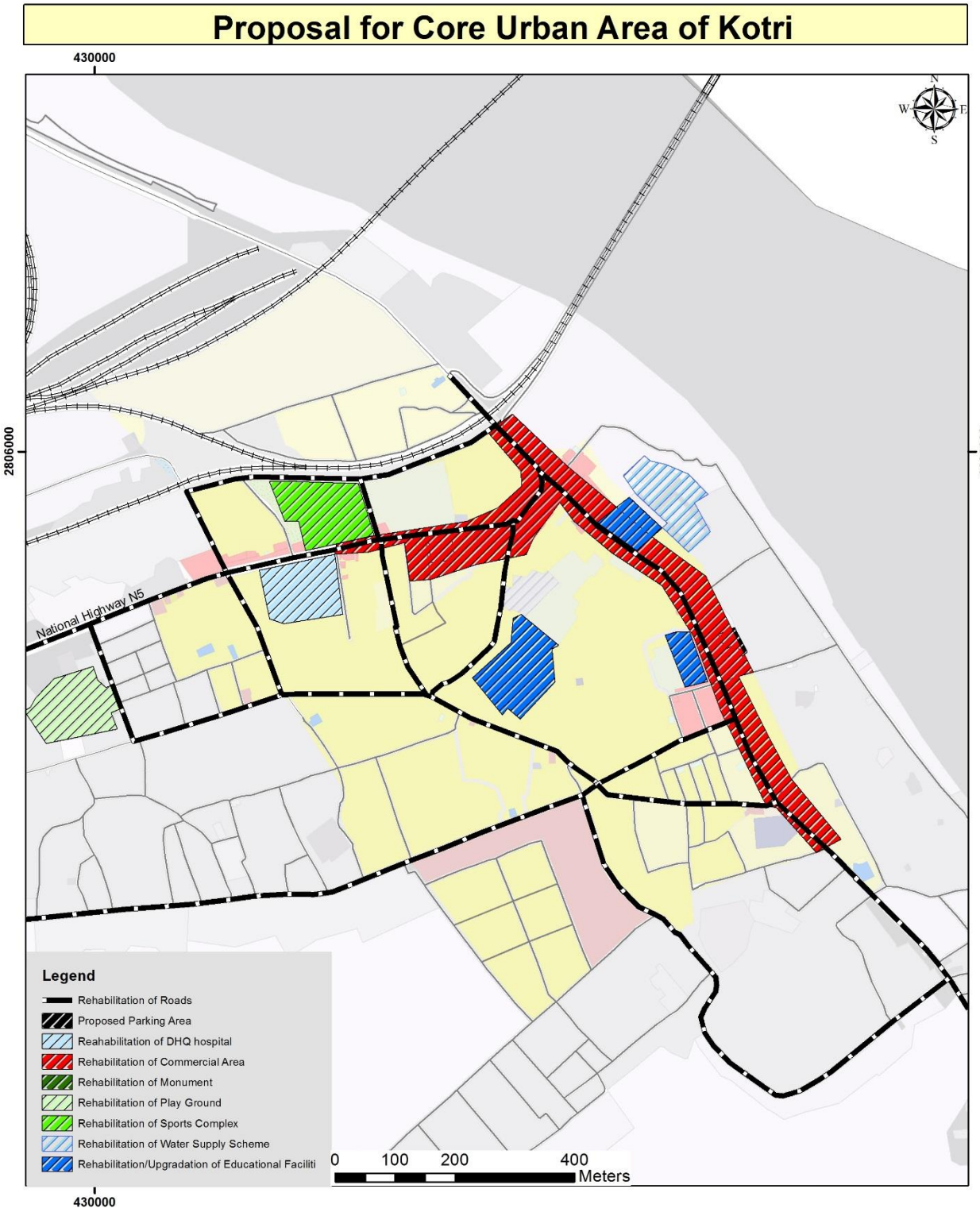


2. Jamshoro

Proposal for Core Urban Area of Jamshoro



3. Korti


Proposal for Core Urban Area of Kotri
430000
2806000
National Highway N5
Legend
Rehabilitation of Roads
Proposed Parking Area
Reahabilitation of DHQ hospital
Rehabilitation of Commercial Area
Rehabilitation of Monument
Rehabilitation of Play Ground
Rehabilitation of Sports Complex
Rehabilitation of Water Supply Scheme
Rehabilitation/Upgradation of Educational Faciliti
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I. SDGS ACCELERATION PLAN:

Under the contract of the Preparation of Development Master Plan of 14 DHQ towns, SDG Acceleration Plan was not part of the approved TORs, however keeping in view the Sindh Government's initiatives to mainstream SDGs targets in provincial planning (taking Islamkot as a model SDG Taluka) the Directorate and Consultant after due consultative process felt the need to include brief SDG Acceleration Plan as part of Development Master Plans. Further in consultation with SDG Unit Sindh, SDG 11 – *Sustainable Cities and Communities* was selected for SDG Acceleration Plan for 14 DHQ towns, since it is pertinent to urban planning and development. Please refer Annexure (A) for brief SDGs Acceleration Plan.

1. SINDH – AN OVERVIEW

Sindh is the most urbanized province in Pakistan. Due to lack of interest in the planning and development of secondary cities District Headquarters towns, the public funding in development infrastructure had been sporadic resulting in un-informed adhoc decisions. Consequently the secondary cities have not been able to play their role as "Engines of Economic growth" and hinterland has remained poor facing abject poverty due to less economic opportunities and social facilities. The poverty head count ratio in the urban-cum-rural areas is almost double than that in the declared urban areas.

Sindh government took initiative by establishing Directorate of Urban Policy and Strategic planning within the P & D Department initiate and ensure planned growth of Secondary cities through the Preparation of Master Development Plans of District Headquarter Towns in September 2008.

1.1 Project Background

Sindh, Pakistan's second most populated province plays a pivotal role in the national economic and development agenda. The country's largest port city, Karachi, is the financial capital of the country. The Province comprises of 23% of Pakistan's population and 18% of its land area. It has the highest concentration of urban population at 49% as compared to an overall country average of 32.5%, making it the most urbanized province in the country. With 23% of country's population, its contribution to the national GDP is around 33%. Sindh collects 70% of Pakistan's Income Tax and 62% of Sales Tax.

Sindh has 54% of country's textile units, 45% of its sugar mills, 20% of pulp & paper mills and 35% of edible oil processed locally. Sindh accounts for 34% of total industrial capacity in large scale manufacturing and 25% of small scale manufacturing. Moreover the Province produces 70 % of Country's gas, 30% petroleum and 95% of Coal.

Despite global economic slowdown towards the end of 2008 and Pakistan's solidarity with the International cause for peace, playing a key role as the front line state, Sindh's manufacturing sector has been resilient and investments have continued to pour in the economic cycle. MNCs and local enterprises are committed to make investments worth around USD 8.0 billion in the province in coming years.

Sindh's diversified economy also comprises of a well-developed agricultural base supported by an effective irrigation network on the River Indus. Around 14% wheat, 30% rice, 30% sugar cane, 25% cotton and 30% vegetable crops grown in Pakistan are from Sindh. This provides immense opportunity for setting up export based agri-processing industry in the province. (http://www.sbi.gos.pk/sindh-economy.php).

1.2 General Issues

Despite of its significant contribution in National GDP, Sindh has not received the priority in development funding as it deserves. DUP&SP is the medium through which grass root development / strategy is being formulated by professionals for the betterment of people and create de-centralize economical hubs to counter higher migration rate towards developed urban centres resulting better socioeconomic condition of the people. While going through the available literature so far, several issues have been identified in this regards, such as:

- Non-existence of Sustainable planning policy, apparatus, regulatory framework and its implementation;
- Absence of current housing policy based on sustainable and smart growth mechanism;
- Lack of coordination between institutions responsible for development of a town or Absence of Institutional Framework.
- Previous Master / Development / Structure Plans of Town Planning Department have hardly been implemented due to poor implementation mechanism;
- Local cultural preferences and settlement patterns undermine the role of urbanization in supporting economic growth;
- In most of the District Headquarters Towns, in-effective municipal infrastructure and service delivery is a common cause of failures in water, waste water, SWM, etc.
- Non-existence of spatial and non-spatial database systems;

1.3 Objectives

The objective of the assignment, as mentioned in the TORs is to prepare Development Master Plans of Fourteen (14) District Headquarter Towns of Hyderabad, Mirpurkhas and Shaheed Benazirabad Divisions; for development of spatial planning and zoning system as well as local economic development strategies on the basis on ecological sustainability.

The Consultant is tasked to prepare strategies:

- To plan for social infrastructure at affordable standards for education, health, recreation and cultural needs.
- To upgrade the existing physical infrastructure and enhance the supply of potable water and to propose the required capacity of network for water supply, sewerage, drainage, flood waters till year 2037.
- To provide for modern sanitation, solid waste management and disposal.
- To improve existing road networks, extend links, upgrade intersections, bridges and flyovers; and other means of communication and proposed where needed.
- To provide for safe and efficient public transport.
- To plan for effective traffic management, smooth transit and provide for parking facilities, where required in multi-storey car parks.

- To plan for enhancement and revitalization of economic base by expansion of industrial and commercial base, and for rapid expansion of IT and Telecom sectors, tourism, agricultural activity, etc in the means of sustainable and smart concept.
- To propose alternate energy sources as country is facing acute shortage especially in summer season.

1.4 The Strategic Plan output

The proposed Development Master Plans of selected District Headquarter Towns of Sindh would focus on the following Tasks

- Review of Past Trends, Development Strategies and Prevalent Conditions
- Preparation of Digital Base Maps
- SWOT Analysis
- Carving out a Vision for the Future of these cities
- Preparation of Development Plan comprising of:
    - Long Term Development Plan
    - Growth Scenarios
    - Short Term Action Plans for Priority Infrastructures
    - Immediate Action Plan for the Core Urban Areas
    - Economic Development Plan
    - Disaster Management Plan and
    - Climate Change, Resilience & Adaptability Plans

2. AN OVERVIEW OF JAMSHORO AND ITS ENVIRONMENT

2.1 History

District Jamshoro is situated in the western part of the Sindh province. In 2004, Jamshoro was made a district after carving it out of district Dadu. According to the 1998 census, the population of taluka Kotri (now District Jamshoro) was 582,094 persons with only 23% urban population and 77% rural population whereas an average annual growth rate is 2.57 with household size 5.7 but in census 2017, the population of District Jamshoro is 993,142 with 44% urban population and 56 rural population. This district is bounded by the north with Dadu district, on the east River Indus separates it from Shaheed Benazirabad, Matiari and Hyderabad districts, on the south lies Thatta district, south-west Karachi district and on the west Khirthar Range make its boundary, which separates Sindh and Lasbela district of Baluchistan.

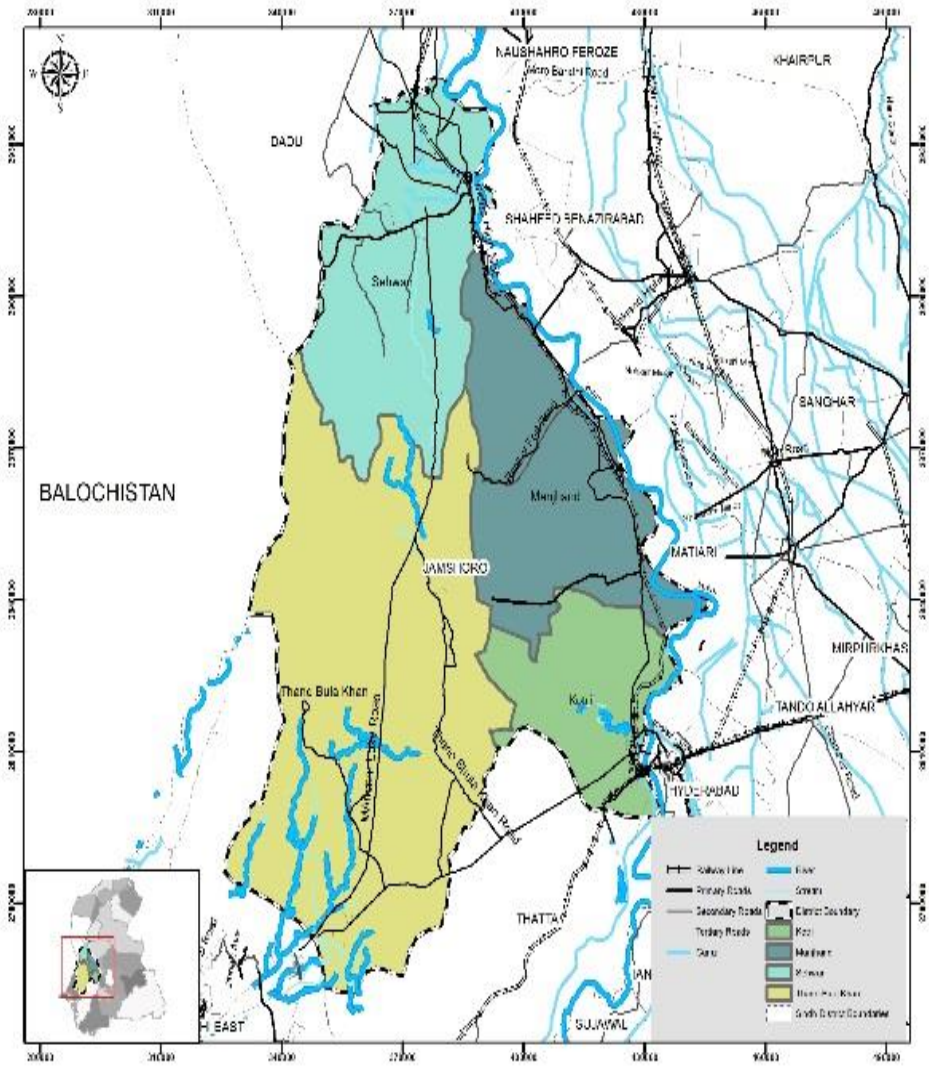


Figure 2:1: Tehsil Map of Jamshoro

After the independence of Pakistan, in 1947, district Jamshoro remained a part of district Dadu. This area continued to be neglected by the authorities but the gradual process of development has changed this district significantly. In 2004, Jamshoro was made a district after carving it out of district Dadu.

District Jamshoro has its district headquarters at Jamshoro city. This district has four talukas, named: Sehwan, Kotri, Thano Bula Khan and Manjhand. It has 28 union councils and 174 mouzas (revenue village). Out of these mouzas, 139 are rural, 6 are urban, 11 are partly urban and 13 are un-populated mouzas.

2.2 Topography and Geology

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.[4] 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.[5]

2.3 Geographical Location and Area

District Jamshoro lies in 67° 16” 20’ to 68° 27” 37’ east longitudes and 24° 58” 14’ to 26° 36” 33’ north latitudes. This district is bounded by the north with Dadu district, on the east River Indus separates it from Shaheed Benazirabad, Matiari and Hyderabad districts, on the south lies Thatta district, south west Karachi district and on the west Kherthar Range make its boundary, which separates Sindh and Lasbela district of Baluchistan.

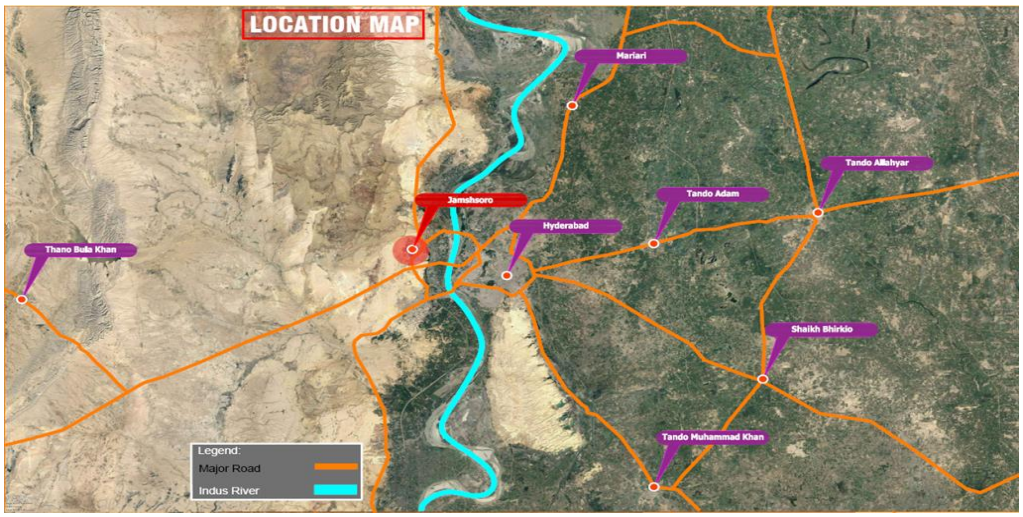


Figure 2:2: Location map of Jamshoro

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

[5] https://www.adb.org/sites/default/files/project-documents/48404/48404-003-iee-en.pdf

2.4 Administrative Set-up

District Jamshoro has its district headquarters at Jamshoro city. This district has four talukas, named: Sehwan, Kotri, Thano Bula Khan and Manjhand. It has 28 union councils and 174 mouzas (revenue village). Out of these mouzas, 139 are rural, 6 are urban, 11 are partly urban and 13 are un-populated mouzas.

Table 2-1: Administrative Division of District Jamshoro

Jamshoro	Kanungo Circles/ Supervisory Tapas	Patwar Circles/ Tapas	Number of Mouzas					
			Total	Rural	Urban	Partly Urban	Forest	Un-Populated
Sehwan Taluka	3	20	71	58	4	3	1	5
Kotri Taluka	2	7	26	22	2	1	1	-
Thano Bula Khan Taluka	1	8	28	26	-	2	-	-
Manjhand Taluka	2	12	49	33	-	5	3	8
Jamshoro District	**8**	**47**	**174**	**139**	**6**	**11**	**5**	**13**

Source: Mouza Statistics of Sindh 2008, Agriculture Census Organization.

2.5 Population

Jamshoro was part of kotri MC till 2017 now it has been separated as a Town Committee, so, in stakeholders meeting the point was discussed to take combine population of Jamshoro TC, Kotri MC, and Bolhari MC to get the district headquarter town population and treat the combination of two MC's and One TC's as a single headquarter Town. In 1998 population of the project area (Kotri MC + Jamshoro TC+ Bolhari MC) was 143,466 souls with an average household size of 6.7.

2.5.1 Present Population

According to the census 2017, the population of the towns has increased to 293,798 with an annual average growth rate of 3.84% which indicates a decreasing trend in growth.

Table 2-2: Past Population Growth in Kotri MC + Jamshoro TC+ Bolhari MC

Project Area	Population		AGR		Average Household Size	
	Census 1998	Census 2017	Census 1998	Census 2017	Census 1998	Census 2017
Kotri MC + Jamshoro TC+ Bolhari MC	143,466	293,798	--%	3.84%	6.7	5.8
Kotri Taluka	207,574	437,561	3.08%	4.0%	6.1	5.8
Jamshoro District	582,094	993,142	2.64%	2.85%	5.6	5.5

2.5.2 Future Projections

According to the 1998 census, the population of the project area (Kotri MC + Jamshoro TC +Bolari MC) was 143,466 souls. In the 2017 census, its population increased to 293,798. The projected population of

the project area works out to be 624,277 by 2037. The project area has a slow growth in terms of population as depicted in the table and graph below.

Table 2-3: Future Projections for the project area

Area	Census 2017	Projected 2022	Projected 2027	Projected 2032	Projected 2037
Kotri MC + Jamshoro TC+ Bolhari MC	**293,798**	354,709	428,248	517,034	624,277
Jamshoro District	993,142	1,142,965	1,315,389	1,513,825	1,742,197

Source: Census 2017 and Consultant's Estimates

*2.5.3 **SWOT Analysis:***

STRENGTH	WEAKNESSES	OPPORTUNITY	THREATS
DEMOGRAPHY			
1. Different ethnic groups live in harmony. 2. Young population proportion is high. 3. Sufficient land available for new growth and up-gradation/development. 4. 57% of urban population is in working age group b/w 15 years to 64 years.	1. High demand for job and employment. 2. Shortage of middle age and senior skilled professionals. 3. Limited opportunities to hire people to work in public and private sector. 4. Impact on public and private sector employment.	1. Intervention 2. A large number of future professionals in any specific field can be produced. 3. Efficient distribution of utility services in urban areas. 4. Good labour force is available.	1. Intra state migrations of skilled professionals. 2. Unemployment (can give birth to social crime). 3. Child labour due to shortage of education facilities. 4. Uncontrolled informal development. 5. Infrastructure deterioration.

2.6 Urban Morphology

Kotri city is the best example of ribbon development. The entire city is expanding towards the north-west direction of railway track and National Highway N-5, whereas the N-E direction is purely resident and some part is mixed-used (residential and commercial). Another part which is south-east, purely industrial use and most of the industrial units are not working or non-functional nowadays. The internal road pattern of the city is based on gridiron pattern.

The administrative complex and offices are situated along national highway N-55 and national highway N-5 Road. District headquarter town can be divided into two tracts northern and southern tracts. ater, the city started growing both sides of Kotri-Thatta Dual carriageway road and Karachi-Kotri railway track. Mostly public projects established along the Karachi-Hyderabad Motorway M-9 and Indus Highway road longitudinally. A well know low-income housing project Khuda ki Basti also present north-west of the Kotri town.

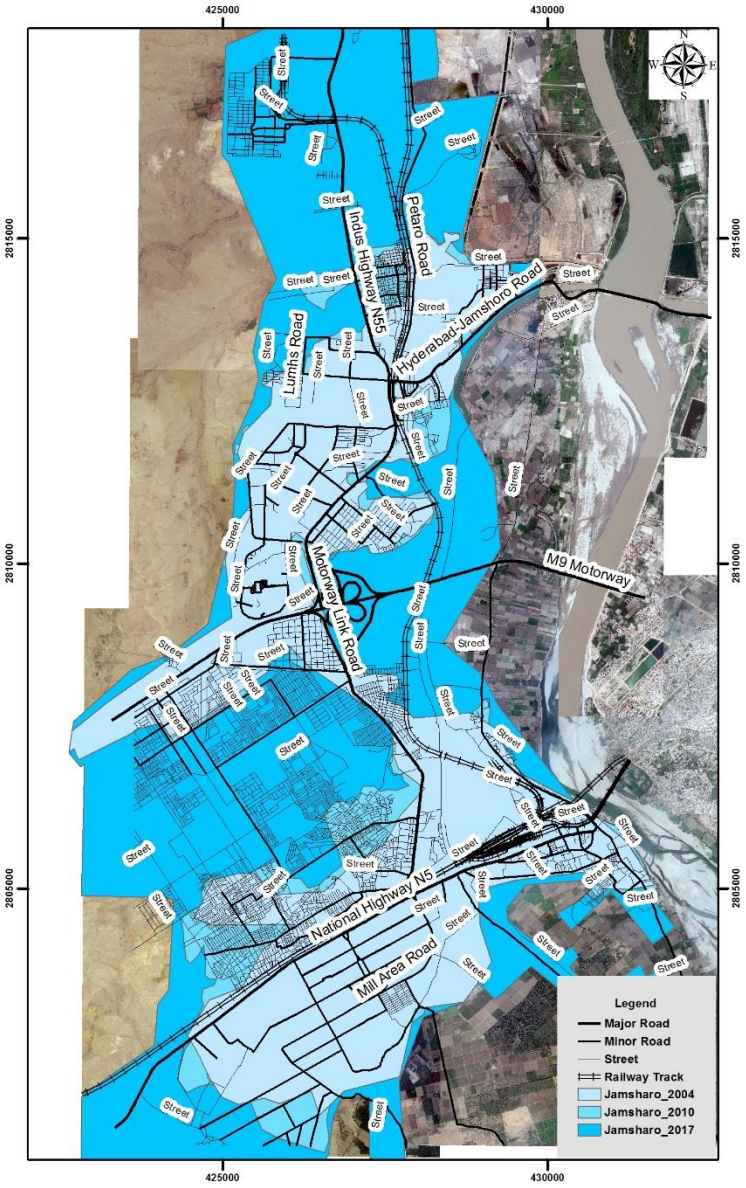


Figure 2:3: Historical Growth of Project Area

2.7 Land Use and Spatial Analysis

The built-up area of the project area comprises around 16,711.2 acres of land which is around 43% as compared to the consultant's suggested urban boundary which is 38,941.0 acres. The land use analysis indicates that almost 17.2% of the total urban boundary area is in use of residential purposes only. 20.7% of the area is covered by agriculture fields.

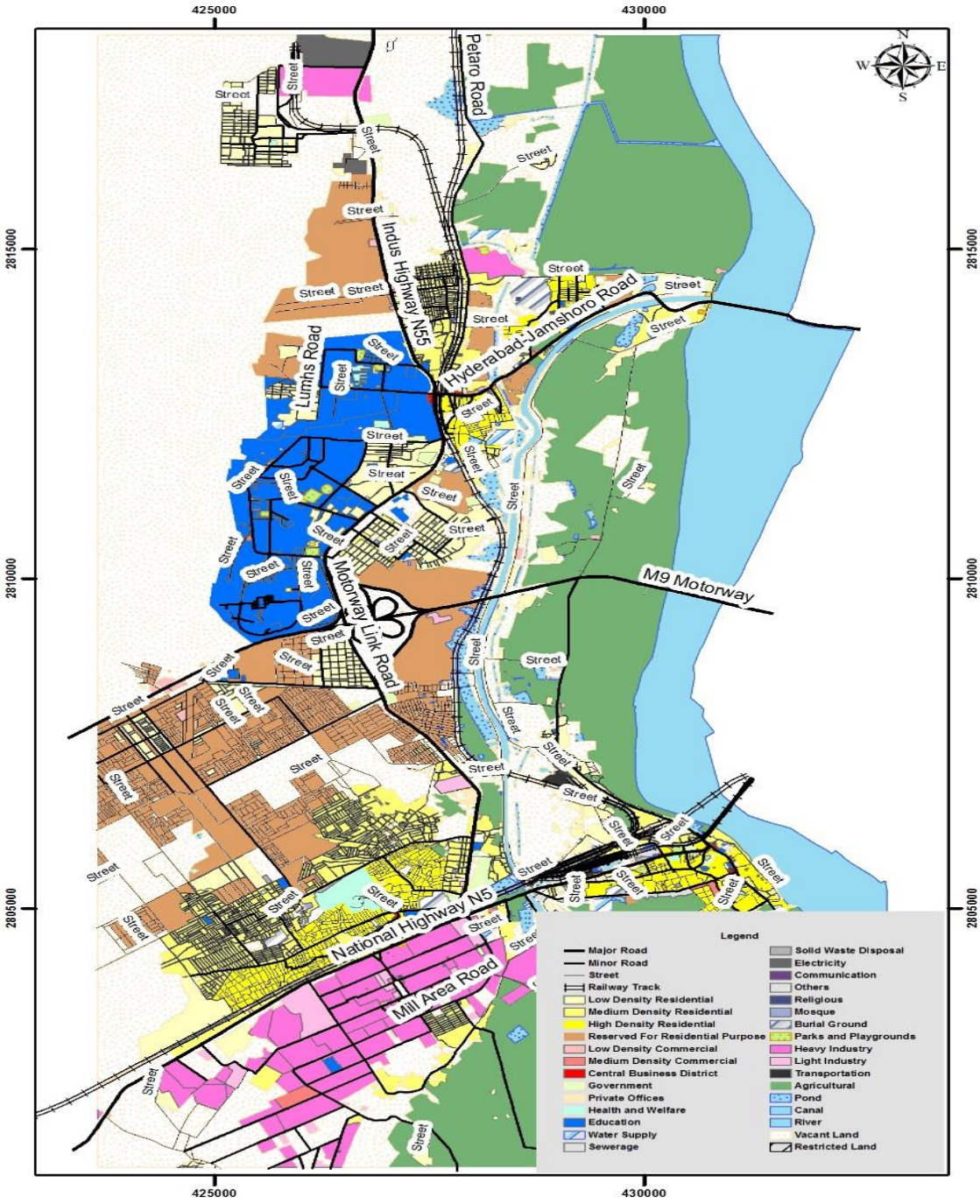


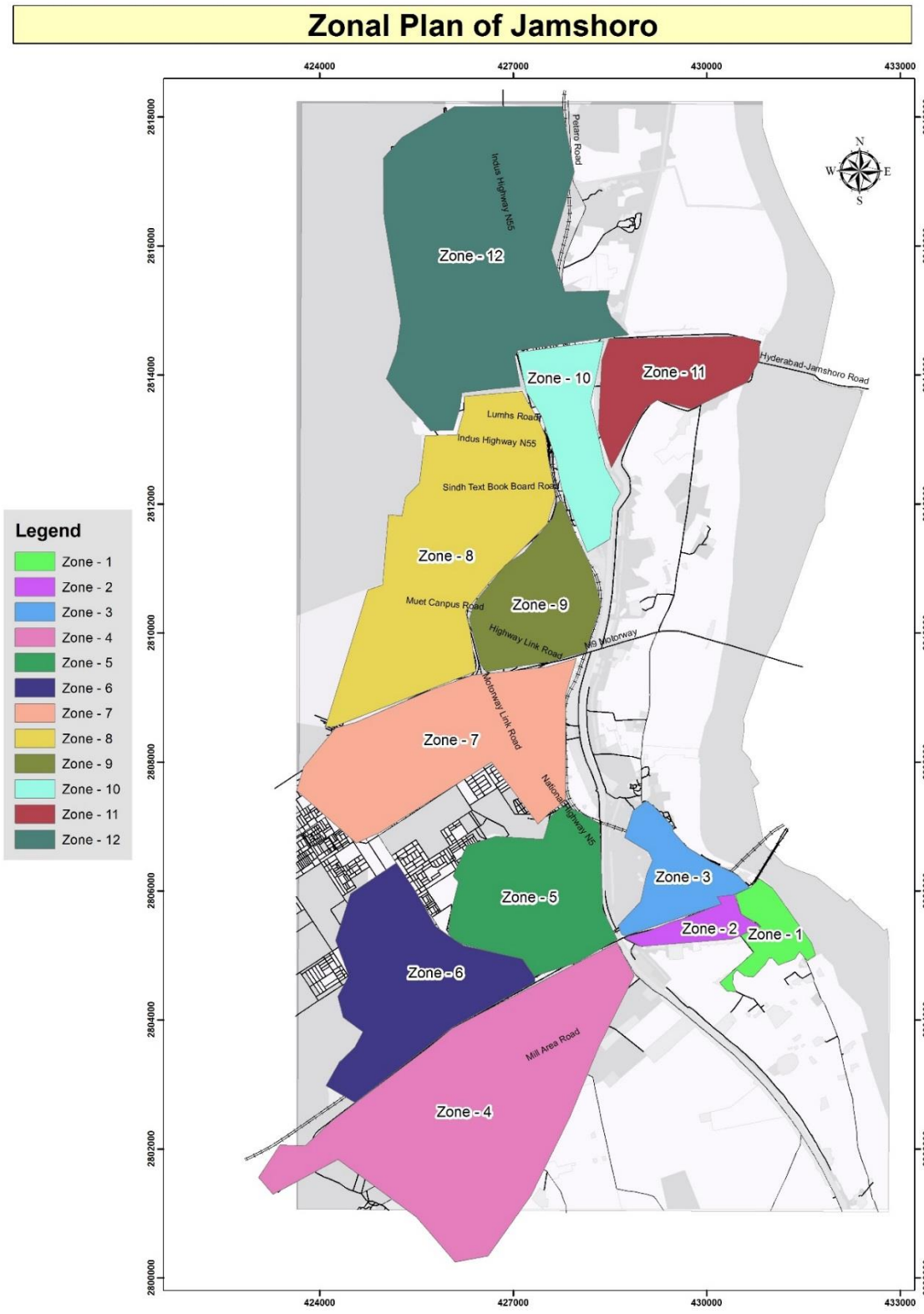
Figure 2:4: Land use Map of Project Area

Table 3-5: Land use Classification and Percentages[6]

Project Area (Jamshoro MC + Kotri TC) (URBAN BOUNDARY)				38,941.0
CATEGORIES	**LANDUSE CLASSIFICATION**			**AREA**
URBAN	Residential	Residential	Low Density Residential	1,677.3
			Medium Density Residential	1,525.8
			High Density Residential	811.3
			Proposed Housing Schemes	2,669.599
	Sub Total			6,684.0
	Commercial	Commercial	Low Density Commercial	64.69
			Medium Density Commercial	46.71
			High Density Commercial	22.85
	Sub Total			**134.3**
	Parks and Playground	Parks and Playground	Parks and Playgrounds	46.77
	Sub Total			46.8
	Amenities	Institutional	Education	1,480.33
			Public Administration	153.57
			Health And Welfare	107.8
			Private Institutions	0.326
			Religious	21.31
		Utilities And Municipal Service Facilities	Electricity	106.7
			Sewerage	38.14
			Communication	2.88
			Water Supply	77.18
		Burial Ground	Burial Ground	126.94
	Sub Total			**2,115.2**
	Industrial	Manufacturing	Small-Scale Manufacturing/ Light Industry	187.5
			Large-Scale Manufacturing/ Heavy Industry	1,485.6
	Sub Total			**1,673.1**
	Transportation	Transportation	Transportation	6,057.97
	Sub Total			6,058.0
	Sub Total			**16,711.2**
NON-URBAN	Agriculture And Forestry		Agricultural	8,076.995
	Sub Total			8,077.0
	Water Bodies		Canal	304.31
			River	3,220.5
			Water Bodies	556
	Sub Total			4,080.8
	Vacant Area			10,055.36
	Restricted			16.62
	Total			10,072.0
TOTAL				**38,941.0**

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

2.8 Town Scape



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.

This zone also contain 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.

3. VISION FOR STRATEGIC DEVELOPMENT PLAN OF JAMSHORO

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.

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 Jamshoro DHQ town 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) Although the participants generally understood that vision should reflect citizens and stakeholders' aspirations as to where they want to see their town in twenty years from now. However, their focus has been remained on the resolution of immediate problems namely; supply of clean drinking water, sewerage and drainage, solid waste disposal, traffic congestion and parking, better health and educational facilities, cleanliness, parks and play areas. It is clear that far flung high sounding vision statements, are meaning less for them if the immediate problems are not urgently solved.

2) The participants showed concern regarding high rate of population growth and migration. Urbanization and uncontrolled land use conversion is eating away lots of urban agricultural land and breaking social fabric of residential communities. Need for land management system has been stressed.

3) The socio- economic uplift of the population has been mentioned by most participants, which include provision of basic needs of housing facilities with sustainable utility services, health, education, parks and playgrounds, employment and income generation.

4) Peace, safety, security and proper governance are envisioned by the participants as the ultimate goal for the twenty year Jamshoro's Strategic Development Plan. Whereas the Vision will remain static, the path to reach the vision may be subject to adjustments to account for ground realities.

3.2 Jamshoro's Vision Statement

The visioning process stems from the Stakeholders' Vision of the town which have been translated into tangible and concrete targets. The discussions in the Workshop that most people want to see:

Where a lot of investment is expected to be made;
The priority will first be given to improve the Core Urban Area of DHQ town. And then could go to remaining town and Peri-urban areas.

Existing utilities including water supply, sewerage & drainage as well as facilities are in bad state of repairs due to shortage of funds. The government should make sufficient fund allocations for the repairs and rehabilitation of existing facilities.

JAMSHORO VISION 2037

"The city full filling all the basic needs, such as housing, water supply and sanitation, in clean and sustainable pollution free environment, with education and health for all, along with growth in local and regional economy with increase in employment, incomes and related skills development to emerge as well planned modern city with peace, security and prosperity like some of the best most liveable cities in the world."

PROPOSED MASTER PLAN OF JAMSHORO DHQ TOWN

4. PROPOSED MASTER PLAN OF JAMSHORO

4.1 Spatial Pattern

In 2004, Jamshoro was made a district after carving it out from District Dadu and it lies in the western part of the Sindh Province. Jamshoro District is bounded by Dadu District from north, on the east River Indus separates it from Shaheed Benazirabad, Matiari and Hyderabad Districts, on the south lies Thatta District, southwest Karachi Division and on the west Kirthar Range make its boundary, which separates Sindh and Las Bela District of Baluchistan.

Since the lands of this district lie at the bottom of the Kirthar mountain range having high altitude as compared to Indus River. The area of the district is mostly arid and barren with some vegetation and due to the hilly nature of the land, cultivation is scarce in the district. However, the district is rich in minerals like limestone, gravels, and marbles.

Secondly, there is no canal system available in this district and only perennial water is available for cultivation. Besides, katcha area, irrigated croplands are on the border and alongside the Indus River. Thus the agriculture production is not as efficient as in other districts of Sindh Province. Nonetheless, with the given water resources and climate; wheat, cotton, maize, and vegetables are grown in this district.

Sehwan Town is famous for the shrine of great saint Lal Shahbaz Qalandar, thousands of people from all over the country come for ziarat and pay tribute during Urs every year. Manchar Lake is also one of the well-known places of Sehwan because it is the largest sweet water lake in the Asian continent.
Moreover, Dargah of Hyder Shah Sanni, Ranikot Fort, Lakhmir-ji-Mari, Sehwan Fort and Kotri Barrage are also famous places of Jamshoro District.

The main means of transport and communications in Jamshoro District are roads and railways. Kotri Junction station is among the oldest railway stations in Pakistan. The district is linked with the national network of Pakistan Railways through Karachi-Kotri Railway Line and Kotri-Dadu Railway Line. The DHQ Town of Jamshoro is linked with its taluka headquarters of Thano Bula Khan, Manjhand and Sehwan through metaled roads.

The National Highway N5 connecting Karachi and Peshawar passes through this district. In addition Karachi-Hyderabad Motorway M9, connecting Karachi and Hyderabad, also crossing Jamshoro City. Also Indus Highway N55 is connected through the district, going towards Dadu. The administrative complex and offices are situated along Indus Highway N55 and National Highway N5. Mostly public projects established along the Motorway M9 and Indus Highway N55.

District Headquarter Town of Jamshoro District, is comprises of Kotri MC, Bolhari MC and Jamshoro TC; and can be collectively named as **Jamshoro Town**. In other words, Jamshoro Town is a combination of Educational Hub (Jamshoro), Economic Hub (Bolhari), and Transport Hub (Kotri):

- **Jamshoro** 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. At present educational hub of Jamshoro mainly includes: University of Sindh, Liaquat University of Medical and Health Sciences, and Mehran University of Engineering and Technology.

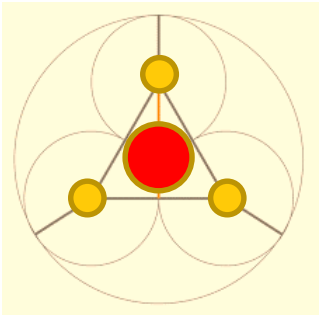
- **Kotri** is an old area in southeast side, it is the best example of ribbon development along transport corridors. The entire area is expanding along Railway Line and National Highway N5, whereas the remaining town is purely residential with some mixed-used (residential and commercial).

- **Bolhari** is mainly an industrial based area i.e. Sindh Industrial Trading Estate, lies in southwest direction. Its internal road pattern is based on gridiron pattern. A well know low-income housing project Khuda ki Basti also present in this area, on the other side of National Highway N5 and Railway Line.

4.2 Basic Urban Form

The three existing towns are collectively forming a large size lively and thriving urban center of Jamshoro Town that fulfils the socio-economic and financial needs of its population and of surrounding towns. Specially those are not along major connectivity corridors are benefited, like Thano Bula Khan and Manjhand Talukas.

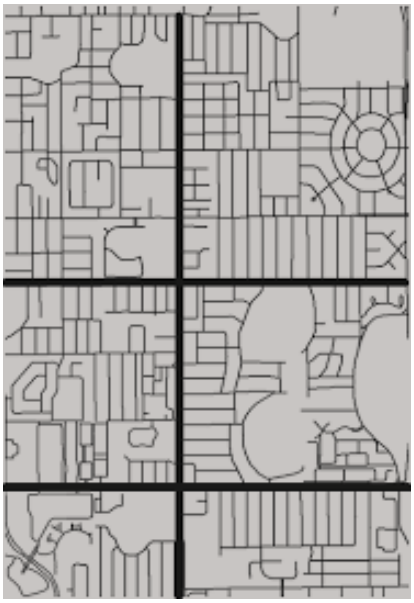
It is no surprise then that the population demands the uniqueness and prominence of the existing towns to be maintained or enhanced in the future plan. During the stakeholder's conference, the towns' elders insisted that any future urban development detached from the existing towns making the existing towns redundant, will not be acceptable to them. The existing core towns would naturally be the physical nuclei of the future DHQ Town, and the future development will grow from it in all directions in form of different sectors.



At present there are three national roads including, Indus Highway N55, National Highway N5 and Karachi-Hyderabad Motorway M9. Out of these N5 and M9 are parallel to each other while crossing Jamshoro, Bolhari and Kotri. The M9 Motorway is exclusively connecting Karachi and Hyderabad passing through Jamshoro. While N5 is starting from Karachi, crossing Sindh from right bank, linking major cities of Multan, Lahore, Islamabad and ending at Peshawar. On the other hand, Indus Highway N55 is providing perpendicular link in between N5 and M9, moving towards Peshawar while crossing Punjab from left bank of River Indus.

Since Jamshoro Town is large enough in terms of its spatial spread, projected future population and functional hub of various activities; thus there is a need to suggest major outer connectivity. The east side of Jamshoro Town is aligned with River Indus and Hyderabad District, while Thatta District exists at a

suitable distance in south and west direction. Therefore, major connectivity is proposed in upward position, towards north of Jamshoro District. As the growth of town is expected to be more towards west, thus instead of ring road, a bypass in continuation from Mill Area Road, at leftward to Motorway M9 and Indus Highway N55 is proposed and named as Jamshoro Bypass.



In addition, there 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. Similarly, parallel to National Highway N5 and Motorway M9; Hyderabad-Jamshoro, LUMHS, SRTC and Zakriya Chohan Roads are forming horizontal connections. In this way, interconnection of the vertical and horizontal roads, sandwiched between the River Indus and proposed Jamshoro Bypass, will keeps the development compact.

4.3 Proposed Master Plan

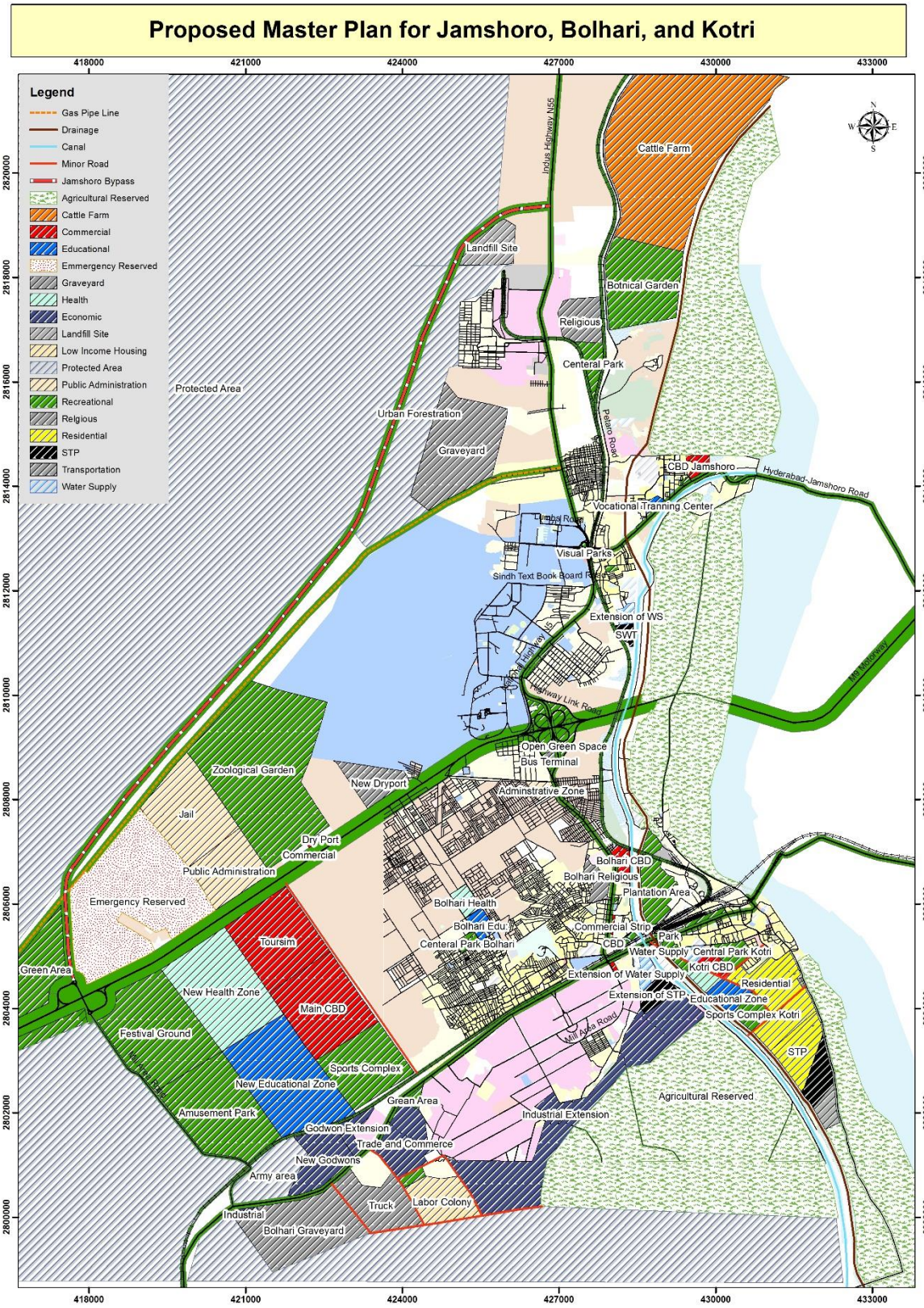
The Proposed Master Plan for Jamshoro has been prepared with the consideration of three phases as follows:

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 overall proposed Jamshoro Master Plan is 55,000 acres approx. for a population of 624,300 by 2037. In this way, Jamshoro Town in next twenty years is expected to have population density of 11 persons per acre and overall twelve housing units per acre with an average household size of 5.8.

The hallmark of the plan is that it is **compact without being congested**. As the future expansion of the Jamshoro Town is expected to be large size, thus the complete Proposed Jamshoro Master Plan is catering for all the needs of a full-fledged city of the future. Thus the plan will afford balanced development containing all required land uses.

The overall structure of the proposed plan is triangular in form, closed from east side, while open for development in northwest and southwest directions. The east side is bounded by River Indus and Hyderabad District, while on other sides till Mill Area Road and proposed Jamshoro Bypass, new development is proposed. After some extent these proposed development areas also have constraints of Thatta District Area and presence of hilly terrain with high altitude. However, agricultural fields and protective areas are proposed in all directions to limit the development.


Proposed Master Plan for Jamshoro, Bolhari, and Kotri
Legend
Gas Pipe Line
Drainage
Canal
Minor Road
Jamshoro Bypass
Agricultural Reserved
Cattle Farm
Commercial
Educational
Emmergency Reserved
Graveyard
Health
Economic
Landfill Site
Low Income Housing
Protected Area
Public Administration
Recreational
Relgious
Residential
STP
Transportation
Water Supply
418000
421000
424000
427000
430000
433000
2820000
2818000
2816000
2814000
2812000
2810000
2808000
2806000
2804000
2802000
2800000
Indus Highway N55
Cattle Farm
Landfill Site
Botnical Garden
Religious
Centeral Park
Protected Area
Urban Forestration
Graveyard
Petaro Road
CBD Jamshoro
Hyderabad-Jamshoro Road
Vocational Tranning Center
Umbrsi Road
Visual Parks
Sindh Text Book Board Road
Extension of WS
SWT
Indus Highway N55
Highway Link Road
M9 Motorway
Open Green Space
Bus Terminal
Zoological Garden
New Dryport
Adminstrative Zone
Jail
Dry Port
Commercial
Public Administration
Emergency Reserved
Bolhari CBD
Bolhari Religious
Plantation Area
Bolhari Health
Bolhari Edu:
Centeral Park Bolhari
Commercial Strip
Park
CBD
Water Supply
Central Park Kotri
Kotri CBD
Extension of Water Supply
Residential
Extension of STP
Educational Zone
Sports Complex Kotri
Toursim
Green Area
New Health Zone
Main CBD
Festival Ground
Mill Area Road
STP
Sports Complex
New Educational Zone
Grean Area
Agricultural Reserved
Amusement Park
Industrial Extension
Godwon Extension
Trade and Commerce
New Godwons
Army area
Truck
Labor Colony
Industrial
Bolhari Graveyard
N
S
E
W

The proposed Jamshoro Bypass is forming one side of the triangle, River Indus as other side and the National Highway N5 is a baseline. While, Indus Highway N55 is representing height of the triangle and Motorway M9 is passing from the horizontal center. Thus, in between Motorway M9 and National Highway N5, the New CBD is positioned as a focal point of Jamshoro Town with grid iron pattern. The other prime activities are also placed on either sides of Motorway M9 and National Highway N5, around the existing town, mostly within the proposed Jamshoro Bypass and River Indus. Most of New Roads are proposed, to provide indirect connection with motorway and highways via service lanes. Thus the intersection of these roads will create main junctions and forming different sectors.

Despite taking different aspects in to consideration, the Consultant suggest that the Master Planning should be reviewed every five years to estimate the land use and area requirement according to the growth rate and economic investment.

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 town. Adjacent to Main CBD a large Tourism Area is also proposed considering tourism potential. In addition, three CBDs are also identified in Bolhari, Kotri and Jamshoro; 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. Considering the location of existing Dry Port, New Dry Port has also been designated along Motorway M9. And a Public Transport Terminal is suggested near Jamshoro Interchange at M9 Motorway in center of the town and also accessible from Indus Highway N55.
- 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 northern direction, along Cadet College Petaro Road, to limit the town development further. It will also benefit the population of nearby villages and other settlements.
- New large scale areas for Health and Educational Zones, are placed adjacent to Main CBD and in between Motorway M9 and National Highway N5.
- Next to Main CBD; Sports and Cultural Complex is placed towards National Highway N5, while three Central Parks are proposed in each areas of Bolhari, Kotri and Jamshoro. Further large recreational areas are located for Amusement Park, Festival Grounds, Botanical and Zoological Gardens.

- The New Public Administration area is proposed along Motorway M9; to serve and manage this beautiful city of Jamshoro. Moreover an area for District Jail is also suggested behind Public Administration Area.
- 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, Jamshoro 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 Jamshoro 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 direction and ended at Indus Highway N55 after Thermal Power Station.

In this way, National Highway N5 is forming baseline with River Indus on right side, while Jamshoro 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.

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[7]. 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 Jamshoro as DHQ Town, secondary zoning i.e. Level-2, is also categorized accordingly, again in consideration to the NRM Standards[8]. The proposed land use zoning is shown in the table:

Table 4-1:Proposed Land Use Classification for Jamshoro

S.No	NRM STANDARDS		PROPOSED LAND USE CLASSIFICATION		
	Land Use Zoning	Land Uses (%)	Level - 1 Functional Zoning	Areas (acres approx.)	Land Uses (%)
1	Residential	40-45%	Residential	8,992	16.4%
2	Commercial	2-3%	Commercial	1,361	2.5%
3	Industrial	2-10%	Economic	5,380	9.8%
			Livestock		
			Industrial		
4	Institutional	3-5%	Health and Welfare	4,665	8.5%
			Educational		
			Religious		
			Public Administration		
5	Community Open Spaces	4-6%	Recreational	4,880	8.9%
6	Graveyards	2-3%	Graveyards	1,263	2.3%
7	Arterial Circulation & Terminals	15-20%	Transportation	9,861	18.0%
			Utilities and Services		
8	Protected Reserved	15-25%	Urban Forestation	18,520	33.7%
			Agriculture		
			Water Bodies		
			Vacant / Reserved		
	Total Area of Proposed Master Plan of Jamshoro Town			54,922	100%

[7] 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

[8] Standard Land Use Classification for Urban Jurisdictions in Pakistan, Appendix 10.1, page no. 398, National Reference Manual on Planning and Infrastructure Standards

The total area requirement for full fledge city of Jamshoro will be around 55,000 acres. As shown in the table of proposed land use classification, the percentages of residential area is lesser in comparison to the NRM standards, although the required number of housing 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.

S.No	PROPOSED LAND USE CLASSIFICATION FOR JAMSHORO TOWN						
	Level - 1 Functional Zoning	Level - 2 Functional Zoning	Areas (acres approx.)		Land Uses (%)	Areas (acres approx.)	Land Uses (%)
1	Residential	Existing Residential	6,684	8,992	16.4%	8,992	16.4%
		Present Housing Schemes	1,520				
		Labor Colony	231				
		New Residential	557				
2	Commercial	Existing Commercial	134	1,361	2.5%	1,361	2.5%
		Main CBD (Central Business District)	559				
		Tourism Area	528				
		CBD - Jamshoro	33				
		CBD - Bolhari	45				
		CBD - Kotri	46				
		Commercial Strip	16				
3	Economic	Trade and Commerce	265	899	1.6%	5,380	9.8%
		Warehouses	296				
		Technical Services	179				
		New Dry Port	159				
4	Livestock	Cattle Farms	1,907	1,907	3.5%		
5	Industrial	Existing Industries	1,673	2,574	4.7%		
		Industrial Extension	901				
6	Health and Welfare	Existing Health and Welfare	108	941	1.7%	4,665	8.5%
		New Health and Welfare Zone	740				
		Health Area - Bolhari	48				
		Health Area - Kotri	45				
7	Educational	Existing Educational	1,480	2,454	4.5%		
		New Educational Zone	833				
		Educational Area - Bolhari	46				
		Educational Area - Kotri	79				
		Educational Area - Jamshoro	16				
8	Religious	Existing Religious	21	243	0.4%		
		Religious - Jamshoro	158				
		Religious - Bolhari	64				
9	Public Administration	Existing Public Adminitration	154	1,027	1.9%		
		New Public Administration Area	348				
		District Jail	525				

10	Recreational	Existing Parks and Playground	47	4,880	8.9%	4,880	8.9%
		Zoological Garden	1,429				
		Amusement Park	675				
		Festival Grounds	742				
		Sports Complex	411				
		Botanical Garden	527				
		Cutural Complex	74				
		Central Park - Bolhari	25				
		Central Park - Jamshoro	70				
		Central Park - Kotri	68				
		Plantation	232				
		Green Area	580				
11	Graveyards	Existing Graveyards	127	1,263	2.3%	1,263	2.3%
		New Graveyard - Jamshoro	751				
		New Graveyard - Bolhari	385				
12	Transportation	Existing Transportation	6,058	9,109	16.6%	9,861	18.0%
		Public Transport Terminal	16				
		Truck Transport Terminal	285				
		Road Network	2,750				
13	Utilities and Services	Existing Utilities and Services	225	752	1.4%		
		Water Supply	102				
		Sewerage	188				
		Land Fill	237				
		Electricity					
14	Urban Forestation	Urban Forestation	1,650	1,650	3.0%	18,520	33.7%
15	Agriculture	Agricultural Reserved	10,514	10,514	19.1%		
16	Water Bodies	Canals and Ponds	5,113	5,113	9.3%		
17	Vacant	Emergency Reserved	1,243	1,243	2.3%		
		Total Area for Future Development of Jamshoro	54,922	54,922	100%	54,922	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 9,000 acres of residential land use is proposed, which will create twelve housing units per acre on average. Thus in overall town more than 108,000 housing units are expected to be in town by 2037.

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 of 230 acres 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:

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

New Residential Scheme [9]		
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

- **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

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

Houses - Applicable SBCA Bylaws[10]					
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 Jamshoro Town, the trend of vertical residential and commercial development is existing more than other DHQ Towns 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[11]					
Types	**Densities[12] 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)

4.4.2 Commercial Zone

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

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). 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.

  Jamshoro is famous for Gorakh Hill Station, which is situated towards west side of the town at a distance of 80 kilometers, accessible via Johi Link Road. It is one of the highest plateaus of Sindh, spread over 2,500 acres (10 square kilometers) of land. Considering the potential of tourism, the New CBD area will also accommodate convention center, expo center, hotels, shopping malls, exhibition ground, etc.

- **CBDs – Bolhari, Kotri and Jamshoro**
  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, three sub commercial centers are proposed along Johi Link Road, Moro Road and Bhan Road; 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[13][14]	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

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 is 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**
  In north side of the town along Larkana Road, trade and commerce area is positioned. It is placed in a way that it is also accessible from Indus Highway (N-55) via New Roads. This will provide in and out trading activities of the region specially to other areas of the district. It will includes grains, fruit and vegetable markets, wholesale markets, slaughter house, storage areas etc.

- **Warehouses**
  The warehouses area is proposed next to truck terminal along Indus Highway (N-55), also accessible from Larkana Road via New Road. 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.

- **Technical Services**
  An area for Technical Services is suggested in between trade and commerce and warehouses; along New Road accessible from both Indus Highway (N-55) and Larkana Road. This area will provide space for technical services like mechanical workshops and spare parts (auto mobile repairing), building construction materials, home depots, furniture market, housewares, food and beverages, computer hardware etc. However with the passage of time, technological advancement and changing needs; new requirement will come up to cater to the job market through new economic opportunities and activities.

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

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[15]	**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 Jamshoro is not only an agricultural town, local inhabitants also rely on livestock as main source of income. The Jamshoro 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 northwest direction along Indus Highway (N-55) and also accessible from Indus Highway Bypass. 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[16]**
  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.

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

- **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.

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 [17]		
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:

- **Cottage Industries**
  An area is proposed for Cottage Industries, next to Technical Service Area, along New Road accessible from both Indus Highway (N-55) and Larkana Road. It is suggested to promote local production and its associated market. The cottage industries will include mainly handicrafts like embroidery, handmade bags, clothes, shawls, home décor items, jewelry, souvenirs etc.

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

- **New Industrial Area**

  The New Industrial Area is proposed along Larkana Road, considering existing industries scattered in this area. It is highly recommended to explore this area according to the economic need of the town. This is more appropriate to develop small to medium scale industries, then heavy industries to keep the city environment clean. 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.

  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.

  The potential of large scale industries also present in this town, not only agriculture related industries. 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[18]	**Prohibited Uses**

- Plot Sizes:
  ○ Small size: upto 0.5 acres
  ○ Medium size: 0.5 to 5 acres
  ○ 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

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

4.5 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:

- **DHQ Hospital with Extension**
  The DHQ Hospital is recently constructed accessible from Bhan Road, its extension is proposed to make these a full fledge public health care like a District Health Complex. Since it will become tertiary level center for health facilities, thus medical and nursing colleges, staff residence, hostels, community and allied facilities will also be accommodated here. It could also include; Rehabilitation Centers, Special children, Edhi Homes (orphanage / old age / women) etc.

- **New Health and Welfare Area**
  A New Health and Welfare Area is marked near New CBD, accessible from both Indus Highway (N-55) and Larkana Road, via New Road. It is placed to make it reachable for other towns as well and to attract private investment in health and welfare sector. It is widely possible that this area will be utilized for distinct health and welfare facilities in long term phase; like specialized hospitals, research and welfare centers etc. It will comprises of the specialized units like oncology, urology, infertility centers, organ transplantation, and specialized treatment centers, research and development centers.

- **Health Areas**
  There are two sub health centers are formed at Johi Link Road and Moro Road considering public and private health institutions. These will serve the clinical as well as regular hospitalization needs like Maternity, Emergency, Dental, OPDs, Laboratories and Diagnosis, Pharmacies, Blood Banks, Physiotherapy Centers etc.

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	- 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)

- Blood Banks - Health Research Institutes	
Applicable SBCA Bylaws[19]	**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

4.5.1 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:

- **University Area**
  The University Area next to DHQ Hospital and near Bhan Road is mainly proposed for the public sector general university, which is lacking in the town. The idea is to first introduce common educational fields like languages, humanities, applied sciences, arts, commerce, social sciences etc., which could be modified further. Afterwards broad-spectrum of new ranges of education will be added according to the demand of the society, in form of wings, departments and blocks.

  In addition to academic buildings; allied facilities like administration, sports grounds, and health clubs will also be accommodated here. Since it will be the primary level university of the town, thus it will also contain large number of students, faculty and staff. This huge influx will also require residences with community facilities.

- **New Educational Area**
  Likewise health, a New Educational Area is also marked near New CBD, along Indus Highway (N-55). As the society is moving towards global dynamics, diversified fields of education will be prerequisite. It could include upcoming need of the job market like; engineering, business, management, finance, media, IT and software, etc. The purpose behind is to involve regional level youth in the education and research, in order to enhance the educational attainment level. It is required for the future demand of young population and to attract private investment in the field of education as well.

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

- **Educational Areas**

  In order to improve educational facilities at all levels, two sub educational centers are proposed at Johi Link Road and Moro 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[20]	**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

[20] Ibid

4.5.2 Religious Zone

In the proposed master plan two religious sites are allocated in the Jamshoro Town. One is in Bolhari along Indus Highway N55 and second is located in Jamshoro accessible from Cadet College Petaro Road. 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[21][22]	**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

4.5.3 Public Administration Zone

The public administration offices will includes District Secretariat, Development Authority, Town Committee Offices, Line Departments, Local Government Offices, Town Planning Department, Judiciary Complex, 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 town, along Motorway M9. As Jamshoro is a district headquarter, 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.

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

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.

- **District Jail**
  The District Jail is suggested along Motorway M9 in the west of the town. It is proposed behind the New Public Administration Area. This will serve the purpose of District Jail with all required needs and will also fulfill the residential requirement of the staff of various levels.

  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[23]	**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

4.5.4 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, festival grounds etc.

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

- **Central Parks – Bolhari, Kotri and Jamshoro**
  Three large Central Parks are proposed in each area of Jamshoro Town i.e. Kotri, Bolhari and Jamshoro. These will be general public parks, however their sub portions could be reserved for families (ladies and children). Thus these will also contain area for family park; swings, sitting,

[23] Ibid

walking, jogging with allied facilities of washrooms, tuck shops, parking etc. These could also include multipurpose playgrounds and orchards for active and passive facilities.

- **Sports Complex**
  The Sports Complex is proposed next to Main CBD, and accessible from National Highway N5 and New Road. It will include cricket, football, hockey and other ground, and gymnasium. These type of sports facilities will be of national level standards to promote domestic sports.

- **Cultural Complex**
  The Cultural Complex is proposed in the area of Kotri, and accessible from National Highway N5 via New Roads. It will include facilities related to cultural activities in the town, the main idea is to promote the cultural heritage and tradition of the town.

- **Festival Grounds**
  At the interchange of Motorway M9 and Mill Area Road, a huge area is located for the purpose of Festival Grounds, in the west of the town. Considering the local tradition and types of festivals, a large space is designated for such events. These grounds will be used for large population events like carnivals, Eid festivals.

- **Amusement Park**
  A large site for amusement park is proposed along Mill Area Road and also accessible from National Highway N5, at extreme southwest of the town. 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, Jamshoro is a regional center 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. The botanical garden is recommended considering the greener area along Cadet College Petaro Road, towards River Indus. While zoological garden is suggested along Motorway M9, with respect to hilly and mountainous area.

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

4.5.5 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 extreme south direction along National Highway N5 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

4.5.6 Transportation Zone

In Jamshoro Town, 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 Jamshoro 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 originate 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.

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:

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**			

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 side 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 includes; 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 towards south along National Highway N5. 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.

- **New Dry Port**
  Considering the location of existing Dry Port, New Dry Port has also been designated along Motorway M9. Since Jamshoro is an economic regional center and it would also require containers facility. It is recommended to mainly comprise of the container yards and related functional spaces. In addition required residence for the drivers and other staff with small offices, rest areas, washrooms, shops etc.

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[24]	**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

4.6 Utilities and Services Zone

The utilities and services provision is 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.

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

- **Landfill Site**

  Two landfill sites are proposed at outskirts of town area, in north and southeast sides considering wind direction. Theses landfill sites are accessible from Karo Kho Road and Jamshoro Bypass respectively. As the whole town will grow according to the master plan these will serve the population for next 20 years or even beyond.

- **Grid Station**

  There are two grid stations existing one in Industrial Area and another in Jamshoro. In addition Thermal Power Station also contain grid station for electric supply. For future need it is possible to extend the facilities in the same premises of existing grid stations in Industrial Area and Jamshoro. The extended facilities will benefit the residents as per the demand of the future consumption of the town.

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

4.7 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 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.

4.7.1 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 Jamshoro Town (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
  - 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 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 Jamshoro Town 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.

5. HOUSING

5.1 Existing Situation

As per the 2017 census results, the DHQ town had a household size of 5.8 persons and a total housing stock of 50,502. Most of them were categorized as pacca houses which include Pacca (Brick construction) and RCC houses.

The sample survey identified that 19% houses are Katcha, 44% are Pacca, RCC construction 24% and semi pacca 13%.

The age of houses construction as per respondents up to 5 years about 14%, up to 10 years 26%, up to 20 years 27% and above 31 years 18%.

Socio-economic survey conducted in 540 households of Jamshoro reveals that majority of the households consist of 5 to 6 members. Jamshoro town has high population density due to commercial activities. 27% of the households surveyed consist of 3 to 4 members. 34% of the households consist of 5 to 6 members and 17% of the households consist of 7 to 8 members.

According to the primary survey conducted in the project area. The status of ownership of houses is like 70% family owned, 5% rent free and 15% on rent. The category of rental indicates housing gap.

5.2 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. It is estimated that 50% of the urban population now lives in katchi abadis and informal settlements.

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

According to data provided by Sindh Kacthi Abadis Authority (SKAA), that sixteen sites are identified as Katchi Abadis in Kotri MC, Bolhari MC and Jamshoro TC, namely; Azad Colony, Adjacent Petrol pump, Al-Shahbaz Colony, Baba Mehmood Shah, Bilal Colony, Darya, Abad Colony, Gharibabad Colony, Jeno Para, Mehran Colony, Muhajir Colony, Near Old Musafar Khana, Pathan Colony, Qalandarabad, Sikandarabad and Station Road & Asad Abad. Out of total six are colonies are yet be 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						
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**	

5.4 Available Housing Stock

As per 2017 Census results, combine population of Kotri MC, Bolhari MC and Jamshoro TC has household size of 5.8 persons and a total housing stock of 50,502. Socio-economic survey conducted by Consultants also reveals that majority of the households consist of 5 to 6 members.

Table 5-2: Housing Statistics				
S. No.	**Housing Stock Census 2017**	**Population**	**Household Size**	**No. of HH**
1.	Kotri MC, Bolhari MC and Jamshoro TC	293,798	5.8	50,502
Source: Consultants Estimate 2018 & 2017 Census Report of Jamshoro				

Shaheed Mohtarma Benazir Bhutto Township (SMBBT)

Government of Sindh included the scheme under Special Initiative Unit in its Annual Development Plan 2011-12 i.e. "Development of Townships in Major Urban Centers (50,000 Nos.) 120-Sqyds plots with all Civic Services" under President's Directives.

The site of SMBBT in Jamshoro is located along main M9- Motorway near Police Chowki No. 13. The site has been fully developed with 737 plots ready for allotments to poorest of society.

5.5 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.

5.6 SWOT Analysis:

HOUSING			
Strength	**Weakness**	**Opportunity**	**Threats**
1. The trend of new housing schemes construction by private development is increasing. 2. Most of the formal population is served by electric and gas supply.	1. Low demand of public housing. 2. High prices of houses. 3. The informal housing sector lacks provision of utility services like gas supply, clean water and drainage facilities. 4. Less than half of the urban area population has pacca houses.	1. Demand for new planned low income public housing projects. 2. Opportunity for local micro financing for housing. 3. Installation of basic utility services through new projects.	1. Homelessness. 2. High housing prices and rents. 3. Development of informal housing in empty/vacant spaces available within town. 4. Formation of urban slums. 5. Relocation of higher income groups to other towns.

5.7 Need Assessment:

On basis of projected Population for year 2037 the number of households have been estimated around 107,634 out of which additional Housing Requirement will be 57,132.

Table 5-3: Housing Statistics

S. No.	Housing	Population	Household Size	No. of HH
2.	**Present 2017**	293,798	5.8	50,502
3.	**Future 2037**	624,277	5.8	107,634
4.	**Additional Required (2017-2037)**		5.8	56,979
Source: Consultants Estimate 2018 & 2017 Census Report of Jamshoro				

5.8 Policy Guidelines

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

Policy Measures for Land[25]

- Priority Identification of Land for Housing
  As an immediate measure, the provincial, municipal, metropolitan and local authorities under the plan shall identify parcels of state and other lands for housing development in the urban and rural settlements in their respective jurisdictions.
- Land Acquisition
  The procedural and legal bottlenecks in the acquisitions process shall be removed and land acquisition laws shall be suitably amended to make provision for unified, transparent and market value oriented systems
- Land Information System
  Development of a comprehensive land information system using modern technology to record correct and up to date information regarding inventory and land classification, settlement patterns, land values and land availability on all land in urban and rural areas.
- Land Registration and Tenure System
  The informal and customary tenure systems shall be rationalized into a formal and registered social contract.
- In all government and private housing schemes, 20% adequate plots for low income people shall be reserved to offer them at affordable prices. In addition private developers will also be encouraged to develop low cost housing schemes.
- A mechanism of new approved housing schemes should be established in which TC should be bound to provide piped water, sewerage, electricity and gas connection to approved scheme with coordination with other relevant authorities.

[25] National Housing Policy 2001

Policy Measures for Housing Finance[26]

- Financial Institutions shall be encouraged to give mortgage loans for housing purposes at market rates.
- Housing finance institutions shall be encouraged to promote savings and provide micro loans for low income group through community organization, NGOs and CBOs.
- Part of the sale proceeds of valuable public land shall be set aside to subsidize low income housing and housing for the poor and needy.
- Subsidized loaning facilities shall be extended for rural housing construction and improvements through micro-financing system and institutions like Khushhali Bank, Zakat funds, etc.

Policy Measures for Katchi Abadis, Squatter Settlements & Slums[27]

- The process of regularization and up-gradation of the pre-1997 Katchi Abadis shall continue as per current policy. However, Katchi Abadis, which are hazardous by virtue of being close to railways tracks or located under high tension power lines, or are on or close to the riverbeds, or on lands needed for operational /security purposes, need to be relocated at appropriate places by LOAs.
- Formation of new Katchi Abadis shall not be allowed and shall be discouraged by exercising strict development controls in all urban areas.

Policy Measures for Low Income Housing

- In all government housing schemes, adequate plots for low income people shall be reserved to offer them at affordable prices. In addition private developers will also be encouraged to develop low cost housing schemes.
- City and District Government shall prepare housing plans to cater for the current and future housing needs for low income groups on incremental basis at affordable cost.
- Building regulations, building by laws, and planning standards shall be revised to permit incremental development and lowering of planning standards to make it cost effective for low income groups.

[26] Ibid

[27] Ibid

5.9 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.
- An affordable housing program for low income group in different phases up to 2037, 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.

5.10 Priority Projects

i. Development of Housing Site with allied services for Low Income People and land acquisition

➢ **Project Justification**

Significant households in DHQ town have low income. These households are unable to acquire their own houses to resolve their housing problem resulting in increase in the number of slums areas and encroachment. The living condition in such areas are poor they face so many problems and mostly don't have utility services. According to the primary survey conducted in DHQ town, the status of ownership of houses is about 85% family owned or rent free, whereas remaining 15% households were settled on rental houses. The category of rental indicates housing gap.

Description	Results
Present Population census 2017	**293,798**
out of total, 15% Population of DHQ Town Living in rental houses with no house ownership	44,070
Households required @ 5.8	7,600

The private sector is usually very active in the development of land and construction of house but the issue is with the affordability for low income groups. The public sector will need to facilitate the private sector. Therefore Approx. 7,600 housing units are required to fulfill present gap. So therefore land of 350 acres with unit size up to 120 sq. yds is proposed to fulfill present gap. For this we have assumed tentative cost of 10.0 million per acre cost covers land development & land acquisition for 370.00 Acres.

The purpose of this project is:

- Provide affordable shelters to the poor people
- Through this process alternate resettlement of the congested part of the towns may be possible
- This process will improve the living standard of the town

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

- **Project Benefits**

  Part of the capital expenditure is expected to be recovered through Sale of commercial plots and buildings. The project is expected to generate direct income. The project will directly give benefit to the low income people. Improve in living conditions are associated with the improvement of social and long term economic benefit.

- **Implementing Authority** – P&D Department Government of Sindh, Kotri MC and HESCO etc.

- **Estimated Cost: 1200 Million Approx**. (Short Term)

Project Name	Short Term	Proposed Area in Acres	Preliminary Cost in Million/- PKR)	Justification
Land acquisition for Low Income Group	Short Term	380.00 acres	1,900.00	For this proposed site land acquisition assumed 5.0 million per acre.
Phase Wise Land Development with allied Facilities	Short Term	380 acres	3,800.00	7,600 housing units size upto 120 SY. For this we have assumed 10.0 million per acre cost covers land development & land acquisition for 380.0 Acres.

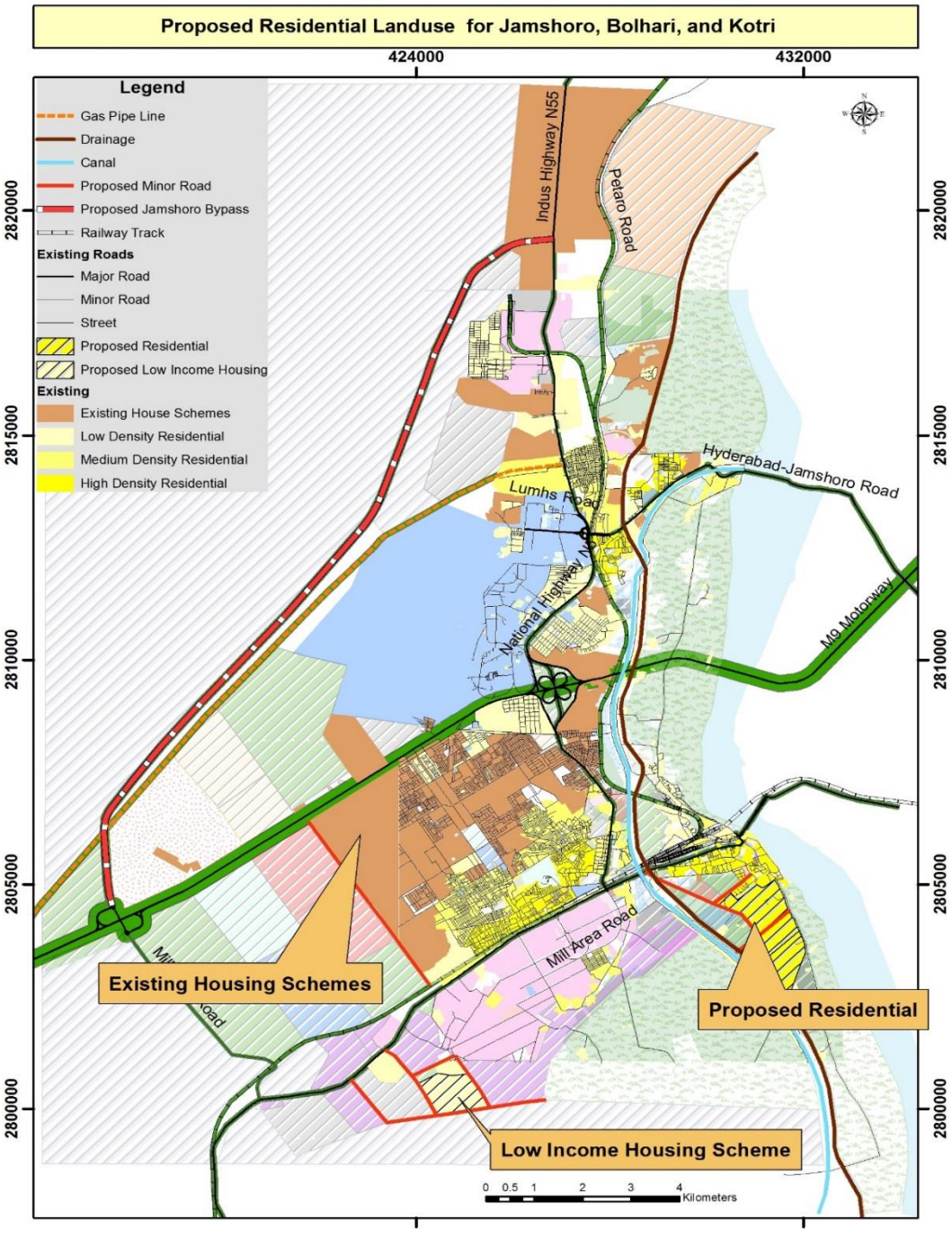


Figure 5:1: Proposal for Site Development for Low income Housing Scheme for DHQ Town

6. SOCIAL INFRASTRUCTURE

6.1 EDUCATION

6.1.1 Existing Situation

Pakistan during last 66 years has been spending on education an average of only 2% of the GNP. The state of education in Sindh is best reflected in its literacy figures and in the serious disparity between rural and urban areas. The Sindh has the largest number of ghost schools in the country and thousands ghost teachers draw government salaries. The education sector in Sindh is facing many challenges; major being very low enrolment level, rural and gender disparity, and low level of quality education. Besides, the alarming fact is a large number of out of school children, even those in the systems are not performing and learning outcomes are less than optimal. There are also issues of large number of closed schools and poor infrastructure in functional schools.

In district Jamshoro there are three universities namely Mehran University of Engineering and Technology, University of Sindh, and Liaqat Medical and Health Sciences.

Figure 6:1: Govt. Girls High School Jamshoro

In district Jamshoro, there are 694 viable schools out of which 661 are functional, 18 schools are temporary dysfunctional, 10 schools are viable dysfunctional, and 5 are permanently dysfunctional. Furthermore, out of total viable schools in the district Jamshoro, 59 schools are for boys, 87 schools for girls and the remaining 548 schools are co-education. The enrolment in viable schools of the district is 87,327 (male 50,289 and female 37,038), the number of teaching Staff is 3,107 out of which 2208 are male and 899 are female.

Furthermore, there are 616 primary schools in the district Jamshoro, out of which 584 are functional, 17 are temporary dysfunctional, 10 are viable dysfunctional, and 5 are permanently dysfunctional. Out of total primary schools in the district, 52 schools are for males, 69 for females, and the other remaining 616 are co-education with an enrolment of 48,202 (male 28,435 and female 19,767) having teaching staff of about 1,626 out of which 1,197 are male and 429 are female teachers.

6.1.2 Condition of Educational Institutes

The government schools and colleges in district are in worst condition due to lack of repair and maintenance of buildings, lack of playgrounds, libraries, electricity, labs, toilets etc.. Efforts to generate universal education ratio are required by engaging teachers, increasing school capacity, operationalizing existing closed schools and opening up new schools.

6.1.3 Educational Attainment at DHQ Town: Socio Economic Survey Results

As per the consultant's sample survey results shown in below table, the literacy ratio is 61%. There is difference in the literacy ratios by sex. The 38% of males are literate against only 24% females, out of which 8% females have education only up to primary level. But overall 19% educated population passed primary, 11% middle, 13% matriculation, and 9% intermediate, 8% graduates and 1% post graduates.

Table 6-1: Present Education Institutions and Enrolment Record

Primary, Middle, and Elementary Schools

S. No	Type	Total Nos.	Class rooms	Total Teachers	Total Enroll	Student Capacity Per Room	Teacher Student Ratio
1	Govt. Boys Primary Schools (GBPS)	18	56	80	2,818	50	35
2	Govt. Girls Primary Schools (GGPS)	21	64	94	2,331	36	25
3	Govt. Primary Schools (Co-education)	65	241	387	9,853	41	25
4	Govt. Middle Schools (Girls)	1	2	5	62	31	12
	Govt. Middle Schools (Co-education)	4	29	43	1,601	55	37
6	Govt. Elementary Schools (Girls)	2	12	10	616	51	62
7	Govt. Elementary Schools (Co-education)	3	40	36	1,872	47	52
Total		**114**	**444**	**655**	**19,153**	**43**	**29**

Table 6-2: Present Education Institutions and Enrolment Record (Secondary and High Secondary Schools)

S. No	Type	Total Nos.	Class rooms	Total Teachers	Total Enroll	Student Per Room	Teacher Student Ratio
1	Secondary School (Mixed)	9	245	302	7,209	29	24
2	Secondary School (Girls)	2	6	21	258	43	12
3	High Secondary Schools (Girls)	3	29	96	2,692	93	28
2	High Secondary Schools (Mixed)	1	14	45	1,516	108	34
	Total	**15**	**294**	**464**	**11,675**	**40**	**25**

RSU (Reform Support Unit RSU Education & Literacy Department. Government of Sindh 2017)

a. Technical Institutions

The present number of technical institutions in district Jamshoro are 6 (male: 3, female: 3). There is 1 male Mono-technic Institution with the enrolment of 120 and teaching staff of 8 teachers, 1 male commercial institution with 50 male enrolment and 9 male teachers and 4 Vocational institutions

(male: 1, female 3) with the total enrolment of 293 (male: 250, female: 43) and having teaching staff of 81 (male: 70, female: 11).[28]

b. Higher Education Institutions

Jamshoro, the site of largest University residential campuses in the country, situated about 18 kilometers from Hyderabad on the right bank of River Indus, was a rather desolate hilly track until 1955 when it was selected for the establishment of Sindh University Campus. 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 Universities. Furthermore, there are three Universities in district Jamshoro to serve the entire region in higher education I.e. the University of Sindh, Mehran University of Engineering and Technology, and Liaquat University of Medical and Health Sciences. The tree-lined roads and greenery developed at the campuses have completely transformed the site. The location of Mehran University of Engineering & Technology, sharing the site with the Sindh University and the Liaquat University of Medicine & Health Sciences complex in the neighborhood, has gone a long way in this transformation to a University township.

c. Non-Professional Colleges

The present number of Non-Professional College in district Jamshoro are 3 (male: 2, female: 1). 3 Degree Colleges (male: 2, female: 1) with the total enrolment of 3,091 (male: 2084, female: 1007) and having teaching staff of 98 (male: 67, female: 31).[29]

*6.1.4 **Issues:***

Identification of major issues of education sector in Jamshoro 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
- 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.

[28] *College Education Statistics-2014-15*

[29] *College Education Statistics-2014-15*

6.1.5 SWOT Analysis:

Strength	Weaknesses	Opportunity	Threats
Education & Literacy			
1. Availability of high standards education institution. 2. Urban literacy rate is higher than rural. 5. High demand rate for private schooling educational system.	1. Illiteracy in rural areas at district level. 2. Lack of appropriate teaching aids 3. Lack of highly educated personnel's. 4. Un-availability of play grounds within school buildings. 5. Unawareness of modern teaching techniques	1. More people will move to urban areas for education. 2. Good labour force available for professions like sales and retail marketing. 3. Education services mark steady growth in urbanization process 5. Highly qualified professionals are intellectual assets.	1. Relocation of educated class to other major towns of province. 2. The trend is barrier to establish higher education institutes offend private sector. 3. Illiteracy, dropouts 6.

6.1.6 Present Need Assessment in Education Sector (2017)

i. District Jamshoro (Includes primary to Higher education institutions)

- As per NRM (National Reference Manual) and NEP (National Education Policy) standards, students per class room occupancy ratio are 30 students per classroom for primary, middle and secondary level. Total enrolment and the available number of classrooms shows that there is a present shortage of classrooms.
- The present need can be fulfilled by providing new classrooms in existing school buildings or providing new school buildings with the provision of playgrounds and other facilities.
- Therefore, for the short term plan, Jamshoro district have need of 264 extra classrooms.

Table 6-3: Present Need Assessment in Education Sector of Jamshoro District

S. No.	Description	Results
1.	Total Enrolments	87,327
2.	Total Number of available Class Rooms	2,412
3.	Student Per Class Room @ NRM Standard (Primary to Secondary)	30
4.	Present Occupancy Load of Students per Class Room	36
5.	Class Rooms Required for present need	2,911
6.	Shortage of Class rooms	499

Source: Sindh Education profile 2016-17 and Consultant's Estimates 2017

ii. Taluka Kotri (Includes Primary, Middle, Elementary education institutions)

- Short term plan for Taluka, the provision of 194 classrooms at different levels is required with the repairing of existing buildings with all basic facilities and training of teaching staff is required.

Table 6-4: Present Need in Education Sector of Kotri Taluka

S. No.	Description	Results
1.	Total Enrolments	19,153
2.	Total Number of available Class Rooms	444
3.	Student Per Class Room @ NRM Standard (Primary to Secondary)	30
4.	Present Occupancy Load of Students per Class Room	43
5.	Class Rooms Required for present need	638
6.	Shortage of Class rooms	194
Source: *RSU (Reform Support Unit RSU Education & Literacy Department. Government Of Sindh 2017) and Consultant's Estimates 2017*		

iii. Taluka kotri (Secondary to High Secondary education institutions)

- As per NRM (National Reference Manual) and NEP (National Education Policy) standards, students per classroom occupancy ratio are 40 students per classroom for Secondary to High Secondary. Total enrolment and available number of classrooms shows that in present, there is no shortage of classrooms.

Table 6-5: Present need of Classrooms in Taluka Kotri

S. No.	Description	Results
In Schools of Kotri Taluka (Secondary and High Secondary)		
1	Total Present Enrolments	11,675
2	Classrooms available at present	294
3	Students per classrooms at present	40
4	Classrooms required for present need @ 40 students per class room	292
5	Present shortage pf classrooms	--
Source: *RSU (Reform Support Unit RSU Education & Literacy Department. Government Of Sindh 2017), District Education Department, and Consultant's Estimates 2017*		

6.1.7 Future Need Assessment in Education Sector (2037)

a. District Jamshoro

i. Primary to Higher Secondary

The long term plan target is to achieve 100% enrolment with a 1:1 male-female ratio by 2037; therefore 20,180 additional classrooms will be required to accommodate the upcoming generation for the next twenty years. This need could be fulfilled either by addition in existing buildings or more new schools and colleges will need to construct in future to serve an additional estimated population of 1,742,197 (10 and above).

Table 6-6: Future Requirement of Classrooms in Jamshoro District

S. No.	Description	Results
Primary to Higher secondary		
1	Expected total enrolment by 2037 @ 100% enrolment	677,766
2	Total classrooms requirement till 2037	22,592
3	Present Supply (2017)	2,412
4	Additional classrooms requirement till 2037	20,180

b. Taluka Kotri

i. Primary to Secondary

The long term plan target is to achieve 100% enrolment with 1:1 male female ratio by 2037; therefore 7,752 additional classrooms will be required to accommodate upcoming generation for next twenty years. This need could be fulfilled either by addition in existing buildings or more new schools and colleges will be need to constructed in future to serve additional estimated population

Table 6-7: Future Assessment (2037) at Kotri Taluka

S. No.	Description	Results
District (Primary to secondary)		
1	Expected total enrolment by 2037 @ 100% enrolment	253,397
2	Total classrooms requirement in 2037	8,447
3	Present Supply 2017	695
3	Additional classrooms requirement in 2037	7,752

ii. Higher Secondary

The long term plan target is to achieve 100% enrolment with 1:1 male female ratio by 2037; therefore 531 additional classrooms will be required at higher secondary to accommodate upcoming generation for next twenty years. This need could be fulfilled either by addition in existing buildings or more new schools and colleges will be need to constructed in future to serve additional estimated population

Table 6-8: Future Assessment (2037) at DHQ Jamshoro

S.No	Description	Results
District (Primary to secondary)		
1	Expected total enrolment by 2037 @ 100% enrolment	22,956
2	Total classrooms requirement in 2037	574
3	Present Supply 2017	43
3	Additional classrooms requirement in 2037	531

6.1.8 Policy Guidelines[30]

- Development of Teachers and professional substitutes;
- Construct required schools and higher education institutions in all districts. Take stock of operational and staffed schools and eliminate ghost schools.
- Launch a rural education program.
- Ghost Schools and absentee teacher should be identified and removed.
- Maintenance of existing depilated schools and buildings should be given top priority.
- For girls literacy and women education, informal system of homeschool may be encouraged.

6.1.9 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 increased the literacy ratio, living standard, employment opportunities of the future population.

[30] Sindh Vision 2030

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.
- 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

6.1.10 Priority Projects

i. Repair & Rehabilitation of schools, Colleges and Technical Colleges With Allied Infrastructure (Excluding IAP projects)

➢ **Project Scope & Justification**

Education should be the one of major goal of any urban strategy. The sitution of education sector in DHQ town is not at the preferred level. The condition of exisiting schools in DHQ town needs rehabilation and improvement of the infrastructure and Allied basic facilities like water, electricity, toilet, playgrounds etc.

At present, there are arround fifteen educational building of various levels prsent in DHQ town, therefore out of total we have suggested below school buildings for repair and rehabilitation work on priority basis.The List of the schools and colleges in this project are given bellow:

S. No.	Name of Facility	Type	Area in Acres
1.	Govt. Boys High School	Secondary	0.90
2.	Govt. Girls Primary School	Primary	0.08
3.	Govt. Girls Primary School	Primary	0.12
4.	Govt. Boys Primary School	Primary	0.14
5.	Govt. Boys Primary School	Primary	0.07
6.	Govt. Boys Primary School	Primary	0.18
Total			**14.68**

- **Project Benefit**

  This relate to the basic right of the people and comes under the compulsory social services, By the increasing in the litracy ratio the living standard of the population will improve with in the district. Attempts will be made eleminate the gender gap and attracts more girls in the school.

- **Implementing Authority – District Education Works & Services Department GoS.**

- **Estimate Cost: Rs.165.00 million approx.**

ii. Capacity Building Training Programs to Enhance Capacities

- **Project Scope & Justification**

  Sindh Teacher Education Development Authority (STEDA), Provincial Institute of Teacher Education (PITE) is providing the professional development of teachers for increasing their teaching skills. In Badin, the peoples are significantly deficit in technical skills.

- **Project Benefits**

  By implementation of this project, people will enhance their academic skills and it also strengthens their teaching skills for better results.

- **Implementing Authority -** Sindh Teacher Education Development Authority (STEDA), Provincial Institute of Teacher Education (PITE) Government of Sindh.

- **Estimated Cost: Rs.15 Million PKR Approx.**

Project Name	Area Acres	Estimated Cost In Millions	Short Term	Justification
Education				
Repair & Rehabilitation of schools, Colleges with allied infrastructure and basic utilities. (Excluding the IAP Projects)*	1.49	129.80	Short Term	94904.4 sft, at the rate of 2,000/- PKR per sft construction cost with all infrastructure cost.
Capacity Building Training Programs to Enhance Capacities.	-	20.00	Short Term	Teachers Capacity building programs can also strengthen their teaching skills for better results.

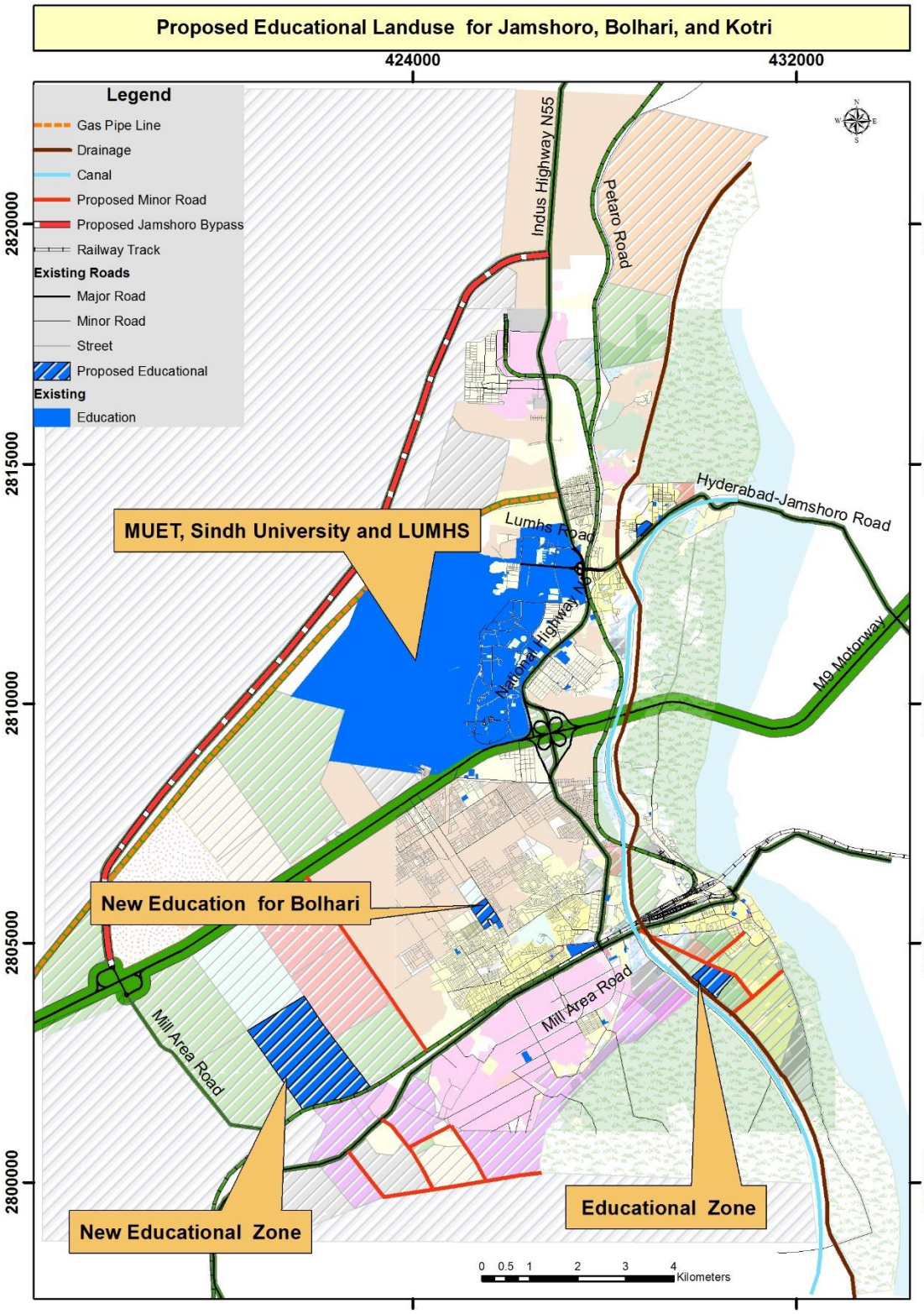


Figure 6:2 : Proposal for Extension of Educational Facilities for Jamshoro DHQ Town

6.1.11 Immediate Action Plan for Core Urban Area

iv. Repair, Rehabilitation of Educational facilities and Provision of Missing facilities

All schools marked in core urban area should be rehabilitate with the structural stability, building repair work, access to utilities, provision of facilities, replacement of old furniture, presence of teaching and non-teaching staff etc. The important educational buildings present in core urban area like; Govt. Boys High School, Govt. Girls High School, Kotri Govt. College, Technical Training Center, Govt. Girls Degree College, Govt. Girls Primary School, Govt. Girls Primary School, Govt. Girls Higher Secondary School, Govt. Boys Primary School, Govt. Boys Primary School, Govt. Boys Primary School, Govt. Girls Primary School and Govt. Boys Primary School.

S. No.	Name of Facility	Type	Area in Acres
1	Govt. Boys High School	Secondary	0.90
2	Govt. Girls High School	Secondary	1.37
3	Kotri Govt. College	Collage	10.39
4	Technical Training Center	Training Center	13.19
5	Govt. Girls Degree College	Collage	1.19
6	Govt. Girls Primary School	Primary	0.08
7	Govt. Girls Primary School	Primary	0.12
8	Govt. Girls Higher Secondary School	Secondary	0.43
9	Govt. Boys Primary School	Primary	0.14
10	Govt. Boys Primary School	Primary	0.14
11	Govt. Boys Primary School	Primary	0.07
12	Govt. Girls Primary School	Primary	0.05
13	Govt. Boys Primary School	Primary	0.06
14	Govt. Boys Primary School	Primary	0.18
Total			**28.31**

At present around fourteen educational facilities are present in core area of Kotri MC, Bolari MC and Jamshoro TC. Besides repair and rehabilitation we are only proposing repair and rehabilitation of six facilities including Govt. Boys High School, Govt. Girls High School, Kotri Govt. College, Govt. Girls Primary School, and Govt. Girls Higher Secondary School, Govt. Boys Primary School and Govt. Girls Primary School, with all allied services related to basic utilities, access road and building renovation. To some extent as the population grown beyond the urban core area assumed boundary the short term and long term educational projects are already proposed in priority projects sector wise for future population of town.

S. No.	Facility Name	Area
1	Govt. Boys High School	0.90
2	Govt. Girls High School	1.37
3	Kotri Govt. College	10.39
4	Govt. Girls Degree College	1.19
5	Govt. Girls Primary School	0.12
6	Govt. Girls Higher Secondary School	0.43

S. No.	Education Facility Name	Area (acre)	Rehabilitation Required - Area wise or job wise cost (PKR)							
			Street / Road / Parking	Utility Facilities					School Building Repair / Renovation	Security
				Electricity	Water Supply	Sewerage	Gas	PTCL		
1	Govt. Boys High School	0.90	0.90	1.03	1.34	1.34	0.90	0.22	0.45	0.22
2	Govt. Girls High School	1.37	1.37	1.57	2.05	2.05	1.37	0.34	0.68	0.34
3	Kotri Govt. College	10.39	10.39	11.95	15.59	15.59	10.39	2.60	5.20	2.60
4	Govt. Girls Degree College	1.19	1.19	1.37	1.78	1.78	1.19	0.30	0.59	0.30
5	Govt. Girls Primary School	0.12	0.12	0.14	0.18	0.18	0.12	0.03	0.06	0.03
6	Govt. Girls Higher Secondary School	0.43	0.43	0.49	0.64	0.64	0.43	0.11	0.21	0.11
Total		**14.39**	**14.39**	**16.55**	**21.59**	**21.59**	**14.39**	**3.60**	**7.20**	**3.60**
Total PKR Rs. Million			**102.90**							

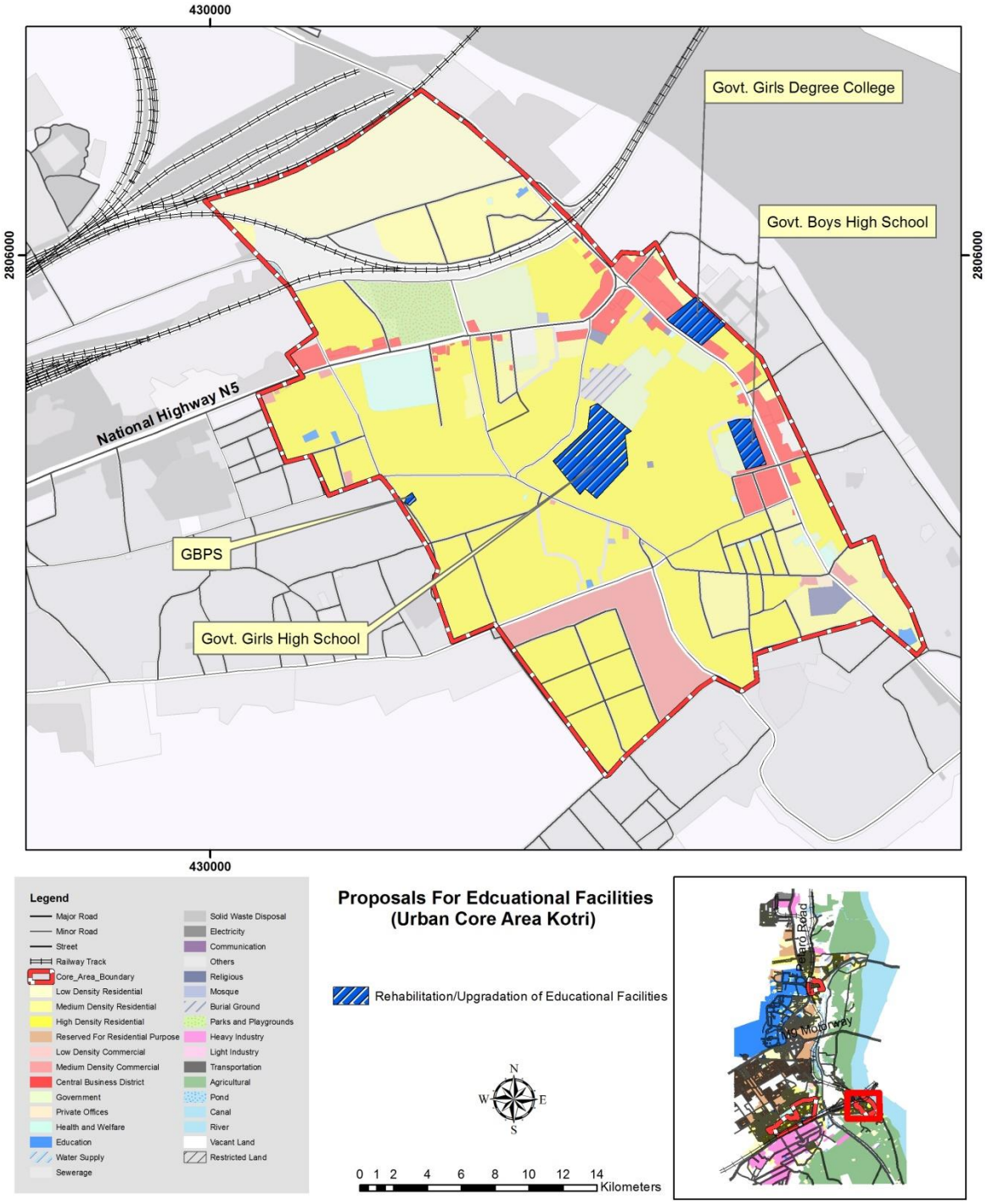


Figure 6:3: Proposal for Rehabilitation of Education Facilities- Kotri

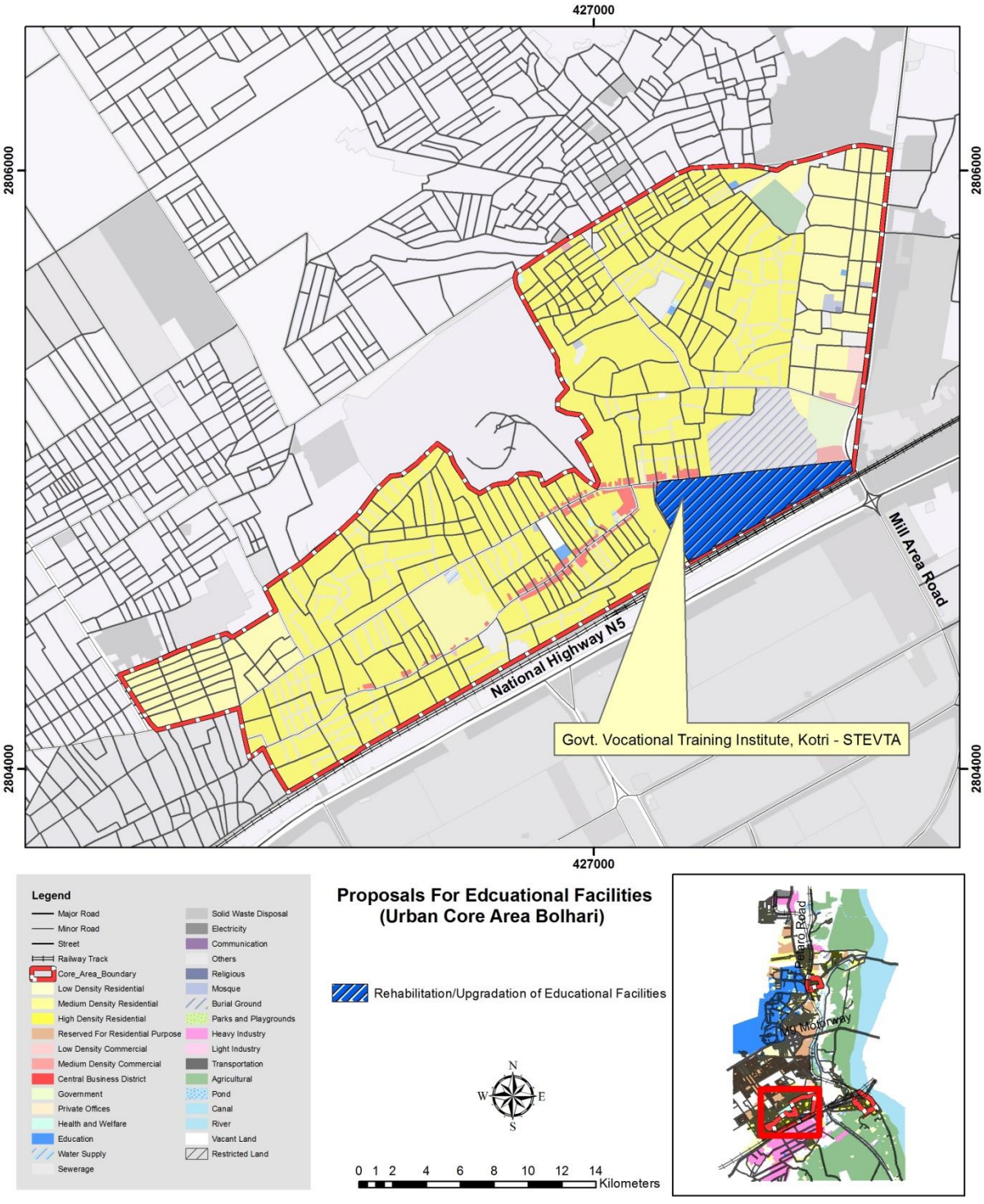


Figure 6:4: Proposal for Rehabilitation of Education Facilities - Bolhari

6.2 Health

6.2.1 Existing Situation

Currently, tertiary level health facilities of Taluka hospital THQ and BHUs are serving the regional population of Jamshoro district. There is one civil hospital having 50 beds, 1 specialized hospital has 204 beds, 3 Taluka Hospitals at District level having 120 beds, and 2 departmental hospitals having 69 numbers of beds to serve the population of the district. The other health facilities spread over the entire districts are 5 RHCs (Rural Health Center) having 100 beds, 9 TB Clinics, 20 BHUs (Basic Health Unit) having bed strength of 40, 46 dispensaries having 6 number of beds, and 2 M.C.H.Cs (Mother Child Health Center).

Table 6-9: Government and Private health Facilities with bed capacity

Type of Facilities	No.	Beds
Civil	1	50
Major Hospital	1	30
Specialized Hospital	1	204
THQs	3	120
Departmental Hospital	2	69
BHUs	20	40
RHCs	5	100
Dispensaries	47	6
Total	**80**	**619**

Source: Health Profile of Sindh, 2017

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.

6.2.2 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

6.2.3 SWOT Analysis:

Health			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Availability of specialized health facilities	1. Unawareness of health issues in community	1. More investment is required through PPP in health sector. 2. More job opportunities for doctors.	1. Less emergency response to health incidents. 2. Difficult to control eradication of epidemic diseases.

6.2.4 Need Assessment District Jamshoro (Population, Bed Ratio)

The NRM (National Reference Manual) recommends 2 beds per thousand as the medium-term target. On this basis, approximately 1,986 beds will be required to provide gradually. Even though available beds are 619, further 1,367 beds are required to fulfil the present need of the inhabitants for bed capacity. The shortage of doctors and paramedical staff, laboratory equipment, diagnostic services and quality of buildings are an evident problem in small/medium towns and will need to be tackled with an increase in beds.

Table 6-10: Present Need Assessment of Health Facilities

Present Population	Available Beds	Present need	Required Beds	Available Doctors	Present Need	Required Doctors
993,142	619	1,986	1,367	251	933	742

According to the WHO (world Health Organization), the ratio of doctor to population is 1:1000. In present, 742 doctors are required to serve the present population of the district Jamshoro.

6.2.5 *Future Need Assessment District Jamshoro (Population, Bed Ratio) 2037*

Therefore, the target up to the year 2037 is to provide 2 beds per 1000 projected district population as per standard is given in the National Reference Manual on Planning and Infrastructure Standards (NRM). The present supply of beds is fulfilling future demand until 2037. To achieve this target of hospital bed ratio, there is a need for 34,225 further beds to fulfill the future bed requirement. Future Supply, Need, Gap, and Population per Bed Ratio is given in the table:

Table 6-11: Future Supply and Need at District level

Future Health Need Assessment At Jamshoro District till 2037						
Future Population	**Available Beds**	**Future Need**	**Required Beds**	**Available Doctors**	**Future Need**	**Required Doctors**
1,742,197	619	3,484	2,865	251	1,742	1,491

6.2.6 *Policy Guidelines*[31]

- 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.

6.2.7 *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

[31] Sindh Vision 2030

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 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 Jamshoro.
- Improve access to healthcare facilities as due to long journeys to hospitals many patient 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.

6.2.8 Priority Projects

i. Repair, Rehabilitation and provision of missing Facilities for LUMHS Hospital and Bilawal Medical College Hospital Kotri

- **Project Justification**

  LUMHS Hospital Jamshoro and Bilawal Medical College Hospital Kotri LUMHS Hospital is facing lot of problems due to unavailability of Laboratorial facilities. Shortage of filled doctors, surgical instruments, and lack of machinery are the major issues.

- **Project Benefits**

  This project will provide high quality health facilities and free medicines to the people of District Jamshoro.

- **Implementing Authority - Government of Sindh - Health Department**

- **Estimated Cost: 250.00 Million PKR Approx. (Short Term)**

S. No.	Project Name	Area (acres)	Estimated Cost In Millions	Short Term	Justification
Health					
1	Repair, Rehabilitation and provision of missing Facilities for LUMHS Hospital and Bilawal Medical College Hospital Kotri	-	200.00	**Short Term**	Lump Sum 250.00 Millions

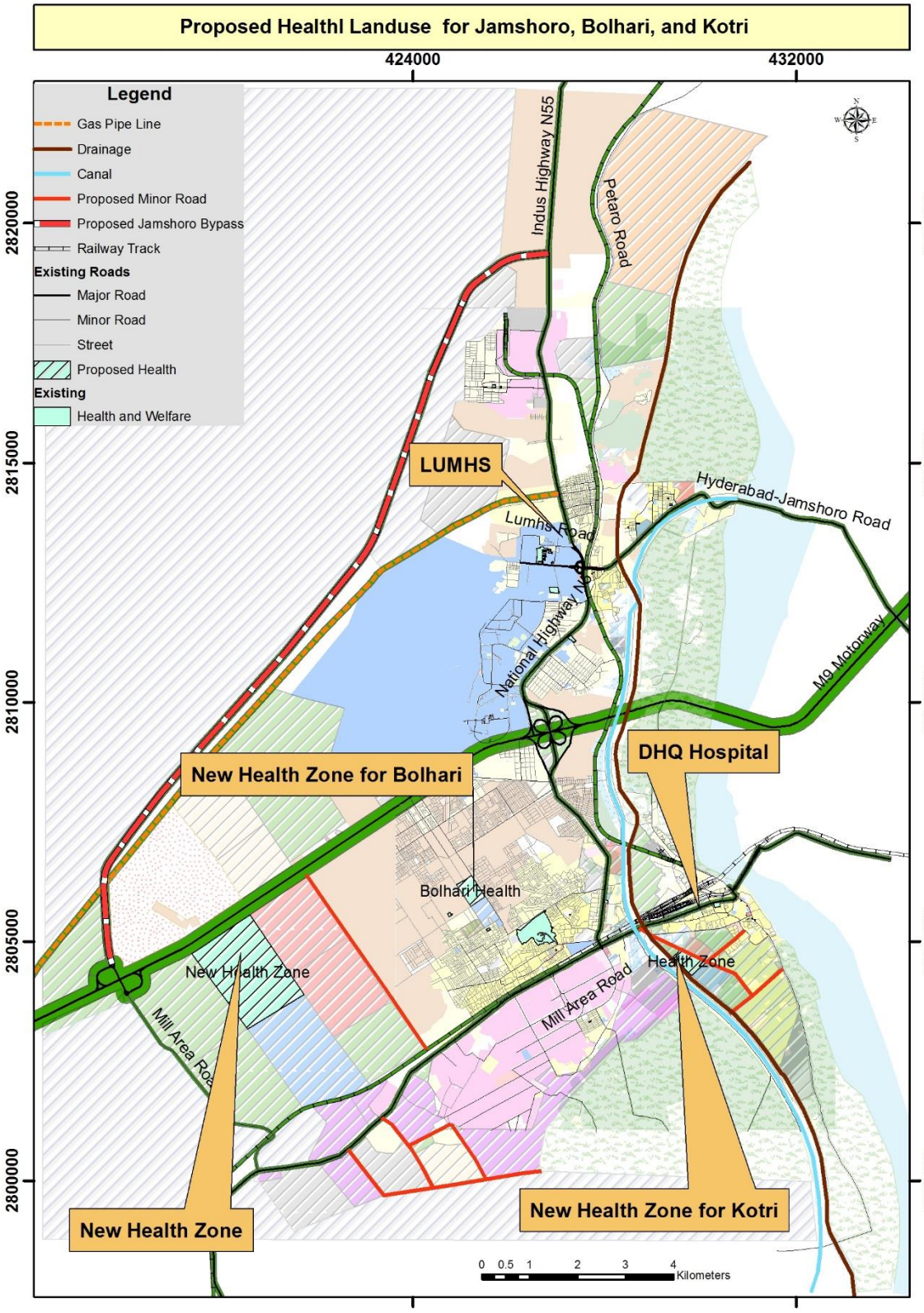


Figure 6:5: Proposal for Extension of Health Facilities for Jamshoro DHQ Town

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.[32]
- 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.[33]
- 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

6.3.2 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

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

6.3.3 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. 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.

6.3.4 Issues/Problems

- Disappearance of incidental open spaces
- Lack of preservation of recreational spots
- Lack of planned open spaces is a major problem.
- In-active tourist development program
- Tourism marketing is weak.
- Unavailability of basic facilities
- Encroachments

6.3.5 SWOT Analysis:

Sports & Recreation			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Local environment of town supports green urbanism. 2. Sports and games are encouraged at a high level.	1. Shortage of water facility to maintain green spaces, green belts and trees plantation. 2. Maintenance of sports complex is required.	1. Good health of local communities. 2. Air pollution reduction. 3. Healthy environment. 4. Protection of natural habitat. 5. Opportunities of sports are availed by students at national level.	1. Give birth to passive recreation. 2. Obesity.

Culture			
1. The indigenous cultural activities of various social groups and minorities comprise many events that attract people from their surrounding localities.	1. Poor Management for organizing cultural events 2. Lack of infrastructure to accommodate visitors into such events. 3. Lack of opportunities to commercialize / merchandize cultural goods	1. If organized appropriately could generate handsome amount of revenues with other spin-off effects.	1. Security Threats 2. Demise of cultural values and norms.
Tourism			
1. Availability of heritage sites. 2. The Ranikot fort is a heritage site located near Sann in Jamshoro District.	1. Less commercialization from tourism point of view. 2. Less heritage preservation.	1. Tourist attraction. 2. Revenue generation through tourism planning. 3. Promotion of rich heritage to increase historical importance of town.	3. Fewer opportunities for active commercial retail.

6.3.6 Policy Guidelines[34]

- 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.

6.3.7 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

[34] NOPRA 2005

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.
- 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.

6.3.8 Priority Projects

i. Repair and Rehabilitation of Malik Asad Sikandar Sports Ground Kotri

- **Project Justification**

  The availability of parks in any city is essential for the safe and healthy environment. There is an extream shortage of recreational spaces in DHQ tow. There are many spaces in the city space which can ideally be converted and developed as recreational purpose. On prirority basis, Repair and Rehabilitation of sports and Religious facililities is proppoed i.e. Malik Asad Sikandar Sports Ground Kotri , Eidgah Ground Kotri, Dargah Shareef Hazrat Baba Dang Shah Saraj, The Salvation Army Church, Juman Shah, Tomb Of Hazrat Hafiz Manzoor Ilahi Qadri and Hanuman Mandir (excluded IAP Projects)* needs rehabilitation in the DHQ town.

- Project Benefits: It will boost the local economic potential with significant Benefits from local to national level. It will create unique city landscape and generate number of employment opportunities.

- **Implementing Authority**: Sindh Government, Local Government and private investors

- **Estimate Cost**: 224.24 million approx.

Project Name	Long/ Short Term	Proposed Area (acre) & Lengths (m)	Preliminary Cost in Million	Justification
Repair and Rehabilitation of Malik Asad Sikandar Sports Ground Kotri	Long Term	4.00	204.24	**A.** Spectator area 30,000 sft. Repair & Rehab; @ the rate of 2,000/ sft. - Total 60.00 Million for the Construction of Spectator area. **B.** Playground Area 3.31 Acres (144,240 sft, @ the rate of playground @ rate of 1000/ sft. ○ Total 144.24 Million **A+B = 204.24 Millions**

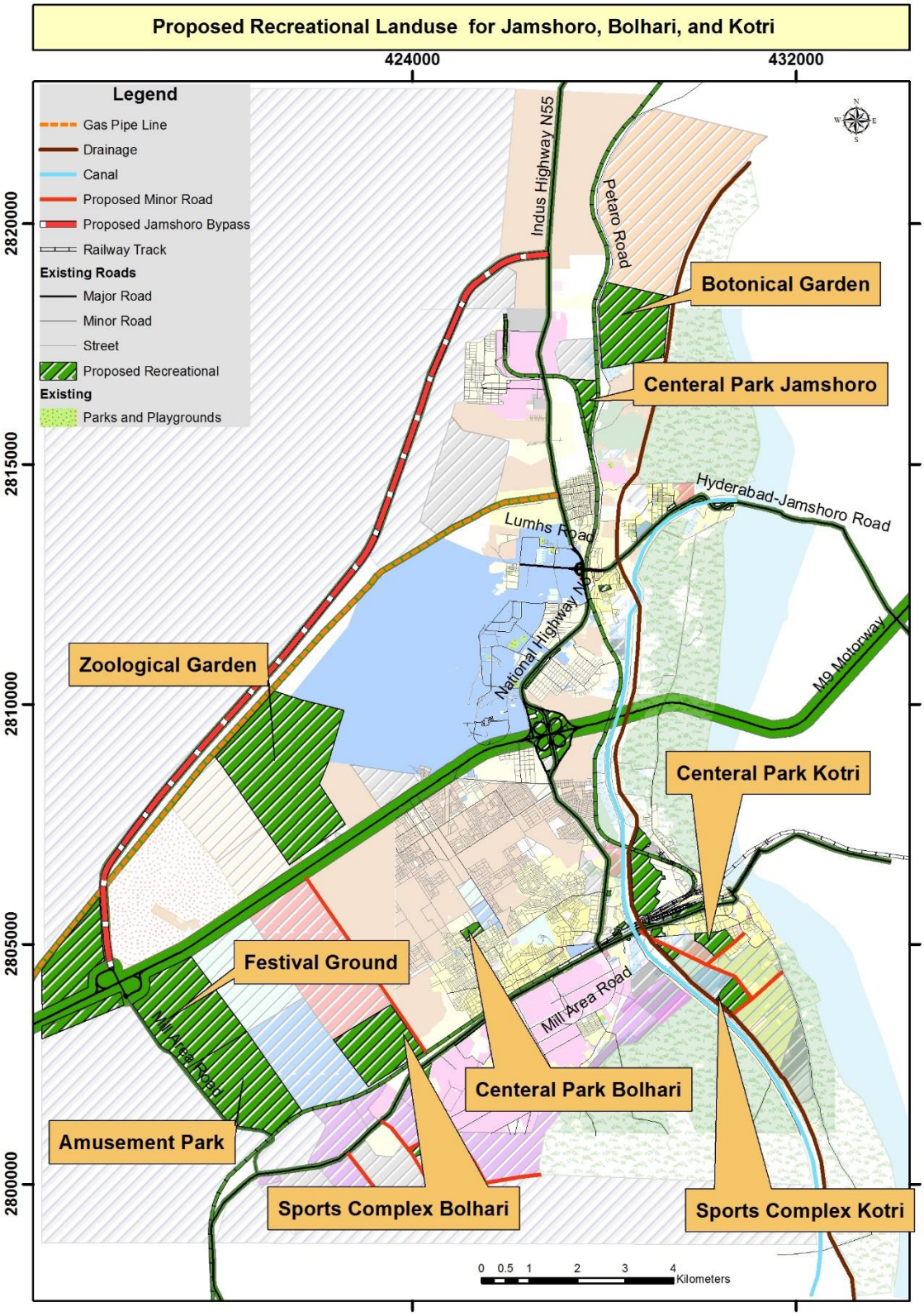


Figure 6:7: Proposal for Future Recreational Landuses for DHQ Town

6.3.9 Immediate Action Plan for Core Urban Area

➢ **Provision of Open Spaces, Parks & Playgrounds**

Availability of recreational facilities can be a vehicle for positive social change for youth and also promoting recreational facilities benefits beyond the traditional aspirations of improved health and wellbeing.

- **Parks**

Currently, core urban area of Jsmshoro TC, Bulari MC and Kotri MC is suffering due to acute shortage of compulsory open spaces. There are only one park is present in core town area of Kotri. Malik Mehrab Khan public Park covering an area of 0.56 acres is located along gauging road kotri adjacent to Al-Sayed Medical Centre. To achieve the short term plan on immediate basis the process of land acquisition should be started to fulfill present gap.

S. No	Site Name	Area / Locality / Address	Area (acre)	Rehabilitation Required Area wise or job wise cost (PKR)			
				Street / Road / Parking	Utility infrastructure	Public Facilities	Security
1	Repair and Rehabilitation of Mir Mehrab Khan Malik Park	**0.56**	0.56	0.56	1.68	1.68	0.28
Total PKR Rs. Million				**0.56**	**1.68**	**1.68**	**0.28**
Total PKR Rs. Million			**4.20**				

Note:
1. Rehabilitation of lanes, streets and connection minor and major roads.
2. Utility Infrastructure rehabilitation includes basic services of Water supply, Electricity supply and Gas supply.
3. Public facilities include rehabilitation and provisioning of public toilets, proper seating arrangements.
4. As per the law and order situation security concerns makes the overall impact to uplift the society life wrt to secured environment.
5. All these basic services in every DHQ town core areas need to be rehab for quicker revitalization of people's life.

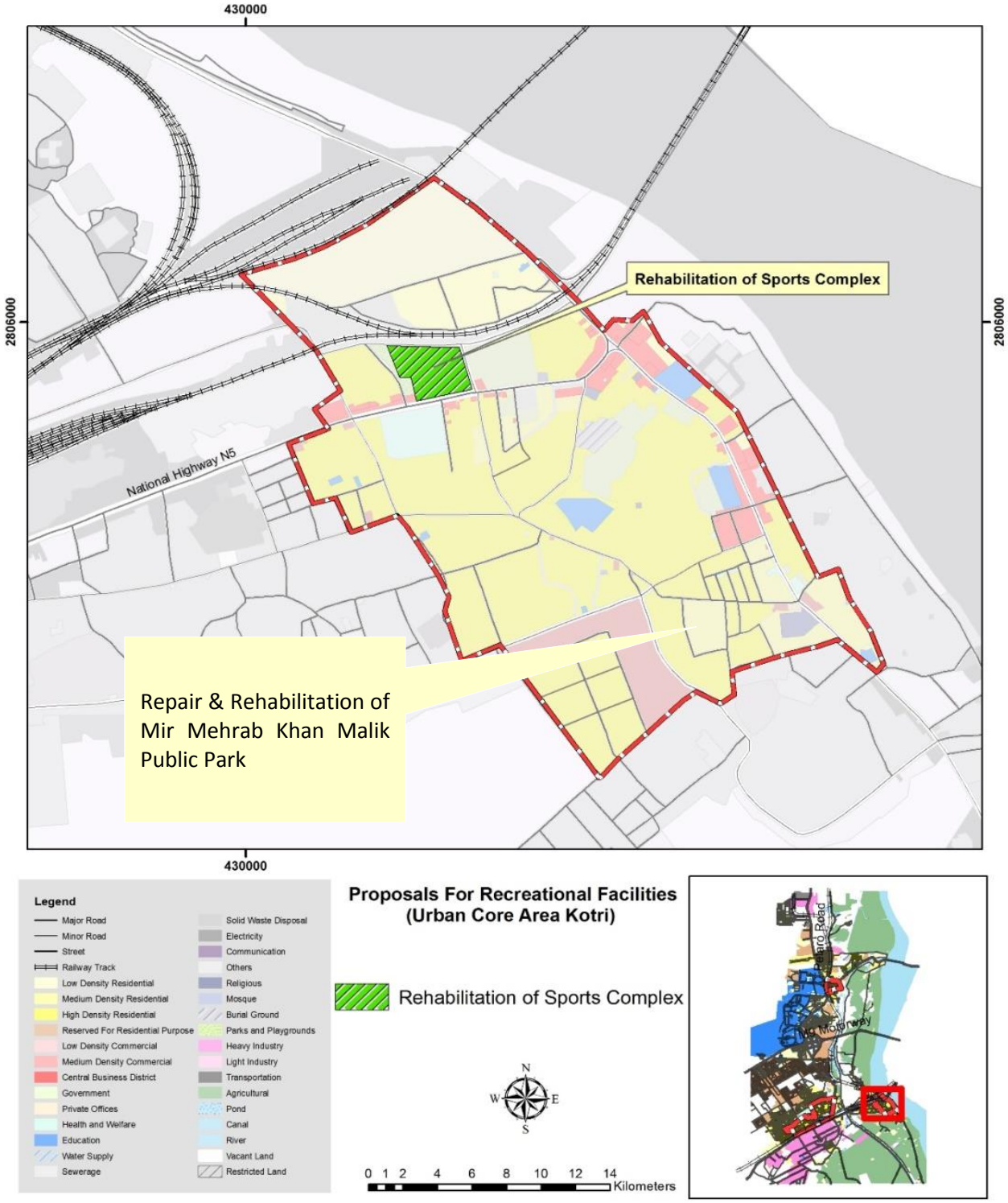


Figure 6:8: Repair and rehabilitation of existing Recreational Facilities-Core Urban Area -Kotri

7. 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.[35]
- Increase farmer's income.[36]
- 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 intervention 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.

[35] ADP 20017-18 Industries Punjab

[36] ADP 2017-2018 Agriculture Punjab

7.1 Agriculture

7.1.1 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.

7.1.2 Crop Production

The data for the production of Rice in the district during 2016-17 was not mentioned in Development statistics of Sindh 2018, whereas the Wheat production was 142,673 M. Tons, Sugarcane 25,956 Bales, Maize production was 177 M. Tons, and cotton 104,784 Bales. Although during 2015-2016, the production of wheat was 116,329, Sugarcane 27,595 bales, Cotton 70,182 bales, and the production of Maize were 469 bales. The crops, production field, and land utilization is given tables as under:

Table 7-1: Crop Production

Product		Agriculture Crops Production Year 2015-16		Agriculture Crops Production Year 2016-17	
S. No	**Crops**	**Area (Hectare)**	**Production (M. tons)**	**Area (Hectare)**	**Production (M. tons)**
1	Rice	--	--	---	---
2	Wheat	38,365	116,329	48,600	142,673
3	Sugar Cane	594	27,595	520	25,956
4	Cotton (bales)	12,046	70,182	16,570	104,784
5	Maize	447	469	178	177
Source: Development Statistics of Sindh 2018					

7.1.3 Land Utilization

The total geographical area of district Jamshoro is 1,235,000 hectares out of this during 2016-17, the cultivated area was up to 98,000 hectares, current fallow was 30,000, and the net area sown was 69,000 but during 2015-16, the values were minor different, cultivated area of the district was 93,000 hectares, current fallow 30,000, and the net area sown was 63,000. Furthermore, the comparison of land utilization before and after disintegration is given bellow:

Table 7-2: Land Utilization			
Sr. No.	Type of Cultivated area	Land Utilization (Hectares) 2015-16	Land Utilization (Hectares) 2016-17
		Geographical area	Geographical area
1	Cultivated area	93,000	98,000
2	Current Fallow	30,000	30,000
3	Net area sown	63,000	69,000
4	Cultivated Waste	139,000	139,000
5	Not available for cultivated	1,002,000	997,000
Total Geographical Area		**1,235,000**	**1,235,000**
Source: Development Statistics of Sindh 2018			

7.1.4 Irrigation Network

Since the lands of this district lie at the bottom of Kheerther mountain range having high altitude as compared to Indus River, there is no canal system available in this district and only perennial water is available for cultivation. Besides, katcha area, alongside the Indus River, is irrigated with river water. Majority of the Dehs are waterless (barani). Out of the 150 rural Dehs, 76 (51%) are arid, 59 (39%) are irrigated with the help of canals, and 36 (24%) are irrigated through tube wells.

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.

In the year 2015-16, 48,267 hectares were irrigated out of 63,374 hectares, whereas in 2016-17, 48,273 hectares were irrigated out of 68,743 hectares. The table below gives information regarding irrigation in the district[37].

Table 7-3 Irrigation by Year Wise

District	2015-16			2013-14		
	Total (Hectares)	Irrigated (Hectares)	Un-Irrigated	Total (Hectares)	Irrigated (Hectares)	Un-Irrigated (Hectares)
Jamshoro	**63,374**	48,267	15,107	**68,743**	48,273	20,470

Source: Development Statistics of Sindh 2018

7.1.5 Issues

- Insufficient water supply to the agriculture field
- High price of Inputs (Fertilizers Material, Pesticides and Quality seed)

[37] Sindh Development Statistics 2018

- Low price of crop production
- Farm to market road
- Lack of agriculture credit facilities
- Lack of Agriculture research centres
- Water logging and salinity
- High rate of diesel
- Shortage of irrigation water

7.1.6 SWOT Analysis:

Agriculture			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Jamshoro contributes in agriculture sector of Sindh by Producing various food items e.g., maize, cotton, gram, pulses, wheat etc.	1. Land of Jamshoro District is arid /barren mostly, agriculture production and productivity is not as efficient as in other districts of Sindh province. 2. Less revenue generation by local government. 3. Water logging and salinity.	1. Healthy population 2. Strong transport system 3. Outside investors show interest in agriculture sector.	1. Less efficient local markets. 2. Shortage of agro based products. 3. High land prices.

7.1.7 Strategic Development Plan

i. Long Term Plan

- Agricultural technology development, dissemination and adoption.
- To address the property issue / raising of income level ,waste land available should be granted to land less
- Enhancing crop productivity through adoption of new technologies
- Establishment of Arid Agriculture Research Station for the development of Kohistan area.

ii. Short Term Plan

- Modernize and revitalize agriculture.
- Use of modern techniques for cultivation by choosing healthy seeds and fertilizers for increasing yield per acre.
- Increase the supply and quality of agricultural crops
- Provision of warehouses for storage of agricultural products.
- Enhancement of the storage capacity.
- Provision of warehouses, food gowdowns for storage of agricultural products.
- Construction of covered gowdown.

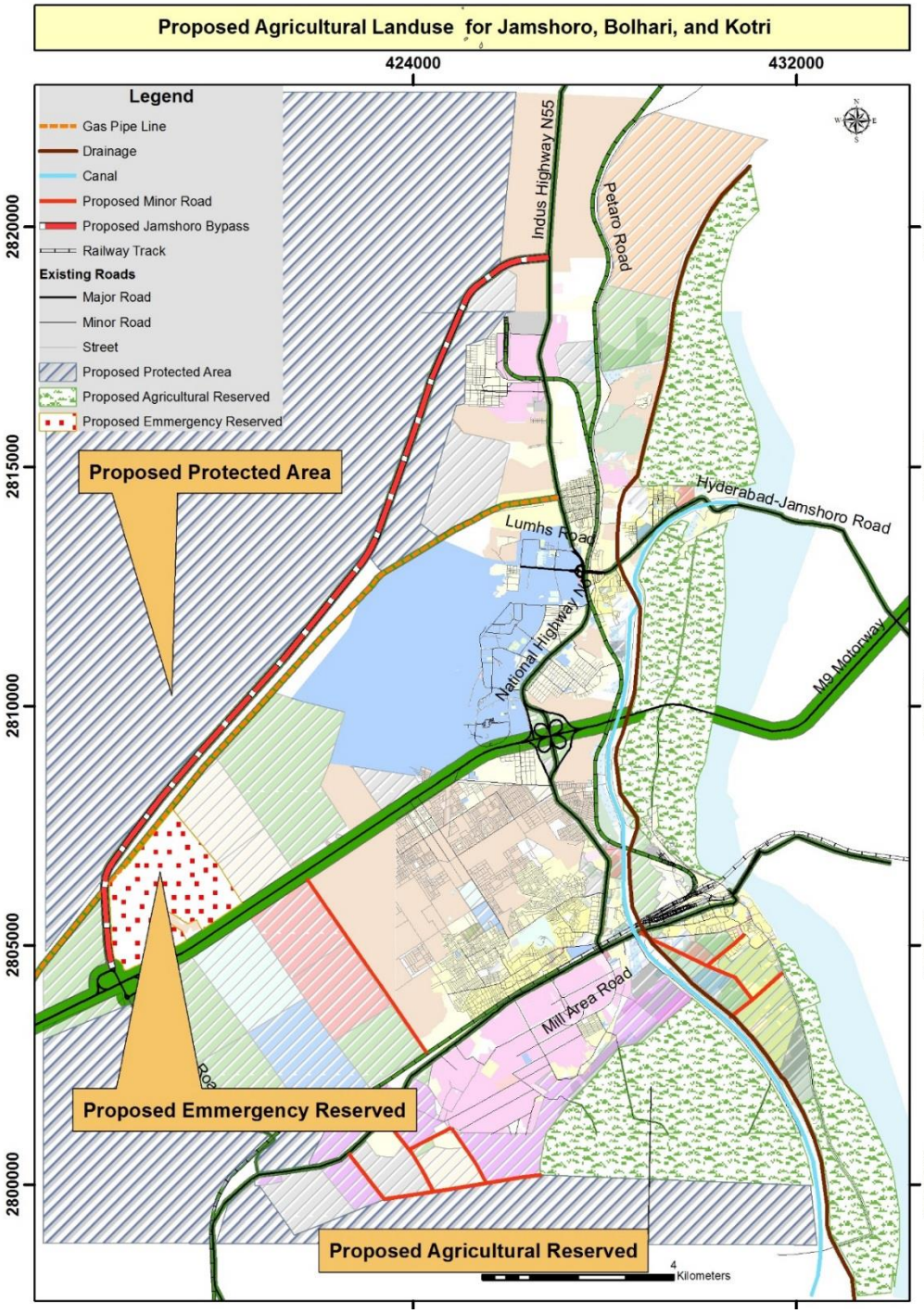


Figure 7:1 Future Proposals for Agriculture Jamshoro – Bolhari+ Kotri Town

7.1.8 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 suits 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

7.2 Livestock

7.2.1 Existing Situation

District Jamshoro is a richly populated area with having animal population of 1221,000 of large and small animals. This district is well known with a different type of breeds of cattle, goats and sheep's. The animal population of the district is the highest number of Goats having 414,000 hands followed by Sheep 172,000 heads and Cattle 164,000.

Table 7-4 : Population of Livestock and Poultry of District Jamshoro Census 2006

Sr. No.	Livestock by Category	Population of District
1	Cattle	164,000
2	Buffalos	119,000
3	Sheep	172,000
4	Goats	414,000
5	Camels	4,000
6	Asses	29,000
7	Poultry	282,000

Source: Development Statistics of Sindh, 2017

7.2.2 Issues and Problems:

- Landlessness and small holding prevents 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.
- Reduced areas for natural grazing and feed production in the face of increasing urbanization and food security requirements
- Climate change and environment degradation

7.2.3 SWOT Analysis:

Livestock & Fisheries			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Well known to have different type of breed of cattle, sheep and goats.	1. Large scale breading has not developed 2. Landlessness 3. Single veterinary hospital	1. Production of livestock based products. 2. Labor force available for livestock growth.	1. Theft and security issues 2. Losses due to Disasters (floods and epidemics).

7.2.4 Need Assessment

District Jamshoro is richly populated area having animal's population 1221,000 of large and small animals. This district is well known with different type of breeds of cattle, Goats and sheep's. For this population of Animals, the services are not sufficient and not serving the all population of animals. There is a single veteran ary Hospital with 18 veterinary centres.

7.2.5 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 cattles and quantity of milk.
- Enhancing Veterinary Services.

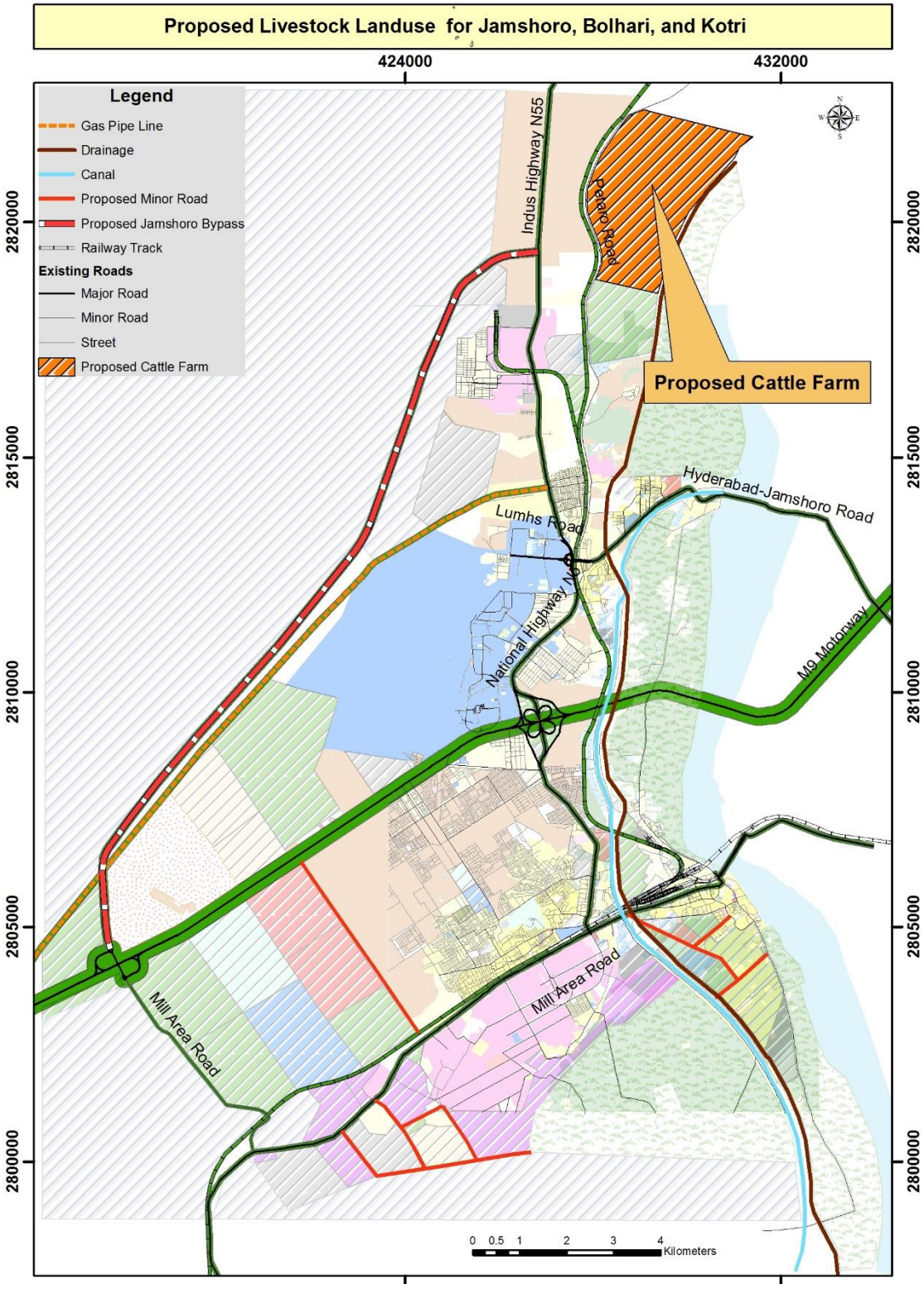


Figure 7:2 : Future Proposals for Livestock Jamshoro – Bolhari+ Kotri+ Town

7.3 Fisheries

7.3.1 Existing Situation

The total area associated with Fisheries department Jamshoro is 18 Acre addition of 56 Water Areas including Manchar Lake. There are 26 persons associated with the fisheries department including officers and lower staff. There are 14 private sector units are working for fish farming in Jamshoro District out of this only 5 farms are functional. There are 650 fisherman's are experiencing their luck. The number of registered boats in district Jamshoro is 650 including Manchar Lake which is comprised of 160 sq.km. The annual production of fish in district Jamshoro is approximately 16,338 M.Tons.[38]

Table 7-5 Annual Fish Production

Fisheries- & Production (M.Tons) (2017)		
1	Number of Boats	565
2	Number of Fishermen	650
3	Annual Fish Production	16,338

Source: Development Statistics of Sindh 2018

7.3.2 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

[38] Fisheries Department Jamshoro

7.3.3 SWOT Analysis:

Livestock & Fisheries			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Suitable land portions are available for fishing production.	1. Lack of facilities to industrialize fisheries based products.	1. Fishing can enhance economic activities if produced through appropriate industries.	1. Theft and security issues 2. Losses due to Disasters (floods and epidemics).

7.3.4 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.

7.3.5 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

7.3.6 Economic Development

It is expected that sustainable growth of livestock will be maintained as per main objectives of Livestock & Fisheries Department along with the participation of private sector. Hence there is possibility to:

- Establish new fish farms and poultry farms in the districts to generate production and income of the people engaged in this business.
- Moreover, 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 under PPP mode.

7.4 Industries

7.4.1 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[39] (latest available data). Mining is also a source of income for the inhabitants of this Taluka. Three main power plants are situated in Jamshoro District like: Jamshoro Power Station – Thermal Capacity 850 MW, Lakhra Power Plant Coal - Capacity 150 MW and Kotri Thermal Power Station – Gas Capacity 174 MW.

7.4.2 Types of Industries

Jamshoro is primarily an industrial-based district and the industrial base in this district is dependent on the Industries. This district has established some industries which are related to the agriculture as well i.e. the Agro food Industries, for these industries, is provided by the agriculture sector. Besides there are sugar mills, flour mills, and rice mills in this district.

Its main industrial hub is Nooriabad which is located along superhighway from Hyderabad to Karachi.

7.4.3 Industrial Estates

There are two large industrial estates in the district as follows

i. Industrial estate at Kotri situated on the right bank of River Indus over an area of 1875 acres was incorporated in 1960, on the pattern of Trading Estates of United Kingdom. With all modern infrastructures available on the site, it has 160 factories.
ii. 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, consisting of 72 industrial units but where only 42 units are operational.

7.4.4 Occupation & Job Opportunities

The main occupations of the people of District Jamshoro are Industrial based, trade, labour/skilled labour, prominent educationist, agriculturist, professionals like engineers, doctors, technical experts especially in the field of sugar industry, oil exploration, lawyers, planners, housing experts are playing their prime role in the development/economic activities of the district. Various type of employments extracted from socio economic survey results are: 18% Teachers, 3% Doctors, 23% Government Employees, 18% Private Employees, 4% Self-Employment and 26% Labour/Technicians. The occupational involvement in industry

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

is also overwhelming. A considerable segment of society adopts government/private service as their occupation.

7.4.5 SWOT Analysis

Industrial			
STRENGTH	**WEAKNESSES**	**OPPORTUNITY**	**THREATS**
Industrial			
1. Active industrial zones are present in district i.e. Kotri and Nooriabad. 2. More people are employed in industrial sector.	1. Lack of Industrial estate policy 2. Bad condition of road Kotri SITE area	1. More international trade. 2. Job employment. 3. Based on the success story of present industries, more industries can be installed in future. 4. Suitable for Cement & Detergent factories	1. Uneducated social group. 2. Air pollution 3. Water contamination to river Indus resources. 4. Security

7.4.6 Need Assessment

- Vocational training to Women force should be encouraged for establishing cottage industry in the district.

7.4.7 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

7.4.8 Priority Projects

i. Revitalization of Industrial Estate of Kotri (located along National Highway Kotri N-5)

- **Project Scope & Justification**

  At present, Kotri is providing sufficient employment through its industrial activities. Land measuring 1,875 acres is designated for industrial activities along main National Highway N-5. Industrial estate kotri established in 1962. There will be a need to take actions with basic aim to retain the situation and attract the future investments. District Jamshoro has various type of Industries i.e. Textiles, Light Engineering, Flour Mills, Copper Wire, food and Beverages. These different industries provide employment to approximately 10,000 people. While revitalizing the Industrial Estate of 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.

- **Project Benefits**

  Increase industrial activity with significant employment generation and overall assistances to the city's economy.

- **Implementing Authority: P& DD Gos, BoR, Sindh Small Industrial Development Board and Kotri Chamber of Commerce and Industries.**
- **Estimated Cost: 500.00 Million Approx.**

Project Name	Sector	Short Term	Area in Acres	Preliminary Cost in million	Justification
Revitalization of Industrial Estate Kotri (located along Main Kotri National Highway N-5 Road)	Sindh Small Industrial Development Board.	Long Term	1,875 Acre	500.00	Lump sum 500.00

7.4.9 Economic Development

- On the basis of projected increase in crop production up to 2037 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.

7.5 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

7.5.1 SWOT Analysis:

Trade & Commerce			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Availability of financial institutes. 2. The Jamshoro Chamber of Commerce is a representative body of business community like companies, firms & Traders in the District Jamshoro.	1. The failure of PPP trouble for locals and government. 2. Demise of local agriculture market. 3. Un-planned local business activities.	1. More opportunities for public private partnership. 2. Support to local economy. 3. Employment Opportunities for a large number of population.	1. Security measures required. 2. Inflation.

7.5.2 Issues

- The failure of PPP (Public Private Partnership) trouble for locals and government.
- Demise of local agriculture market.
- Un-planned local business activities.

7.5.3 Priority Projects

i. Establishment of Fruit and Vegetable Market at Kotri

➢ **Project Scope & Justification**

At present there is no site designated for fruit & vegetable market. Ordinary retail shops for vegetables and fruits are located on the main roads & causes traffic congestion & garbage issues. Provision of new fruits & vegetables market shall resolve issues i.e. congestions & road side waste generation etc.

As towns expand, the relocation of wholesale markets to the fringes becomes imperative. In order for this major operation to be successful, it is necessary to provide good level of access and infrastructure in the project area. Close linkages with bus and truck stands must be ensured. Approximately 5 acres out of total land is reserved for fruit & vegetable market within Trade and Commerce zone.

This planned market shall provide an easy access and the existing Commercial area shall not face traffic congestion and other related problems. Fruit and vegetable market area is considered to be part of trade and commerce zone for future up-gradation of Jamshoro @ Kotri DHQ town with respect to its use in future and giving ease to the present user of existing market.

- **Project Benefits**

  It will help to increase in earnings of local population, reduce congestion and also help to increase revenues & employment.

- **Implementing Authority –** BoR, and Local Government.

- **Estimated Cost**: 250.00 Million Approx.

Project Name	Sector	Short Term	Area in Acres	Preliminary Cost in million	Justification
Land Acquisition for Establishment of Fruit And Vegetable Market At Kotri	Economic Development (Trade & Commerce)	Short Term	5 acre	250.00	Land Acquisition and Development Charges Per acre cost @ 10,000,000 (10 Million)

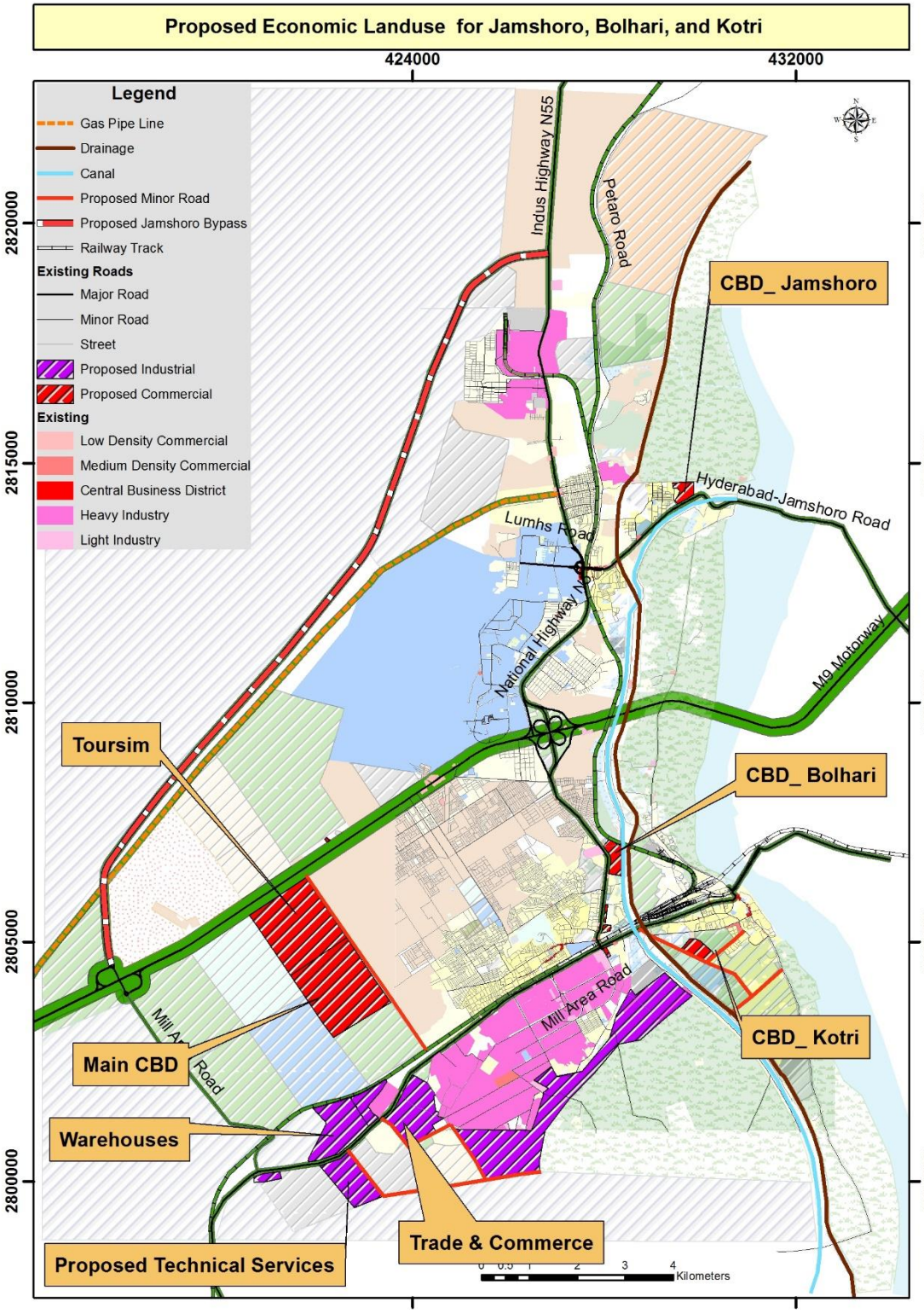


Figure 7:3 : Proposed Economic Facilities Jamshor + Bolhari+ Kotri Town Map

7.5.4 Immediate Action Plan for Core Urban Area

The core town area is the oldest and the most congested part of the Jamshoro TC, Bolari MC and Kotri TC, and facing lot of problems i.e. unavailability of footpaths, outdated sewerage & drainage system, encroachments, illegal Wagon & qingqi stands etc. Main CBD is thriving trade and popular retail businesses in narrow streets and high density low rise buildings occupied by population belonging to various income groups. The proposed projects for core urban area of Jamshoro @ Kotri DHQ consists on; Removal of encroachments from town center and bazaars, created by the shopkeepers and hawkers.

i. Kotri MC

- **Modernization of Commercial Activity in the Core Urban Area of Kotri MC**

  Kotri MC has main commercial hub along the Raswa Mori Road. This area includes post office, police station, banks, milk shops, shopping centres, restaurants, hotels, medical stores, bakery, etc.

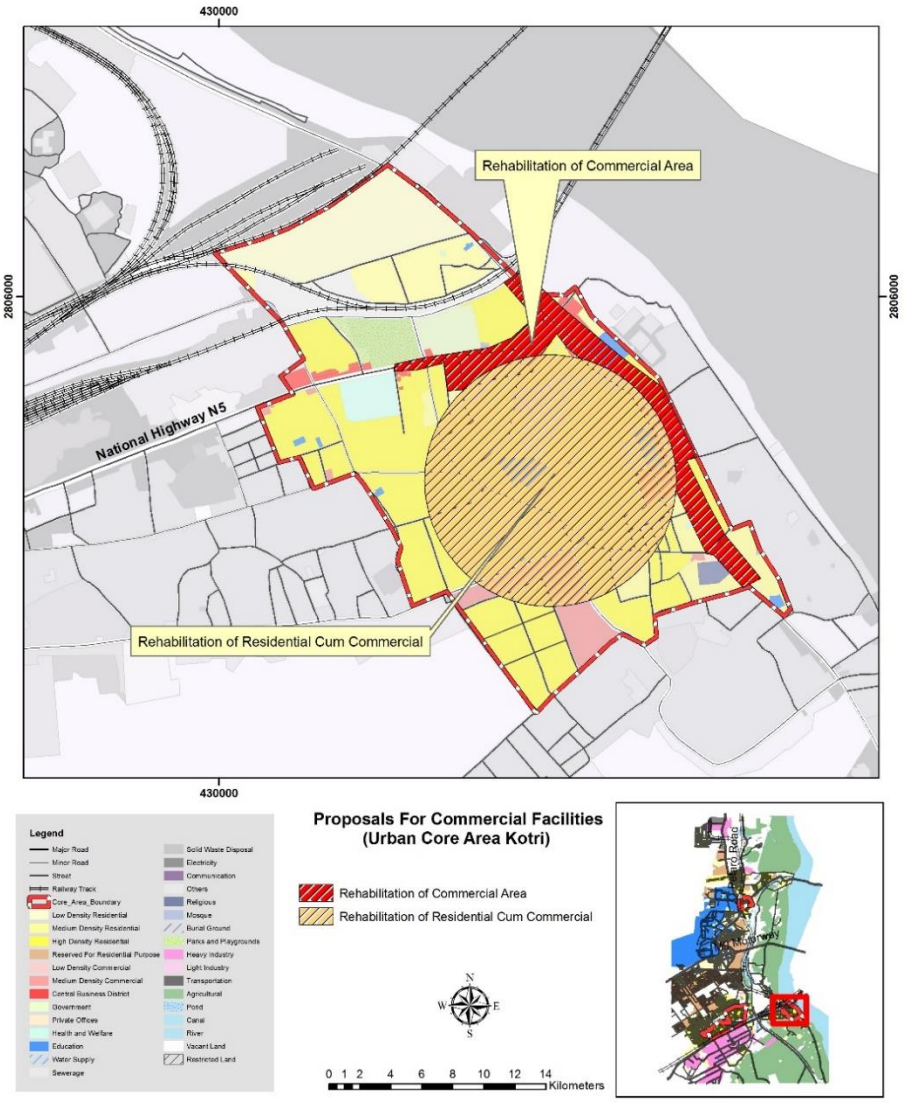


Figure 7:4: Proposals for Commercial Facilities (Core Urban Area)

ii. Bolhari

➢ **Modernization of Commercial Activity in the Core Urban Area of Bolhari MC**

Bolhari MC has main commercial hub along the Hajji Ali Nawaz Chohan Road. This area includes maekets, mobile shops, milk shops, tailors, medical stores, general stores, hotels, restaurants, banks etc.

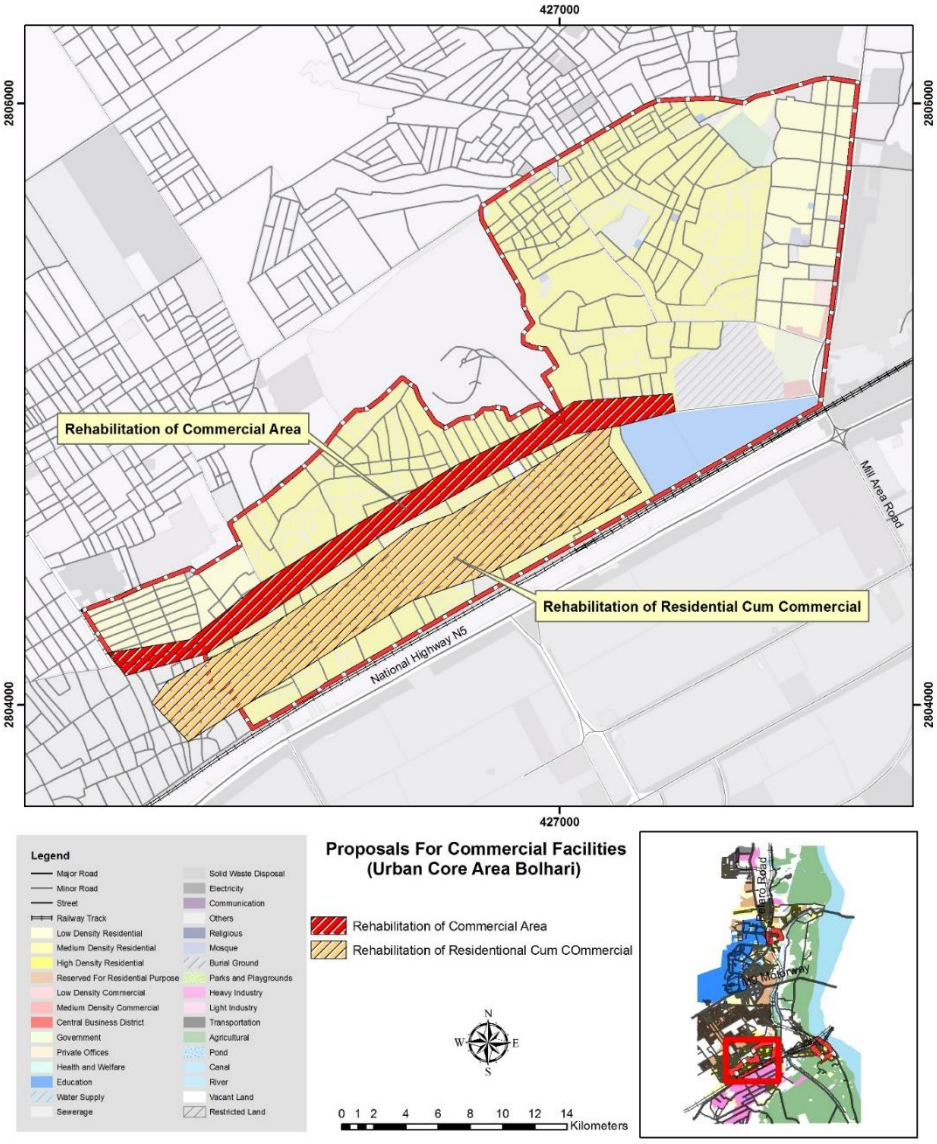


Figure 7:5: Proposals for Commercial Facilities (Core Urban Area Bolhari)

iii. Jamshoro TC

➢ **Modernization of Commercial Activity in the Core Urban Area of Jamshoro TC**

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.

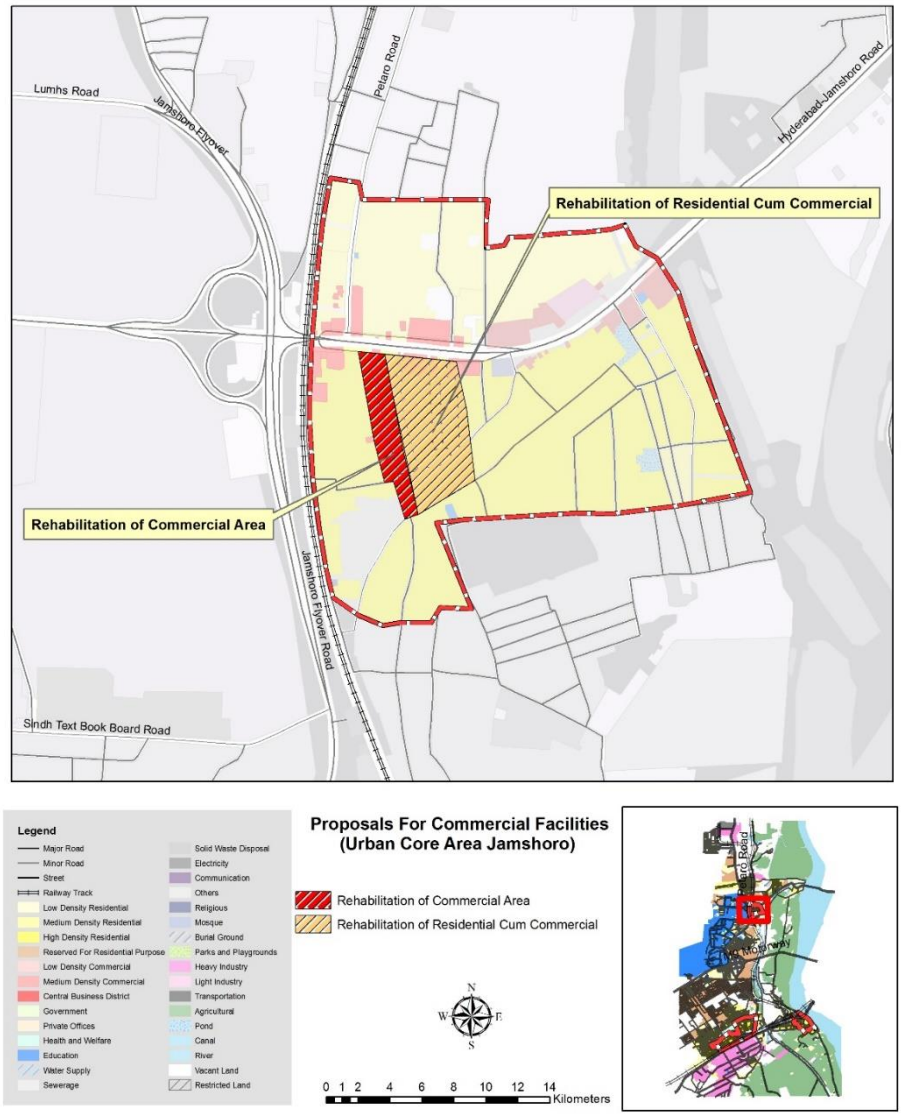


Figure 7:6: Proposals for Commercial Facilities (Core Urban Area Jamshoro)

Municipality old markets are present in old commercial area of Kotri MC. Land encroachers grabbed few municipality properties and not paying any fares.

- Rehabilitation of Shahi Bazar Area
- Provision of pedestrian facility in main Bazar area for visitors
- Up gradation of old Bazaar area's main road
- Relocation of vegetable & Meat Markets
- Removal of encroachments
- Removal of illegal Bus stands

List of proposed projects in Immediate Action Plan for betterment of the existing CBD area are given below;

Rehabilitation of Main Commercial Area – Activity wise cost in Millions						
S.No	**Area / Locality / Address**	**Area (acre)**	**Cost in PKR million.**			
			Street / Road / Parking	**Utility infrastructure**	**Public Facilities**	**Security**
1	**Rehabilitation of Main Commercial (CBD) Area** • Rehabilitation & Beautification of main Bazar area i.e. Bareja Chowk, Raswa Mori Road, Kotri station Road, Shah Latif Road, Main National Highway N-5 Road, Police Station Road, Eidgah ground road, Haji Ali Nawaz Chohan road, Sikandar Ali Chohan road, Shahi Bazar Jamshoro and Commercial along main Jamshoro Road	**228**	57.00	205.20	85.50	45.60
	Total PKR Rs. Million		**393.30**			

- **Note:**
  Commercial areas should 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 define with ease.
- Provision of pedestrian facility in the Bazaar area
- Banned heavy vehicles during peak hours

Removal of encroachments

7.6 Economic Development Plan for Headquarter Town with Poverty Reduction Strategy (PRS)

Poverty Reduction Strategy (PRS)

Sindh province is leading the way in being the first province to have taken the bold step of formulating a specific Poverty Reduction Strategy (PRS) for the entire province, which has been approved by the Sindh cabinet on 16th October, 2018. The PRS developed is aimed to act as medium-term instrument to address the challenge of poverty in Sindh and to have a specific focus on Community Driven Local Development (CDLD). This is a logical approach for Sindh, given the GoS initiatives over the last decade in CDLD, through the Union Council Based Poverty Reduction Programme (UCBPRP).

i. A Vision for Poverty Reduction in Sindh

The poverty reduction strategy is aimed to act as medium-term instrument to address the challenge of poverty in Sindh. As such, the long-term intentions and aspirations of the GoS in reducing poverty should be clear, with a definable 'vision' for poverty reduction and associated goals and targets to be achieved over the specified duration of the Strategy.

ii. Poverty Reduction Strategy (PRS) Approaches

The PRS illustrates three dimensional approaches to reduce poverty at Rural and Urban Level

I. This includes continuation of People Poverty Reduction Program to carry out interventions of financial support and capacity building at grass root level
II. The second proposal entails a model of Rural Growth Centers which will serve as a business hub by clustering the geographically connected and demographically viable village
III. The third approach envisages reducing urban poverty by adding urban economic clusters and creating linkages between rural and urban poverty reduction activities

iii. Poverty Reduction Strategies

The three key strategies of the PRS, and their core components, are:

STRATEGY I Community Driven Local Development (CDLD) – the Foundation

The CDLD Policy is incorporated within and is a component of the PRS continuation of a CDLD approach consists of:

- Building on and expanding the UCBPRP programme
- Mainstreaming a CDLD approach, and integration of this approach with line department activities.

STRATEGY II Addressing Urban Poverty

- The direction of the strategy to address urban poverty is on emphasizing ' urban within rural' – focusing on the small towns within rural areas of Sindh
- The strategy focuses on targeting employment opportunities and enterprise development
- A key approach within this is utilising urban economic clusters as a means to facilitate cooperatives in enterprise development.

Urban Income Enhancement Program and Economic Cluster

In order to address the issues of human development and poverty in districts, the policies and programs are to be developed both for rural and urban areas. These issues for the development of

city have been tackled by linking with "Urban Income Enhancement Program" which emphasizes in establishment of "Urban Economic Cluster" focusing on:

- Small Enterprise Development,
- Vocational training and
- Encouraging Women Force for establishing handicrafts and cottage industry

This would lead to creating the opportunities for income generation and employment.

STRATEGY III Rural Growth Centres, or 'Service Hubs'

- This strategy consists of a new approach in the way forward to address rural poverty and development. This involves identification of locational focal points or villages that can serve as a centre for improved facilities and provision of services to the surrounding clusters of villages
- The intention is to consolidate services and facilities in these hubs, to provide growth and development opportunities.

Rural Growth Centre

Include the following components but not limited to

- Housing and village up-gradation (internal roads, drains, parks, Masjid)
- Commercial facilities to support local agri-based businesses and services - for example, storage facilities including refrigerated facilities for storage of agricultural inputs and outputs), distribution centers, sale outlets, bank, milk chilling plant, veterinary clinic
- High school for students from villages in the cluster
- Rural Health Centre
- Vocational centre and other community facilities, such as RSP centre
- Drinking water plants.

iv. Mainstreaming the Poverty & Policy & Program

In order to initiate the development of a stronger economy of towns, its policies need to be embedded in sector strategies of the following departments along with Municipal Town Committee and Katchi Abadi regulators.

- Industries & Commerce Department
- Local Govt. Department
- Works & Services Department
- Transport Department
- Planning & Development Department

- Reinforce the local governance institutions.
- Modernize local / district / divisional administration.
- Decentralization of governance authorities.
- Involve community participation.
- Exploring and implementing PPP (Public Private Partnership) in all sectors.

v. Access to Micro-Finance

Access to demand-driven microfinance provided by sustainable microfinance institutions (MFIs) has proven to be a powerful tool for poverty reduction by improving the ability of poor people to increase incomes, build assets, and reduce their vulnerability during periods of economic hardship

8. BASIC UTILITIES

8.1 Water Supply

8.1.1 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).

- **Water Intake Works**
  The KB feeder is also known as Karachi canal off-takes, from the right side of Kotri Barrage from Indus River is the major source of supply for Kotri MC, Bolhari MC, and Jamshoro TC. The transmission system of water in Kotri MC, Bolhari MC, and Jamshoro TC is through pumping. There are 20 pumping stations which are pumping water from reservoirs and KB feeder, there are 3 underground reservoirs (capacity data was not given) which are located in Bolhari MC and 19 overhead reservoirs located in kotri MC.

- **Existing Water Works**
  The existing system of water works in Kotri MC, Bolhari MC, and Jamshoro TC is facing partially blockage issues in distribution of water supply due to lack of operation & maintenance. The sample testing revealed that the water supplied to the residents remains polluted. The Town/Municipal Committee is supplying contaminated water which is not acceptable for drinking purposes. The standard maintenance system is not being followed due to which un-safe water is supplied.

- **Distribution Network**
  The distribution system consists of scattered lines of CI, µPVC, AC and PE pipe of size 3", 4", 6", 8", 12" & 16" diameter. Kotri MC has provided 6,000 water connections out of 18,739 housing units. The required water demand is fulfilled by 20 pumping stations from KB feeder without any zoning.

Water Treatment Plant:
There is no water filtration plant in Kotri MC, Bolhari MC, and Jamshoro TC. KB Feeder is supplying contaminated water to the poor residents because the water filter plant at Kotri is not being used and lying idols. Neither the chlorination nor any type of disinfection is taking place in the plant and merely alum is used for silt settlement. In site area Kotri, 145 Industries are operating and taking water from KB Feeder.

- **Current Water Supply**
  The KB feeder is the main source of water supply to Kotri MC, Bolhari MC, and Jamshoro TC. The secondary survey illustrates the technical capability for water supply, sewerage, and drainage lie in PHED while administrative capacity lies with local government. PHED adopts a 30 gpcd standards for evaluation of present and future water demand. There is no problem in the frequency of supply timings every day except when there is power breakdown causing total water supply closure.

*8.1.2 **Issues:***

The following are issues of water supply in Jamshoro DHQ (KotrI MC, Bolari MC and Jamshoro TC):

- Old underground water pipelines are scattered in the whole area and caused problem of water distribution.
- The pipe line connecting filtration plant with main Rohri Canal repaired with cement joints do not work longer and still leaking at Dad wah, koloi stop and SBB University.
- The old systems have collapsed due to lack of maintenance and poor design in the town.
- The water is supplied intermittently. As the water lines are laid adjacent to the sewers/ drains the wastewater is sucked into the water lines. Often water lines have been tapped informally using poor joints and connections, again leading to contamination by sewage.
- High proportion of non-revenue water
- There is also inadequate technical capacity and capability in government agencies to plan and implement and an absence of management information systems
- Good quality drinking water is not available to the general public in the core urban area and water is being supplied to the people without any treatment and filtration. Only some rich people can afford to use bottled water for drinking.

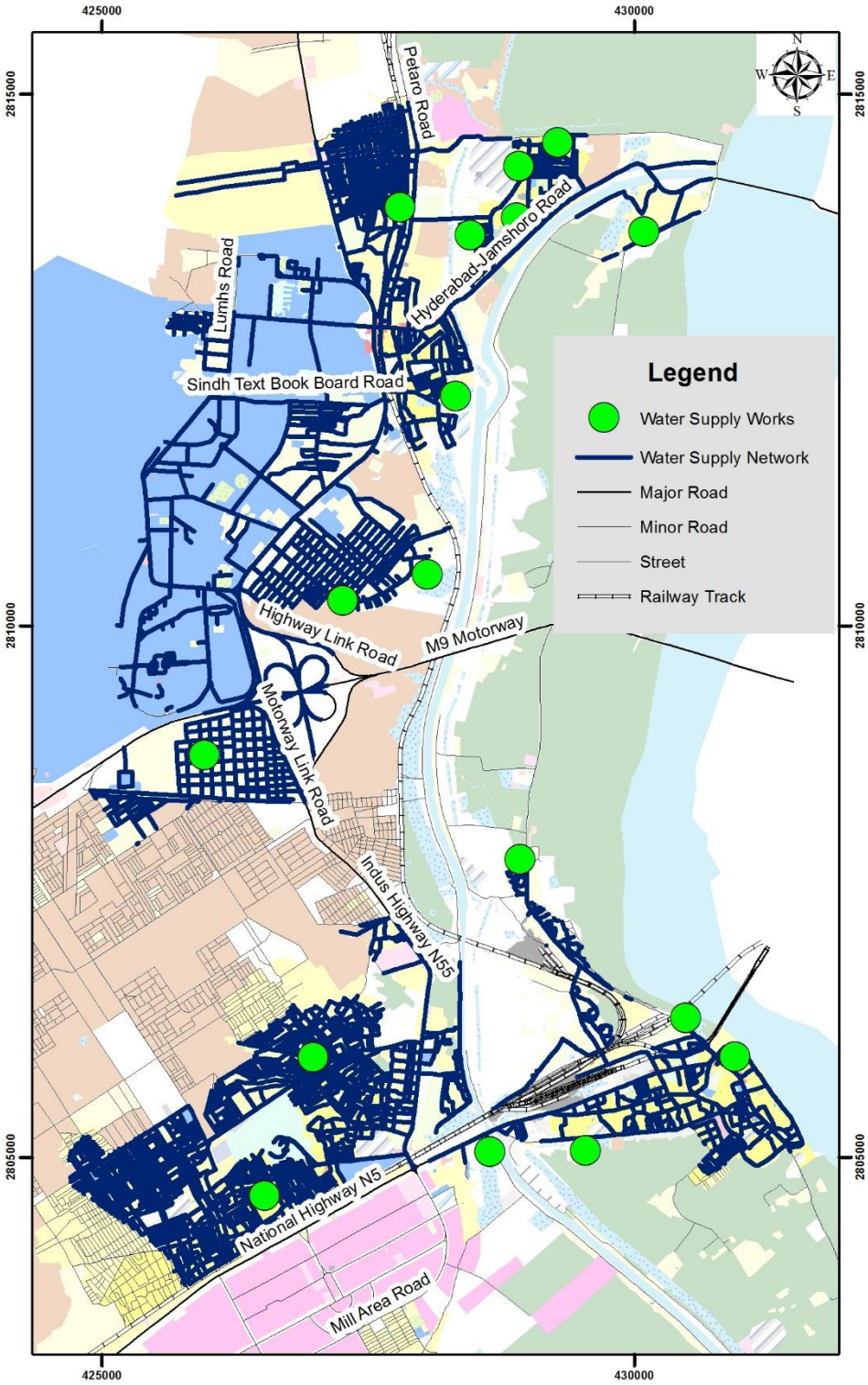


Figure 8:1: Existing Water Supply Map of DHQ Town

8.1.3 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.

8.1.4 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 2037 is shown below:

Location	Present Supply	year	2017	2022	2027	2032	2037
		Population	293,798	354,709	428,248	517,034	624,277
	6.78 MGD	Per Capita daily demand @ 30 gped)	8.81	10.64	12.84	15.51	18.72

Source: Consultant Estimation

As per secondary data from PHED Jamshoro, the current demand of the town is about 8.81 mgd while total water supply is 6.78 mgd. The current gape is 2.03 mgd. Furthermore, it is expected that the Kotri MC, Bolhari MC, and Jamshoro TC will have a population of about 624,277 persons by 2037 and the daily demand for water for the town will increase up to 18.72 for a whole-day supply.

8.1.5 Sindh Drinking Water Policy 2017 [40]

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 faecal 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.

8.1.6 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

[40] Water and Sanitation Policy for Sindh 2017.

- Exploration and regulation of fresh groundwater

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.

8.1.7 Priority projects

i. Improvement of Water Intake Works

➢ **Project Justification**

The purpose of the proposed project is a safe water solution for the water intake from present source for Kotri MC, Bolhari MC & Jamshoro TC of DHQ town. The Present water intakes System is from the KB feeder (Karachi canal) off-takes from the right side of Kotri Barrage from Indus River is the major source of supply for Kotri at Jamshoro.

After Sedimentation, the water is supplied through 20 twenty pumping stations, which are connected with main distribution network of town. As per secondary data from PHED Jamshoro, the current demand of the town is about 8.81 mgd while total water supply is 6.78 mgd. The surrent gape is 2.03 mgd. Improvements in water intake works cover below components;

- Construction of intake structure adjacent to Canal which will comprise of screens, pipe, valve chamber
- Construction of Wet well and pump room
- Installation of Pumps based on solar power
- Construction of Reservoir (approx. 10 million gallon capacity)

➢ **Project Benefits**

The project is to improve the collection of raw water supply collection. This project includes increasing the number of pumping stations and up gradation the sizes of pipe lines with additional water storage resrvioirs with 10 days capacity. After implementation of this project, the source of water intake will be safe. This project shall improve the collection of raw water and increasing the number of pumping stations and up gradation the sizes of pipelines.

- **Implementing Authority:** Kotri MC, Bolhari MC & Jamshoro TC, Government of Sindh and PHE Department.

- **Estimated Cost: 100.00 Million PKR Approx.**

ii. Repair & Rehabilitation of Water Supply Network 79% (6462.23 Acres)

- **Project Justification**

Total Urban Area excluding Core Area, Industrial, Transportation, Agriculture, Water Bodies and Vacant Area (Acres)	8180.04
Total Served Area 79%	6462.23
Proposal for Repair & Rehabilitation of Existing Water supply scheme shall help to supply safe potable water to 79% population of Kotri MC, Bulahri MC and Jamshoro TC @ One Million per Acre = 6462.23	6462.23

Almost all the network of Water Supply in Kotri MC, Bulahri MC and Jamshoro TC is in poor condition and most of it require repair and rehabilitation. This project will help to supply of water in those areas where the network is available and existing network is damaged. The objective of the project is to get uninterrupted water supply for treatment to supply potable water to the inhabitants of Kotri MC, Bulahri MC and Jamshoro TC. The project is to improve the collection of raw water supply collection. This project includes to increase the number of pumping stations and up gradation the sizes of pipe lines.

- **Project Benefits**

As already discussed above that existing supply network is old and needs repair and rehabilitation. So after implementing of this project, the Potable water will be supplied by piped water and connection facility will be made available to every household.

- **Implementing Authority - Government of Sindh- PHE Department Jamshoro**

- **Estimated Cost: 6,462.23 Million PKR Approx. (Short Term).**

iii. Provision of New Water Supply Network for Remaining 21% of Kotri MC, Bulahri MC and Jamshoro TC. (Approx. 1,717.80 Acres)

- **Project Identification & Justification**

Total Urban Area in Acres	8,180.04
21% of Total Urban Area in Acres	1,717.80
Installation of New water supply scheme is proposed to cover the rest 21% population / Area of Kotri MC, Bulahri MC and Jamshoro TC @ Rate of 3.0 Million Per Acre	5,153.42

According to socio economic survey conducted by consultants about 21% of population of Kotri MC, Bulahri MC and Jamshoro TC has no water supply network & dependent on hand pump & community wells. People purchase

their potable water through tankers due to unavailability of water supply network. This project will help to extend the supply of water in those areas where the network is not available. Provision of New Water Supply Network will cover main components i.e. Excavation, Pipe cost, Gate valve/ Washout valve/ Air release valve, Joints repairs, Balancing slopes at all network, Checking of pipe life with rupture checker and Valves for area wise pressure maintenance.

- **Project Benefits**
  After implementing of this project, the Potable water will be supplied to the whole of Kotri MC, Bulahri MC and Jamshoro TC.

- **Implementing Authority - Government of Sindh- PHE Department Jamshoro**

- **Estimated Cost: 5,153.42 Million PKR Approx. (Short Term)**

Priority Projects				
S. No.	**Project Name**	**Estimated Cost In Millions**	**Non ADP**	**Breakup**
Water Supply				
1	Improvement of Water Intake Works	100.00	-	-
2	Repair & Rehabilitation of existing Water Supply Network 79% Kotri MC, Bulahri MC and Jamshoro TC. (6,462.23 acres)	6,462.23	Non ADP	6,462.23 Acres, at the rate of 1.0 million per acre for overall Repair and rehabilitation.
3	Provision of New Water Supply Network for Remaining 21% of Kotri MC, Bulahri MC and Jamshoro TC. (Approx. 1,717.80 Acres)	5,153.42	Non ADP	1,717.80 Acres, at the rate of 3.0 million per acre for overall construction.

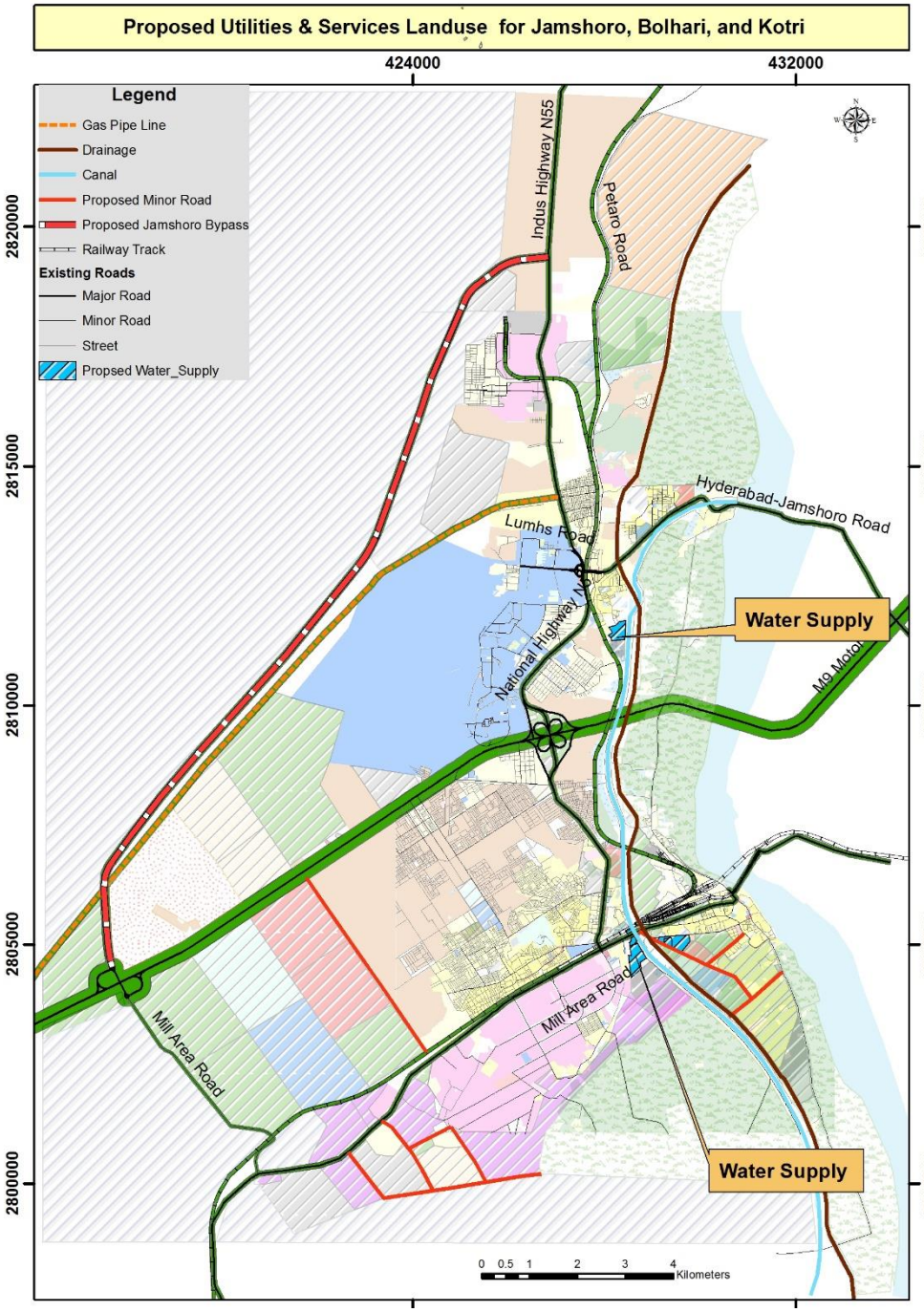


Figure 8:2: Proposed Utilities Landuse for Kotri, Bolhari and Jamshoro

8.1.8 Immediate Action Plan for Core Urban Area

Existing water supply scheme of core town area has passed ages and became outdated, core area of Jamshoro TC, Kotri MC and Bulhari MC is counted as densely populated area of DHQ town, residents of core town area are complaining regarding the quality of water supplied to residents. Mixing of drainage with fresh Water is major issue observed during survey. So therefore it is proposed to repair & rehabilitate existing water supply network of core town area.

Rehabilitation of Existing Water Supply Network of Core Urban Area of Jamshoro TC, Kotri MC and Bulhari MC (800.16 Acre)				
S.No	**Name**	**Area (acre)**	**Per acre cost (PKR) million**	**Cost (PKR)**
1	**Water Supply System:** (Water supply system renovation includes supply pipe networks, pumping machinery and equipment's for more efficient and effective supply of water).	800.16	1.0 million Per acre	800.16
			Total Cost (PKR). Million	**800.16**
Note: Water supply system renovation includes supply pipe networks, pumping machinery and equipment's for more efficient and effective supply of water.				

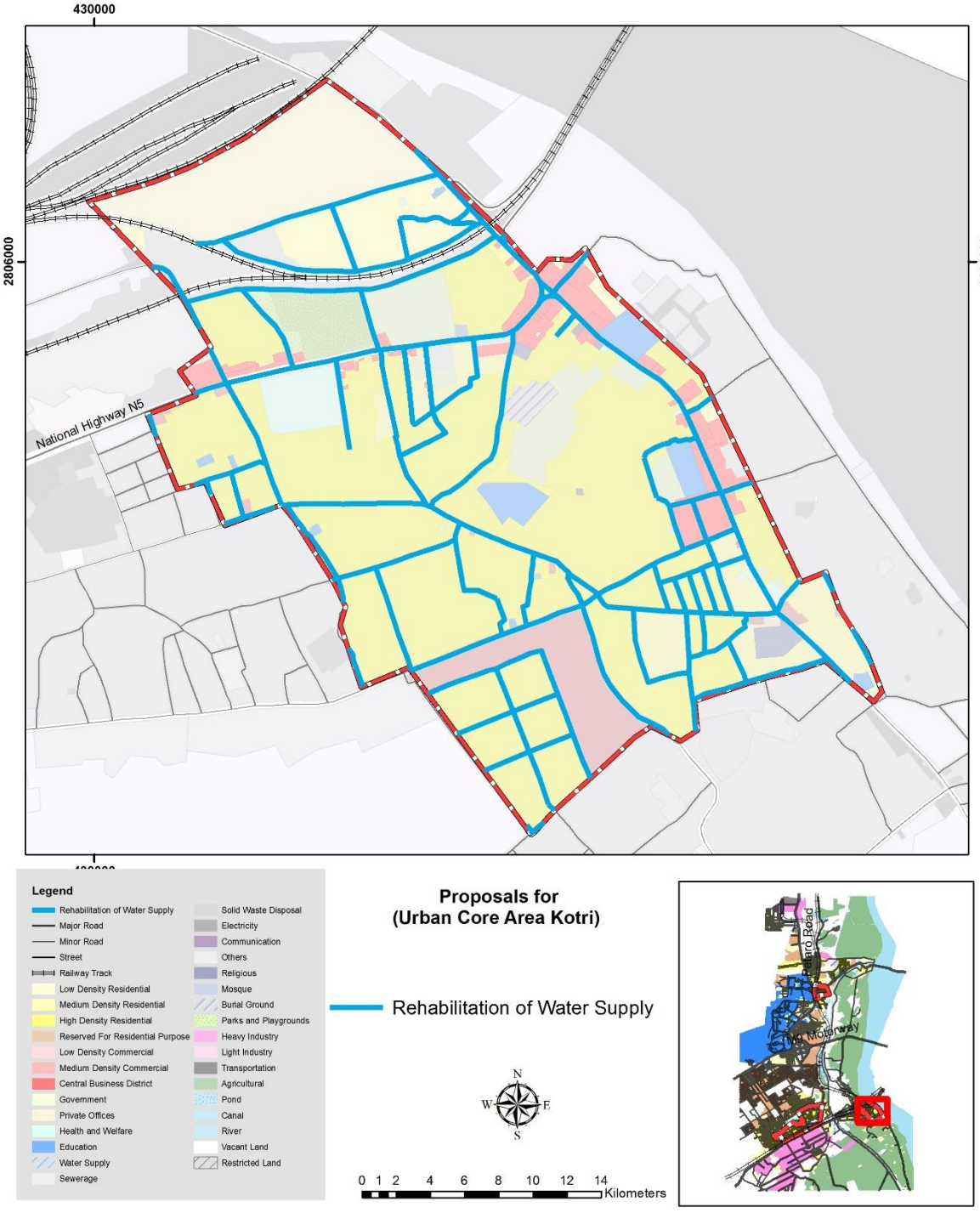


Figure 8:3: Rehabilitation of Water Supply Network for Core Urban Area Kotri

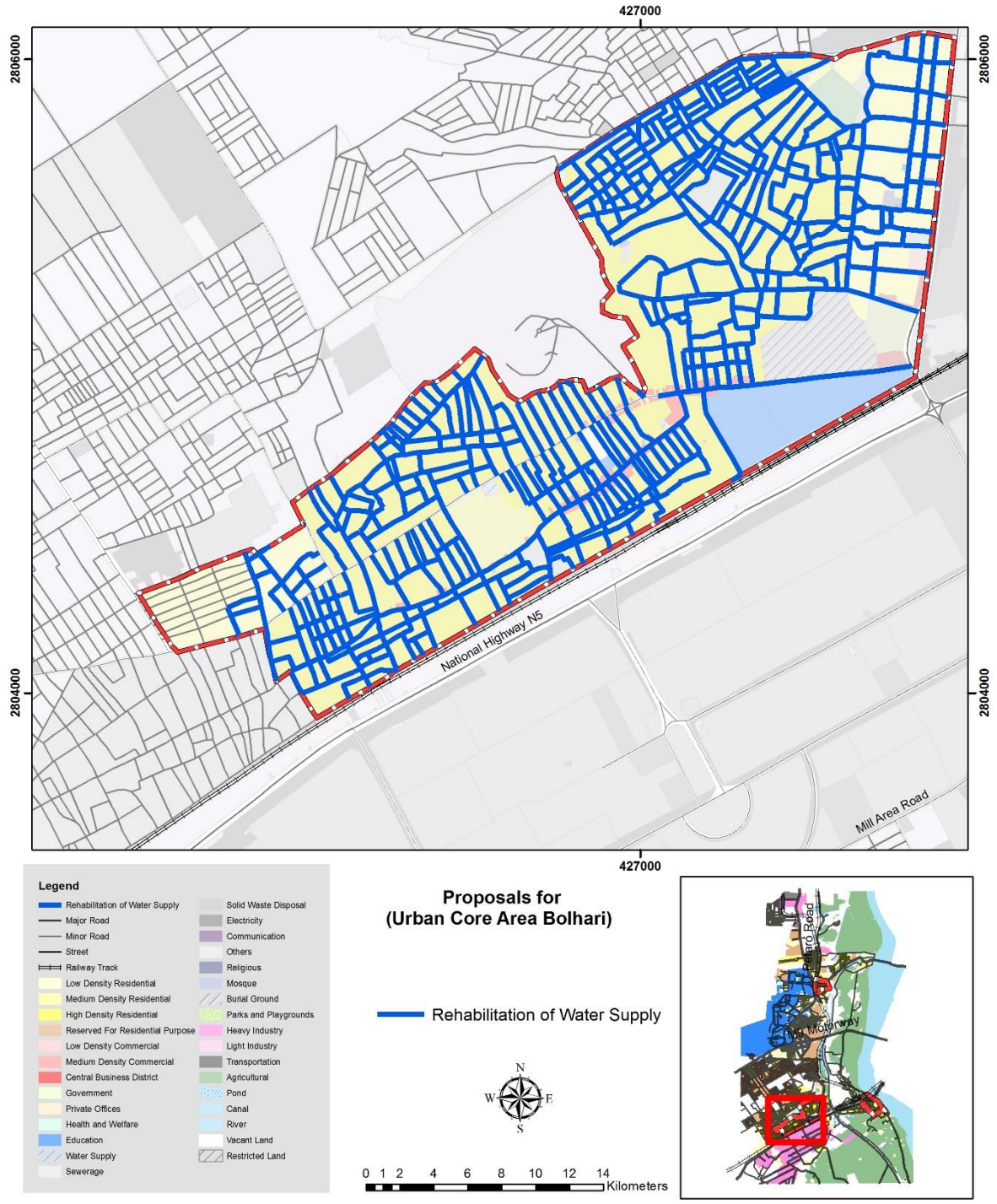


Figure 8:4: Rehabilitation of Water Supply Network for Core Urban Area Bolhari

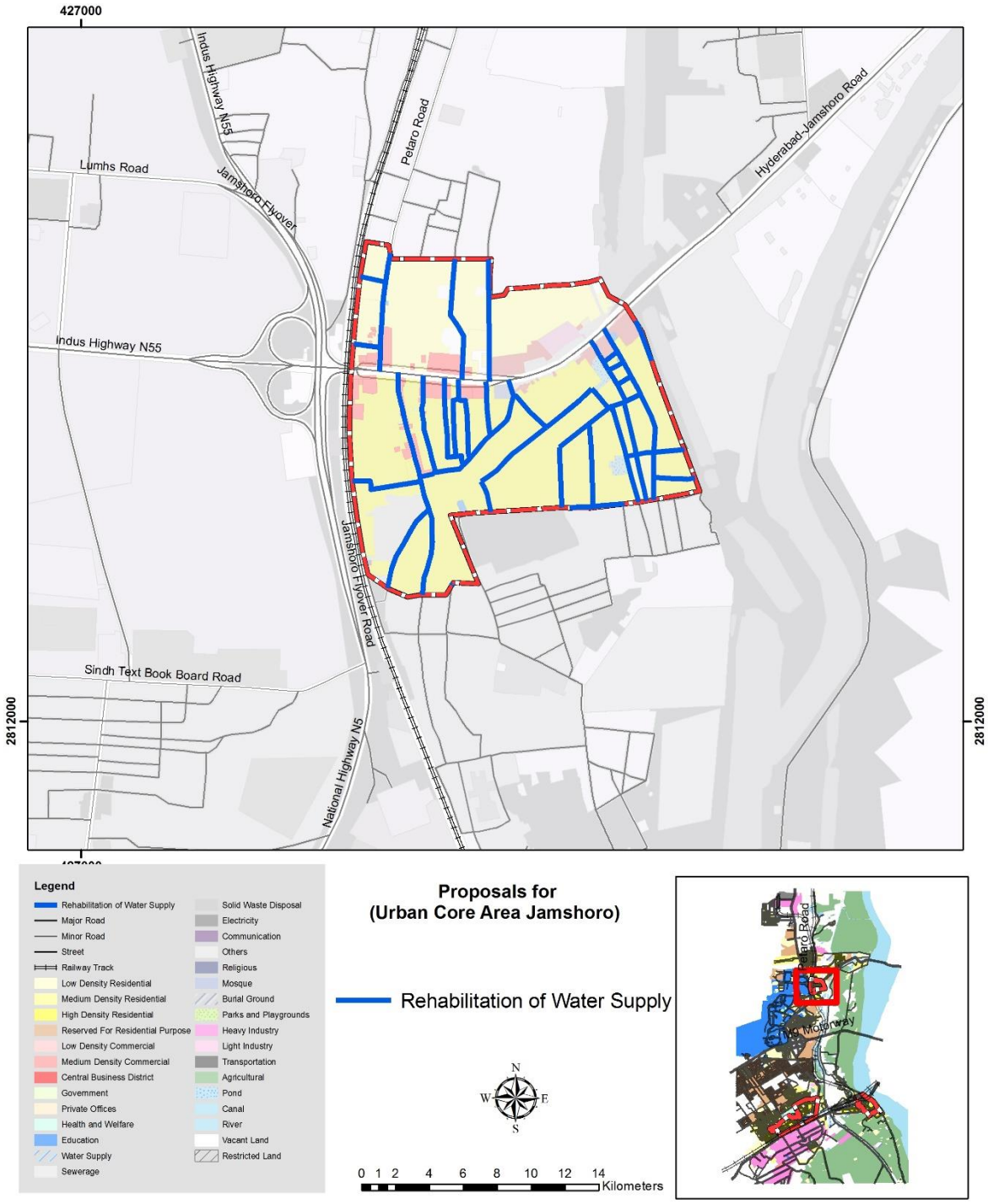


Figure 8:5: Rehabilitation of Water Supply Network for Core Urban Area Jamshoro

8.2 Sewerage and Drainage

8.2.1 Existing Situation

There are four types of disposal systems & these include underground sewer pipes, Covered drains, open drains categorized as Type A, B & Type C concrete drains. The quality of construction is very poor in block masonry instead of cast in situ or RCC structure. This way the operation & maintenance cost is higher or mostly the drains remain broken creating the unhealthy environment and in many cases the overflowing gutters become breeding grounds for flies & mosquitoes. The adequacy of Sanitation facilities in the DHQ town Kotri @ Jamshoro is not more than 30%. The Sewerage & Drainage System of DHQ Town Kotri at Jamshoro with considering Bolhari MC as well consist of a combination of underground pipe sewers, Concrete drains constructed in 1988 at different stages. There are three pumping stations in Kotri MC located at Main City, nagay lane, and behind Baba Salaudin which pumps the disposal to discharge it in main KB feeder without treatment and private field Courses. Furthermore, there are 3 storage tanks for sewerage and drainage in Bolhari MC. The main drainage point of MC Bolhari is located at Khuda ki Basti #1. 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.

8.2.2 Waste Water Treatment Plant

There is no wastewater treatment plant for residential wastewater in Kotri MC, Bolhari MC, and Jamshoro TC, although the industrial area of Bolhari MC is disposing of wastewater in KB feeder with treatment plant located at KB Feeder. The dispose of sewage and drainage water of residential areas of Kotri MC, Bolhari MC, and Jamshoro Tc is directly into the KB feeder without treatment.

8.2.3 Issues:

- Damaged lines and was not fully functional
- Overflowing sewage water on the streets and blockade in the sewerage lines
- Improper operation and maintenance of sewerage facilities.
- Inefficient record of operation and maintenance works including machinery and equipment available for cleaning drains / sewers – in the same manner, little information in written form is available on the performance of pumping and treatment facilities such as flow rates, operation hours, water qualities, facility failures and repairs and so forth.
- The many informal settlements are located in poorly drained low lying land can be subject to flooding, resulting in ponds of stagnant water in their midst and providing breading grounds for mosquitoes and water borne diseases. There is no standby pumping equipment at disposal stations.
- The drainage system and structures are in poor condition with open smelly drains and sewers.
- There is no sewage treatment and untreated sewage collects in ponds / swamps or directly discharge in to irrigation canal. The residents were dissatisfied with current sewerage system.
- No waste water treatment plant, thus raw sewage is being discharged into water bodies.

- Open road side drains carry raw sewage which is collected in ponds and swamps located outside the inner core area. These drains are in poor condition and usually overflow in the rainy season. This system causes bad odour, ill-health and spread of contagious diseases for the residents.
- The sewerage system lacks proper operation and maintenance due to shortage of technical staff and proper equipment and vehicles.

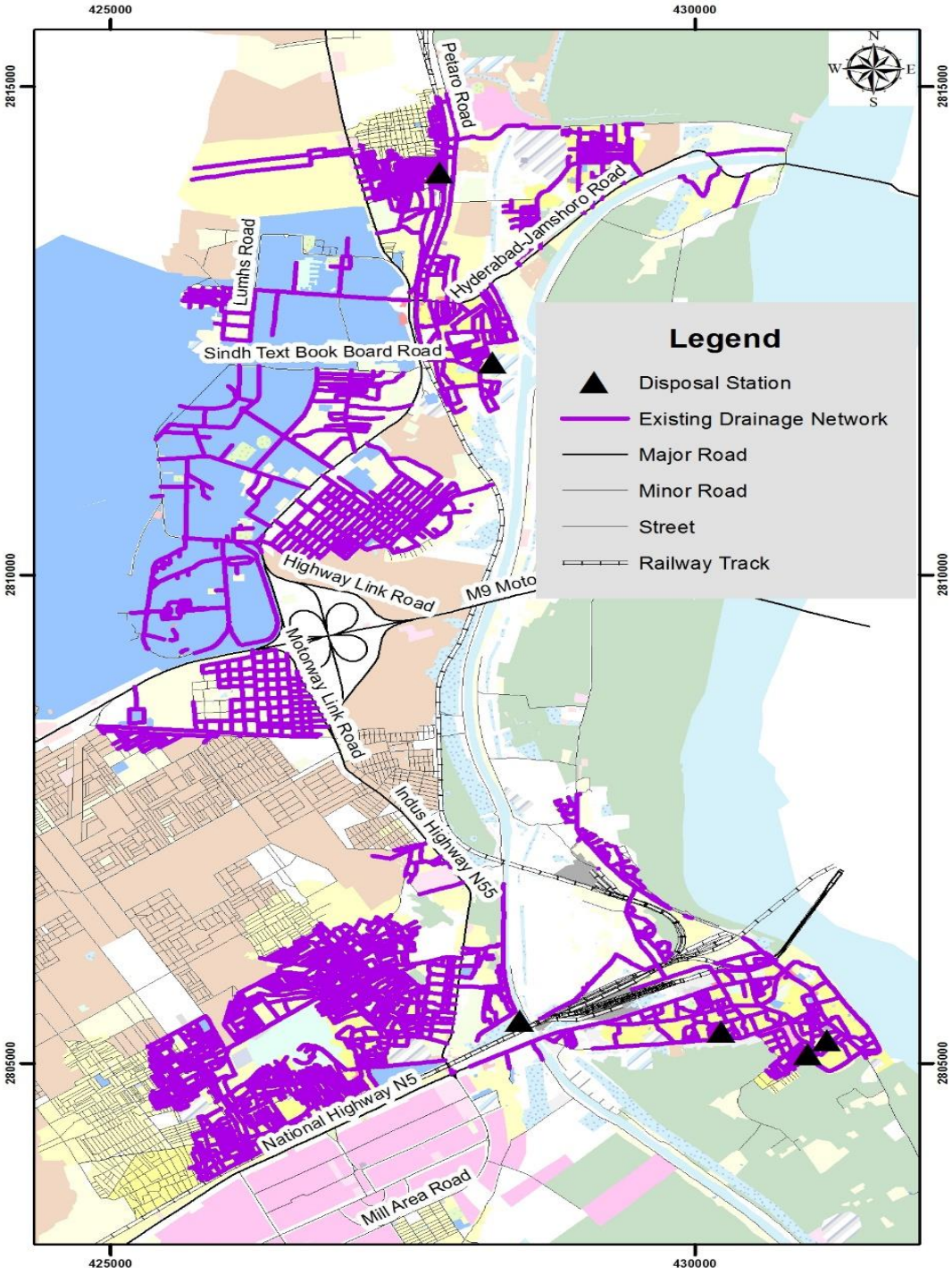


Figure 8:6: Existing Drainage Works in DHQ Town

*8.2.4 **SWOT Analysis:***

STRENGTH	WEAKNESSES	OPPORTUNITY	HREATS
Sewage Collection & Disposal			
1. The existing sewerage system facilitates the urban area of the city. 2. Sufficient land for disposal sites is available.	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. Improvement of general hygiene/ public health by cleaning sewerage system 2. Canals should be saved from toxic disposals. 3. Development of well-designed trunk sewerage network with less number of disposal station. 4. Planning for well-connected gravity based open drainage system covering ponds 5. Job opportunities for skilled staff for proper maintenance 6. Revenue can be generated through by charging services for cleaning. 7. PPP in service delivery 8. Reclamation of land (that accommodates water of flood/rain) for public land uses.	1. Public health 2. Storm water flooding/ over flow of sewers 3. Environmental degradation 4. Funding & policies. 5. Removal of encroachment 6. Land grabbers
Drainage & Flood Control			
1. Town 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 main town area.	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.

8.2.5 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 7.05 mgd. For the future population of 2037, the estimated waste generation is given below table:

Table 8-1: Estimated Wastewater Generation for the period up to 2037

Town		2017	2022	2027	2032	2037
Kotri MC + Jamshoro TC+Boalari MC	Water Demand	8.81 mgd	10.64 mgd	12.85 mgd	15.52 mgd	18.7 mgd
	Sewerage Flows @70 % water supply mgd	6.16 mgd	7.45 mgd	8.95 mgd	10.86 mgd	13.12 mgd

Source: Consultant's estimation

8.2.6 Sindh Sanitation Policy 2017[41]

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:

- 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.

[41] Water and Sanitation policy for Sindh 2017

- 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.

*8.2.7 **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

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.

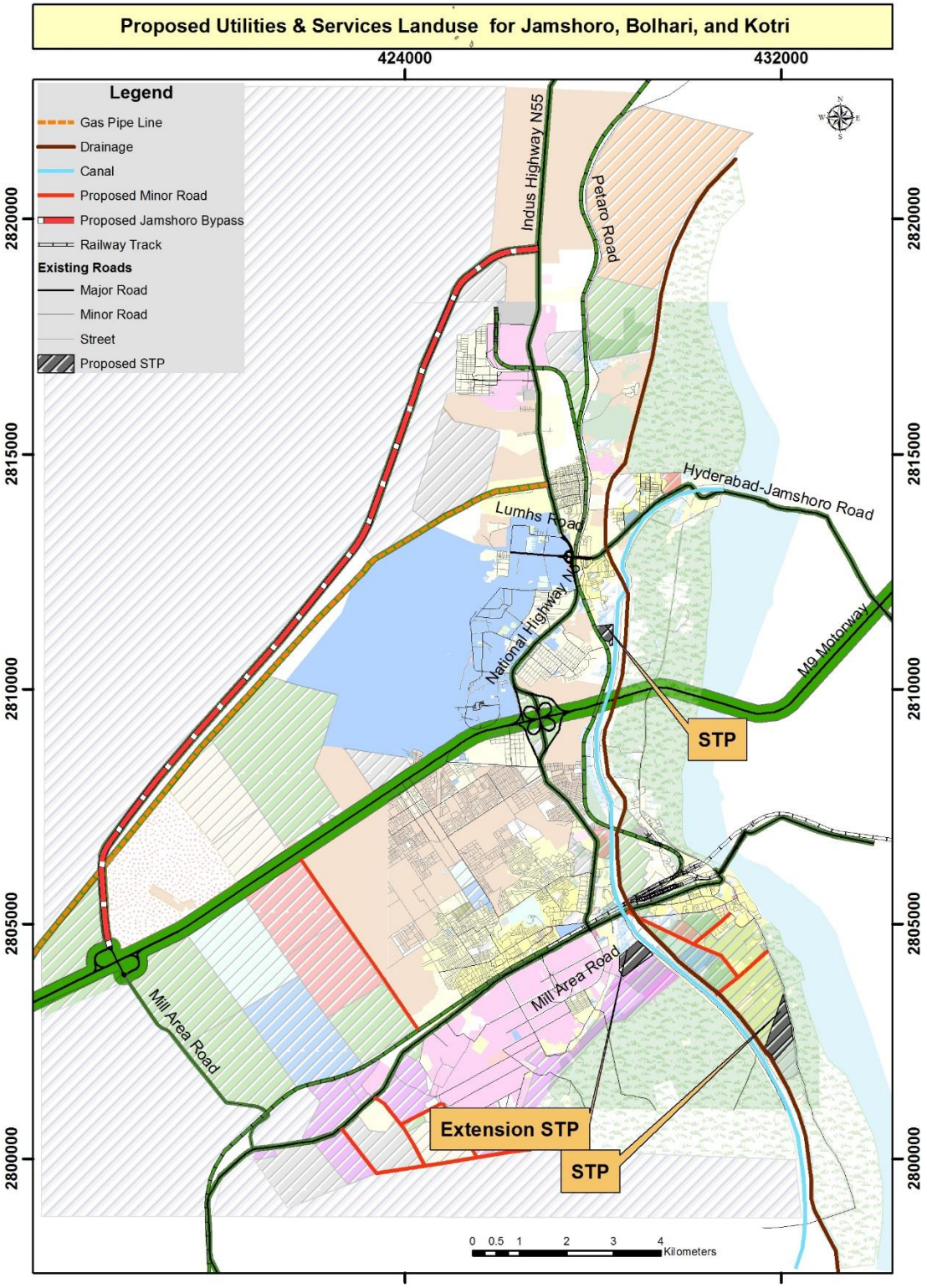


Figure 8:7 Future Proposal for Sewerage and Solid waste Map

8.2.8 Priority Projects

i. Repair & Rehabilitation of Primary and Secondary Drains 88% (7198.44 Acres) Except Core Urban Area

- **Project Justification**

Almost all the secondary and tertiary drains of Kotri MC, Bulhari MC and Jamshoro TC are poor in condition, as most of them is open and semi covered drains. According to socio economic survey results about 88% of the areas of town are connected with drainage system.

- **Project Size**

The tentative Land use of DHQ town is about 8180.04 acres approximately. This tentative area is excluding Core urban Area, Agriculture, Vacant Land, Industrial, and Transportation & Water Bodies. According to socio economic survey results 88% (7,198.44 Acres) of town area is served with drainage system. Whereas almost 75% of respondents from the town were dissatisfied with the current sewerage system. Therefore it is proposed to repair & rehabilitate existing drainage scheme for DHQ town on priority basis covering an area of 7,198.44 acres excluding core town area. Repair & Rehabilitation of Primary and Secondary Drains will include the following components;

Project Size	
Land use of DHQ town excluding Core urban Area, Agriculture, Vacant Land, Industrial, Transportation & Water Bodies in Acres	8,180.04
88% area of Kotri MC, Bulhari MC and Jamshoro TC is served with sewerage and Drainage Network in acres.	7,198.44
Estimated cost @ one million per acre	7,198.44

- Repair of Walls, bed and Top slab of drains, manholes and chambers
- Reconstruction of drains ,chambers and manholes where found completely damage
- Cleaning of pipes, chambers, drains and inlet gratings
- Laying of news pipes after replacement of old damage pipes

- **Project Benefits**

After the implementation of this project, the inhabitants can easily drain the sewerage water in the drains (Municipal system) provided by the Municipal committee.

- **Implementing Authority** - Government of Sindh- PHE Department Jamshoro.

- **Estimated Cost:** one Million Per Acres - 7,198.44 Million PKR Approx. (Short Term)

ii. Construction of new drainage network for remaining 12% (981.605 acres)

- **Project Justification**

Whereas, more than 12% of the houses have septic tanks in their houses for storage of sewage. This project will help to proper disposal of sewage water of Kotri MC, Bulhari MC and Jamshoro TC.

- **Project Size**

The tentative Land use of DHQ town is about 8,180.04 acres approximately. This tentative area is excluding Core urban Area, Agriculture, Vacant Land, Industrial, and Transportation & Water Bodies. According to socio economic survey results 12% (981.60 acres) of town area is not connected with main drainage network and count as unserved area. Therefore it is proposed to install new drainage and sewerage network for DHQ town on priority basis covering an area of 981.60 acres excluding core town area. New scheme shall cover the following components;

Project Size	
Land use of DHQ town excluding Core urban Area, Agriculture, Vacant Land, Industrial, and Transportation & Water Bodies.	8,180.04
12% land use of DHQ town excluding Core urban Area, Agriculture, Vacant Land & Water Bodies in Acres	981.60
Estimated cost @ three million per acre	2,944.81

- Construction of Walls, bed and Top slab of drains, manholes and chambers
- Construction of drains ,chambers and manholes where found completely damage
- Installation of pipes, chambers, drains and inlet gratings
- Laying of news pipes after replacement of old damage pipes etc.

- **Project Benefits**

After the implementation of this project, the inhabitants can easily drain the sewerage water in the drains (Municipal system) provided by the Municipal committee.

- **Implementing Authority -** Government of Sindh- PHE Department Jamshoro.

- **Estimated Cost:** 2,944.81 Million PKR Approx. (Short Term)

Priority Projects				
S. No.	**Project Name**	**Estimated Cost In Millions**	**Non ADP**	**Short Term**
Sewage & Drainage				
1.	Repair & rehabilitation of primary and secondary drains 88% (7,198.44 acres) except core urban area	7,198.44	Non ADP	Short Term
2	Construction of new drainage network for remaining 12% (981.60 acres) except core urban area	2,944.81	Non ADP	(Phase Wise)

8.2.9 Immediate Action Plan for Core Urban Area

- **Repair & Rehabilitation of Sewerage and Drainage Network Core Town Area**

During the survey the residents complained that, the design of existing drainage network is not fulfilling the present demand. And old sewerage line which had burst several times within one year. So therefore it is proposed to repair & rehabilitate existing sewerage & Drainage network of core town area of Jamshoro TC, Bolhari MC and Kotri MC.

S.No	Name	Area (acre)	Per acre cost (PKR) million	Cost (PKR)
Total Core Urban Area : 800.16 Acre				
1	Sewerage System	**800.16**	**1.54 million Per acre**	**1,233.36**
2	Storm Water Drain System			
			Total Cost (PKR). Million	**1,233.36**

Note:

- ✓ Sewerage system includes all urban core area network system with all related machinery and equipments.
- ✓ Storm water drain system includes all the coverage core town area storm drain system through all steeps slopes and peak areas with all linking equipments and machinery.

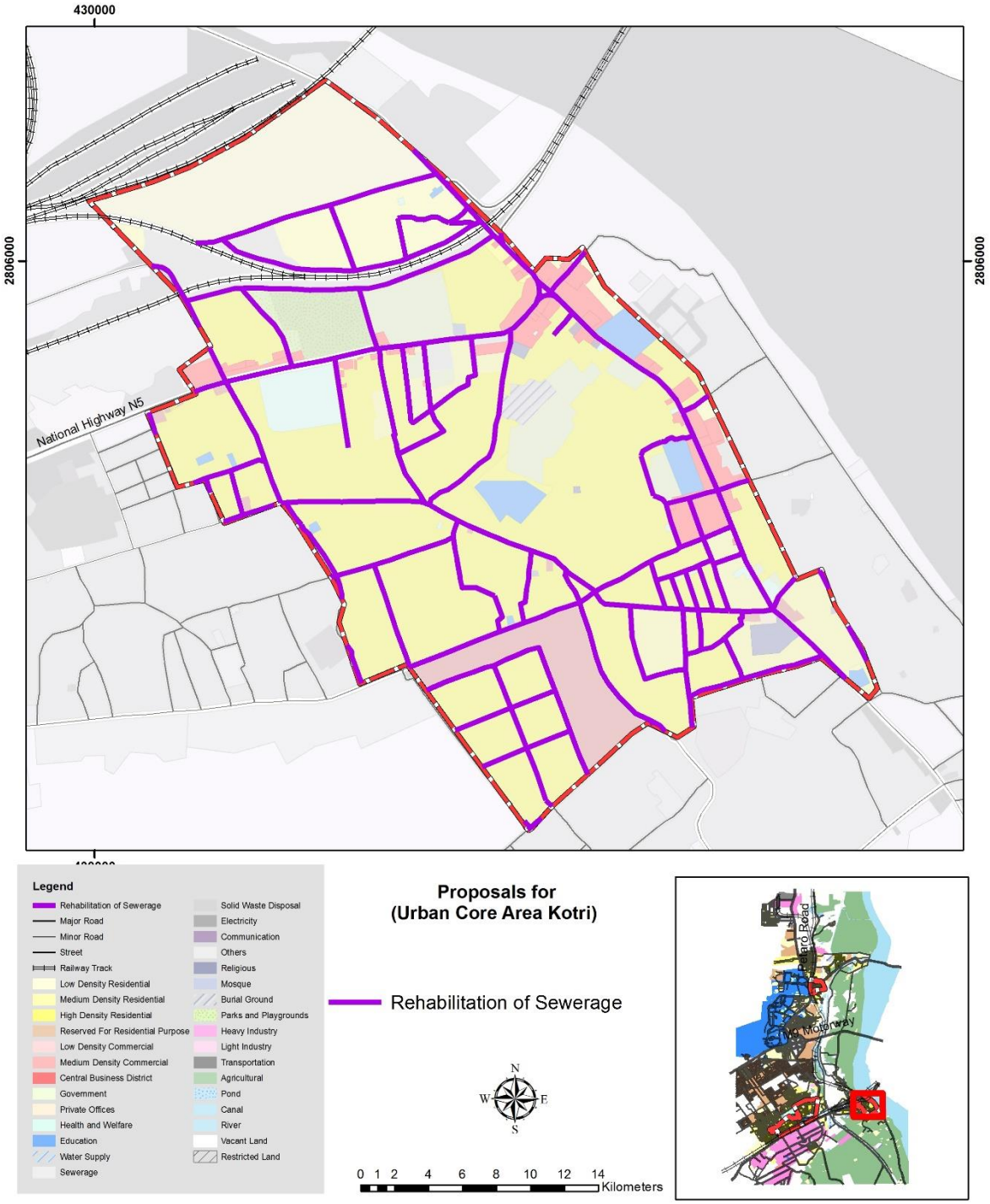


Figure 8:8: Rehabilitation of Sewerage & Drainage Network of Core Urban Area Kotri

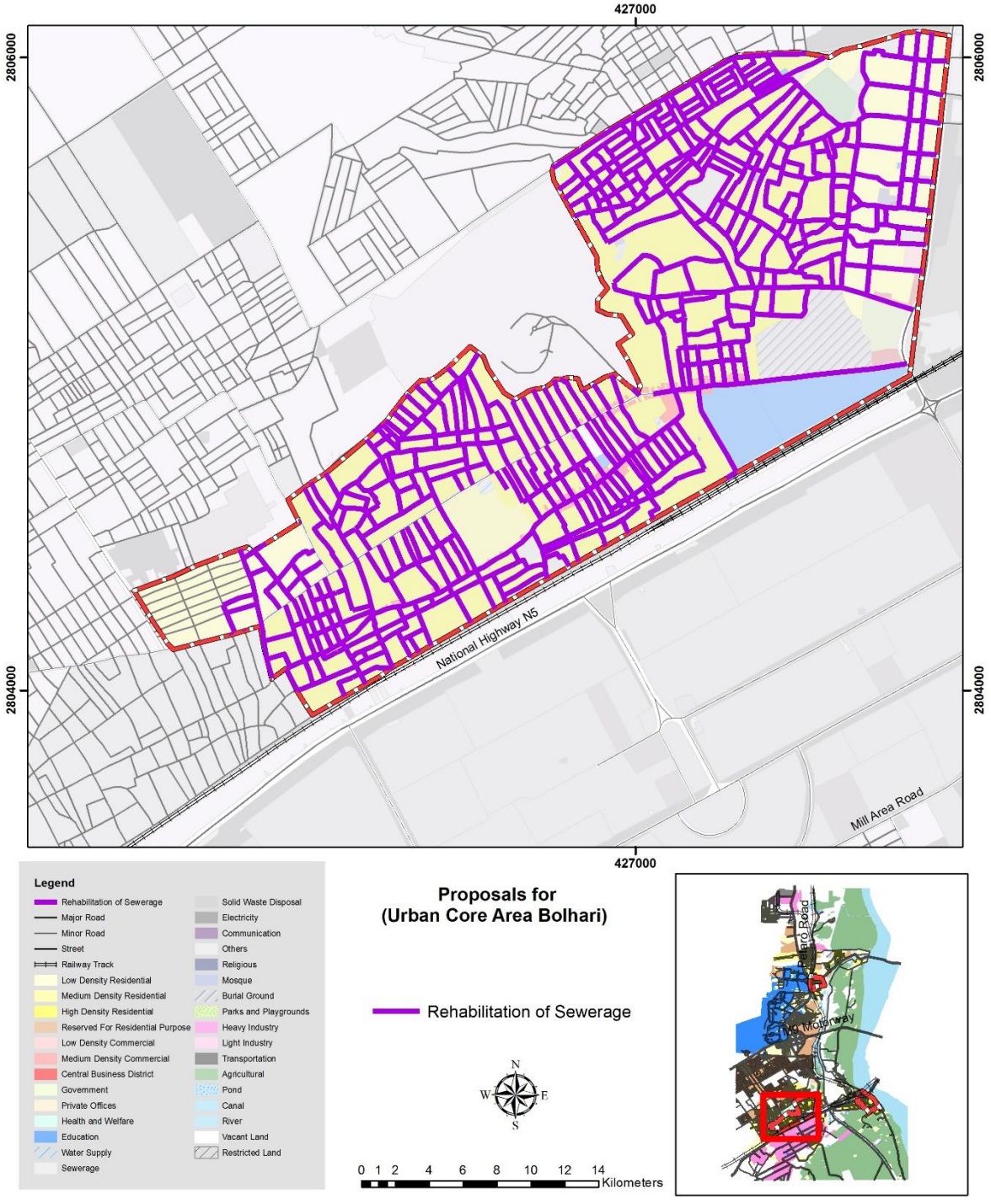


Figure 8:9: Rehabilitation of Sewerage & Drainage Network of Core Urban Area Bolhari

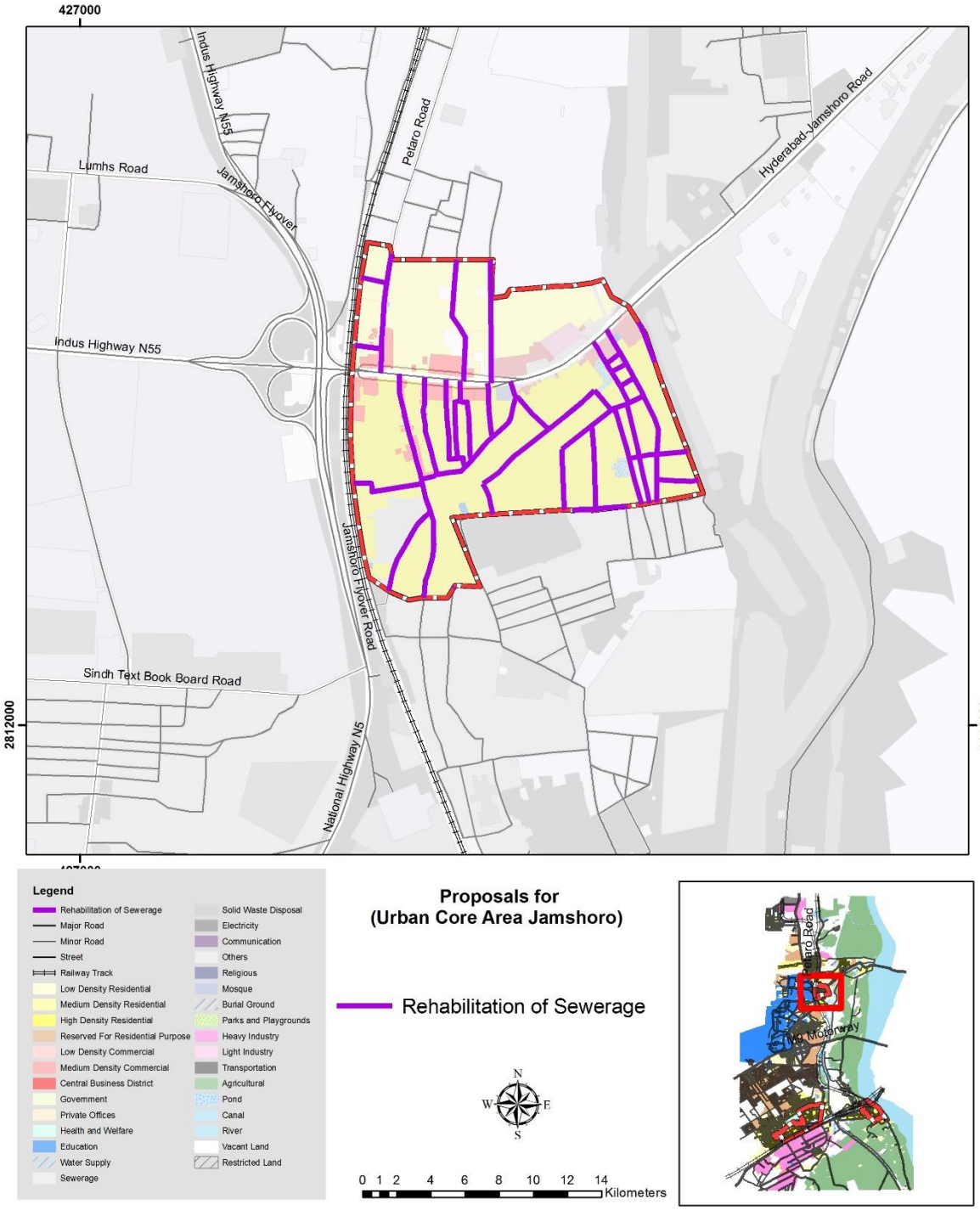


Figure 8:10: Rehabilitation of Sewerage & Drainage Network of Core Urban Area Jamshoro

8.3 Solid Waste Management

8.3.1 ***Existing Situation***

Effluent and solid waste management is a devolved issue with major responsibility resting with the municipal administration. The waste generated in and around the district has many dimensions and cannot be left to handling by municipal authorities only. Even the district government per se is incapable of dealing with the magnitude of the problem

It is responsibility of the municipal authorities to collect and dispose of solid waste but they have yet to function effectively because of lack of required machinery, capacity, expertise and proper management etc. The allocations / releases of budget and spendings of funds on basic public services including solid waste management are not invested properly for the concerned operational & management purposes, or may be poor solid waste management condition in the district existing due to the weak check and balance at town level.

8.3.2 **Current Practice of Solid waste Collection & Disposal**

After the passing of the Sindh Solid Waste Management Board Act in 2014, the Sindh Solid Waste Management Board (SSWMB) has been established which has the responsibility to collect and dispose of all kinds of solid waste being generated in Sindh. As indicated, TC/MC is officially responsible for the entire solid waste management of the district under the directives of SSWMB. At present SSWMB has directed the municipal committees for identification of land for Garbage Transfer Stations and Landfills so that garbage collection and transfer & transport operations can be handed over to SSWMB for effective management of solid waste. Meanwhile, feasibility studies of medical hazardous waste of Hyderabad, Mirpurkhas and Shaheed Benazirabad are in progress. Once the municipal committees would be able to allocate proper and adequate land for waste disposal on a long-term basis then SSWMB will come into action for effective SWM at primary and secondary levels in these District Headquarter Towns.

The office location and the premises of the Kotri MC and Bolhari MC provide a functional office cum workshop station for its waste management fleet. MSW collection vehicles, tractors, trolleys, and other equipment are stationed and operates from the administrative office hence remains the focal point of the management and operational activity.

The collection mechanism that exists in Kotri MC, Bolhari MC, and Jamshoro TC is still the primary waste management system. The garbage is collected in open container/community bins placed in streets or empty spaces designated as throw away places. The waste is collected and transferred/ transported outside limits of the town to designate/non-designated dumping sites by means of refuse vehicles and tractor trolleys which are usually inadequate in numbers for the handling of MSW by the sanitary/waste collection staff. Total actual numbers of staff in Kotri MC are as Sweepers and Cleaning staff are 120 and 100 are more required. The employed staff in the municipality is 126 in numbers and the sanctioned employees are also the same.

The vehicles and equipment required by the municipality is as follows:

i.	Refuse Vans	Nos 2
ii.	Tractors Trolleys	Nos. 3
iii.	Shovels	Nos. 2
iv.	Sweeping machines	Nos. not specified
v.	Command machines	Nos. not specified
vi.	Sucking machines	Nos. not specified
vii.	Equipment	
	a. Bieco pumps	
	b. Transformers	
	c. 160 KV motors	
viii.	Fire Tenders (16000 liters capacity)	Nos. 2-3
ix.	Fire tender (small vehicle for industrial area)	

8.3.3 Identification of Disposal Points

There are lot of recognized/established active primary collection points in the town. These are not permanent structures but rather empty corners or vacant places. Besides regularly served designated collection points, every locality has got throw away sites in the form of depressions, empty areas, cuttings areas, etc. These types of non-designated points if coming in the collection route are often served by the municipality staff or usually avoided due to a shortage of time and resource constraints.

8.3.4 Hazardous Waste

There are no special arrangements for the handling, storage, and disposal of clinical or hazardous waste except for the breaking of needles and their collection. Hospital waste is internally collected and disposed of by the hospital sweepers No records are kept of where waste is buried as this is at the discretion of the sweeper. As there is no control over the disposal of the waste it is highly likely that some is sold to middle dealers and enters the recycling sector.

Table 8-2: Hazardous waste (Healthcare waste) source and estimation in Jamshoro

S. No.	Healthcare Facilities (HCF) *Jamshoro	No. of Beds*	HCW @ 1.1 kg/bed/day!
1.	Hospitals Govt. / Dept. / 04 No.	305	335.5
2.	Taluka Hospital 02No.	50	55
3.	Rural Health Unit 06 No.	108	118.8
4.	TB Clinic 09 No.	Nil	-
5.	Basic Health Unit 19 No.	38	41.8
6.	Mother & Child Health Centre 02 No.	Nil	-
7.	Dispensaries 47 No.	06	6.6
Total (90)		**507**	**557.7 kg/day**

There is no data available on the hazardous waste generation and its management in Kotri MC, Bolhari MC, and Jamshoro TC. Whatsoever the waste generated in healthcare facilities (HCF) such as hospitals and laboratories is mingled with the MSW. The estimated quantities of hazardous waste (risk waste) can be estimated from the bedded healthcare facilities.* Health Profile of Sindh by Districts - 2012, Bureau of Statistics, Govt. of Sindh.

Issues:

Some of the major issues faced by MC / TC are as follows.

- Shortage of machineries and equipment
- Lack of properly organized waste Collection System
- Arrangement of segregation, collection and disposal of infectious hospital waste
- Segregation of Organic waste from Municipal Solid Waste (MSW) and Treatment
- Safe disposal of hazardeous waste in an environmentally sustainable manner
- Directives for implementation of waste policy framework and execution of its management system.

*8.3.5 **SWOT Analysis:***

Solid Waste Management			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Municipal Corporation is responsible for operating mechanism for solid waste management 2. System in place with improving efficiency, there is a slightly improvement in garbage collection and allocation of landfill site to dispose of toxic waste 3. Recycling by scavengers	1. Poor financial and operational management system. 2. There is no system to identify toxic wastes produced by various activities. 3. Communities' particularly low income groups are not aware with disposal procedures. 4. No separate collection of medical waste	1. Appropriate measures should be adopted for collection and re-cycling of SWM. 2. SWM recycling will help to generate revenue. 3. Appropriate landfill sites should be identified for future disposals. 4. Establishing of a primary collection system would add more revenue resources. 5. Opportunity for recycling and reuse of solid waste, such as RDF, bio-gas etc. 6. PPP in service delivery	1. Improper sanitation 2. Poor public health 3. Threats to plants and animal life 4. Loss of trust building with people in future.

*8.3.6 **Need Assessment***

The waste generation rate estimated from the studies conducted suggests to be around 0.4 – 0.45 kg per capita per day42. However it is recommended to undertake the field study for the determination of waste generation and characterization for the project area in order to plan and design the solid waste management system. Considering waste generation rate for design purpose as 0.45 kg per capita per day with the current (2017) population of the municipal committee as 293,798 the total municipal solid waste load arising in the municipality is approx. 132,209 kg or 132.20 tons per day. Based on National Reference Manual (NRM): on population of 10, 000, one acre of landfill area is required. So for the population of 293,798 in 2017, landfill area of 29.37 acre is needed and for the projected population in 2037 of 624,277, landfill area of approx. 62.42 acre is required.

*8.3.7 **Policy Guidelines**[43]*

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.
- 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.

[42] SCIP-03 Program Management, Project Preparation and Implementation Support for Planning & Development Department, Solid Waste Management Studies of Towns of Central Cluster of Province of Sindh, 2013, Brisbane City Enterprises Pty Ltd, & MMP

[43] Solid Waste Management Policy for Sindh
Sindh Water and Sanitation Policy 2017

- 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.

8.3.8 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.
- 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.

8.3.9 Priority Project

i. Feasibility Study for Solid Waste Management Mechanism

- **Project Justification**
  The collection of the solid waste is the responsibility of Municipality. Jamshoro TC, Kotri MC and Bolhari MC have been contributing to keep clean the city by providing the basic municipal services includes solid waste management. As street sweeping and collection are by far the most expensive activities in municipality's waste-management system, the collection system needs to be made more effective and efficient. A detailed feasibility study is proposed to develop the efficient solid waste management mechanism.
- **Project Benefit**
  The project will identify the feasible solution to improve hygienic conditions of the town. A positive impact over the whole population.
- **Implementing Authority - Government of Sindh, Jamshoro TC, Kotri MC and Bolhari MC**
- **Estimate Cost: 100 million approx.**

ii. Feasibility Study For Construction Landfill Site In DHQ Town

- **Project Justification**
  At the present Jamshoro DHQ town MC don't have any suitable land for refuse of the solid waste. Which is the main cause that refuse is disposed of at the open sites in different collections. Landfill is an ultimate safe disposal option for Municipal Solid Waste disposal and is imminently required. Since municipality does not have a proper landfill, mostly they refuse the waste along the Jamshoro DHQ town canal site. The location and selection of landfill site is yet another a technical issue requiring comprehensive study need to be undertaken as multitude of aspects are considered.
- **Project Benefit**
  After implementation of the project the most significant benefit will be the environmental upgradation and health benefit.
- **Implementing Authority - Government of Sindh, Jamshoro TC, Kotri MC and Bolhari MC**
- **Estimate Cost: 80.00 million approx.**

S. No.	Project Name	Estimated Cost In Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Solid Waste						
1.	Feasibility study for construction of Central Composting Plant and mechanism	20.00	-	Non ADP	**Short Term**	-
2.	Procurement for land acquisation process for Landfill Site.	60.00	-		**Short Term**	-

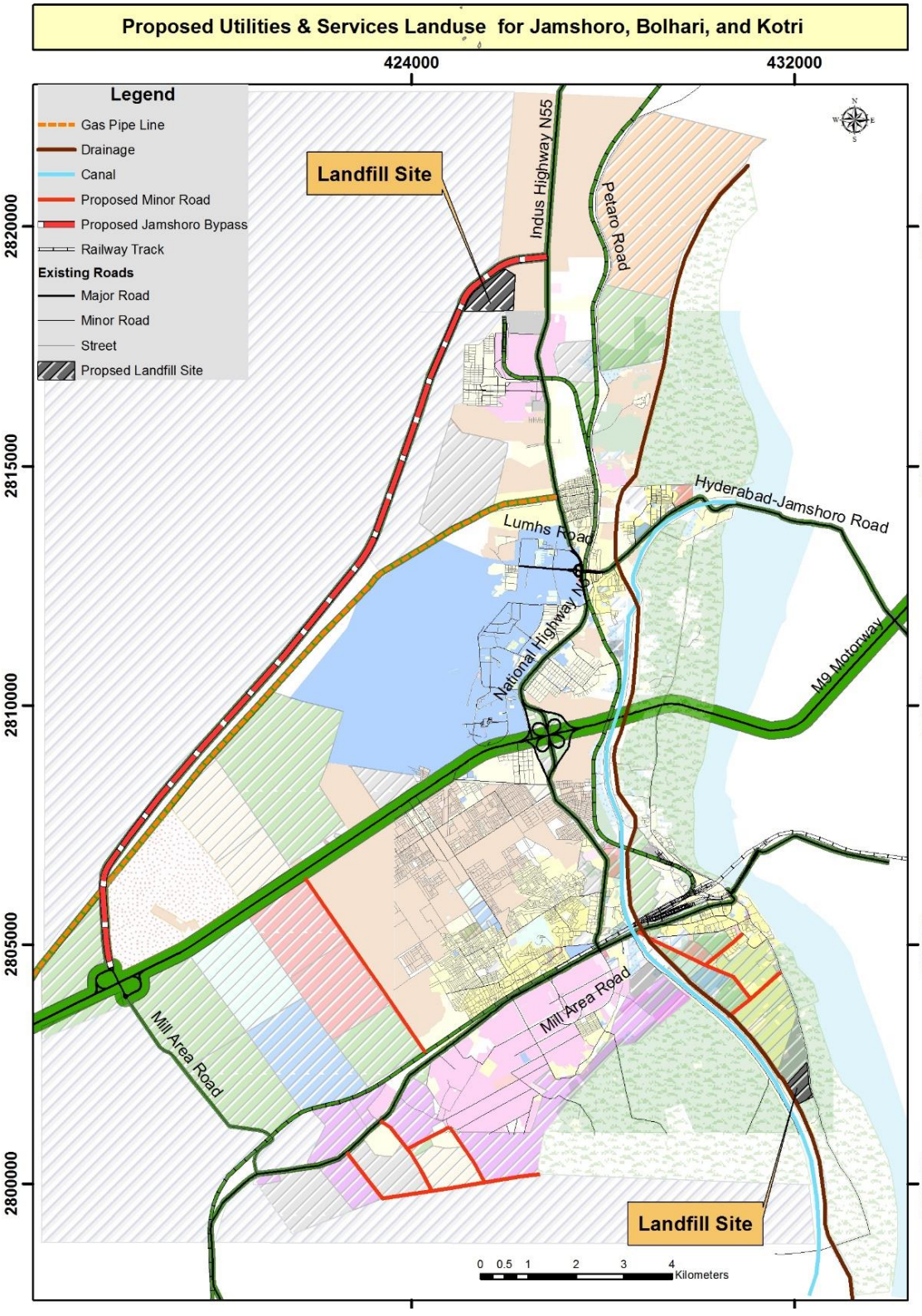


Figure 8:11 Future Proposal for Sewerage and Solid Waste Map

8.3.10 Immediate Action Plan for Core Urban Area

I. Identification of Disposal Points

There is lot of recognized/established active primary collection points in the town. These are not permanent structures but rather empty corners or vacant places. Besides regularly served designated collection points, every locality has got throw away sites in the form of depressions, empty areas, cuttings areas, etc. These types of non-designated points if coming in the collection route are often served by the municipality staff or usually avoided due to a shortage of time and resource constraints.

As mentioned above, due to the lack of data and information available the number of collection points/primary collection (garbage collection points) could not be identified. However, it is presumed that some of these are permanent structures and the majority points are empty corners or vacant places. Besides, every locality has got throw away sites in the form of depressions, empty areas, cuttings areas, etc.

There had been little if any planning in the location of the landfill sites and there has been no planning for the replacement of existing dumping ground(s). Regarding the dumping grounds, the only information available is about their numbers that are there are 3 locations yet geographically not specified. These sites are located at some distance from the town, but now susceptible to be enveloped by increasing urbanization. None of the sites had undergone EIA as required by SEPA Review of IEE & EIA Regulations 2014. Solid Waste collection is done from the designated points by means of vehicles such as; tractor trolleys and refuses vehicles as when necessary to transport the waste to dumping site(s).

II. Suitable locations for Disposal Points

There are number of recognized / established active primary collection points in the town. These are not permanent structures but rather empty or vacant corners. Besides regularly served designated collection points, every locality has got throw away sites in the form of depressions, empty areas, cuttings areas etc. These types of non-designated points if come in the collection route are often served by the municipality staff or usually avoided due to shortage of time and resources constraints. Solid Waste that is collected from Streets and Roads etc. by sanitary workers is transferred and transported to the outside limits of the town. There are some areas where open containers have been placed for solid waste collection but due to lack of civic sense in the people of the town, they are still useless. Solid Waste collection is done from the designated points by means of vehicles such as; tractor trolleys and refuses vehicles as when necessary to transport the waste to dumping sites.

JAMSHORO CORE TOWN AREA - SOLID WASTE MANAGEMENT SYSTEM (Solid Waste Garbage Collection Containers)				
S.No	**Name**	**Containers No.s**	**Cost / Container**	**Cost (PKR)**
Total Core Urban Area : 800.16 Acre				
1	Placing of Garbage Container at different sites/locations in core town area	250.00	520,000.00	**130,000,000.00**

Total Cost (PKR). Million	**130.00**

Note:

1. Each site located for garbage container must be strictly followed by MC 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 should kept control on each project for the uplifting of town as per master plans.

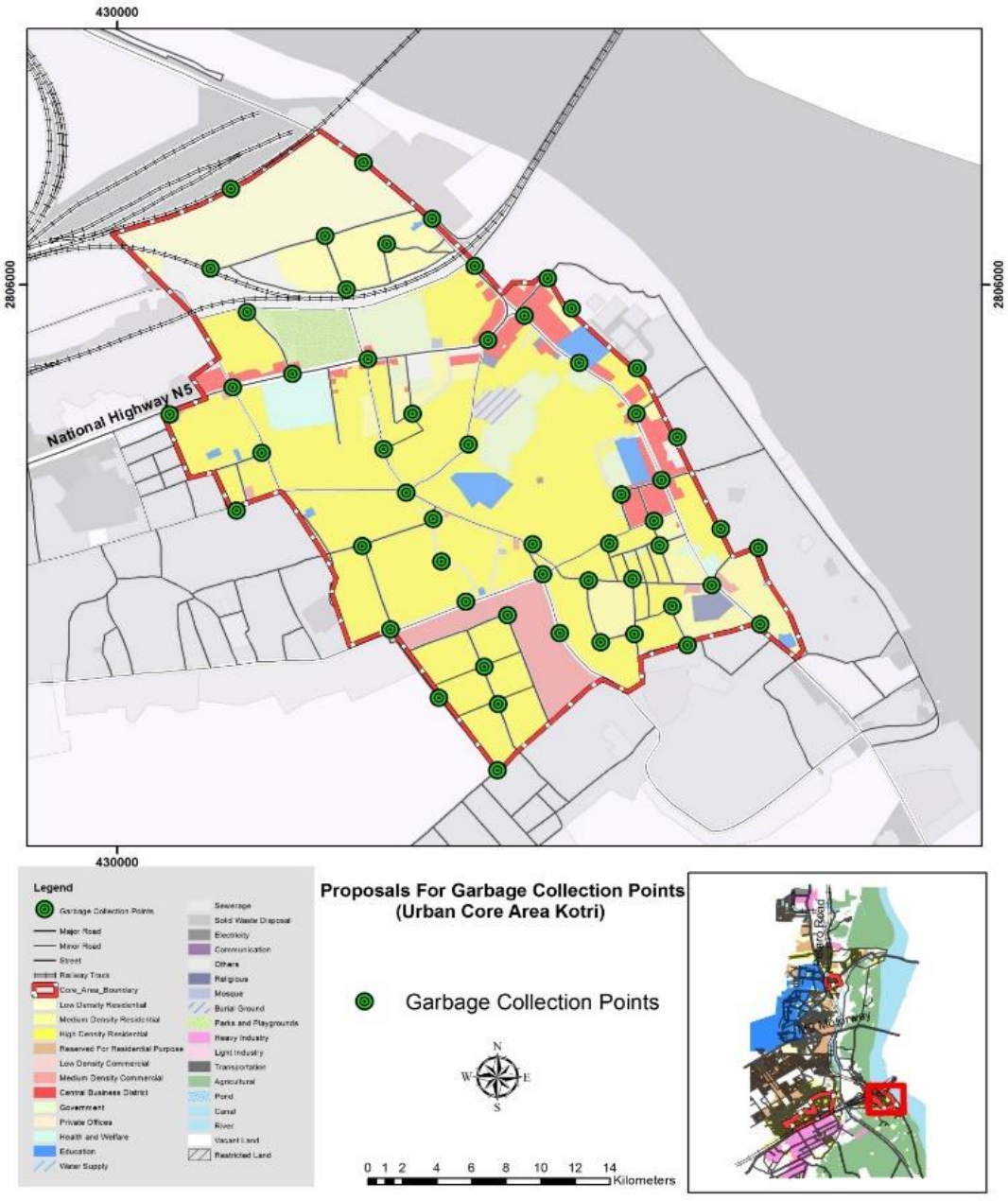


Figure 8:12: Proposed Garbage Collection Points Core Urban Area Kotri

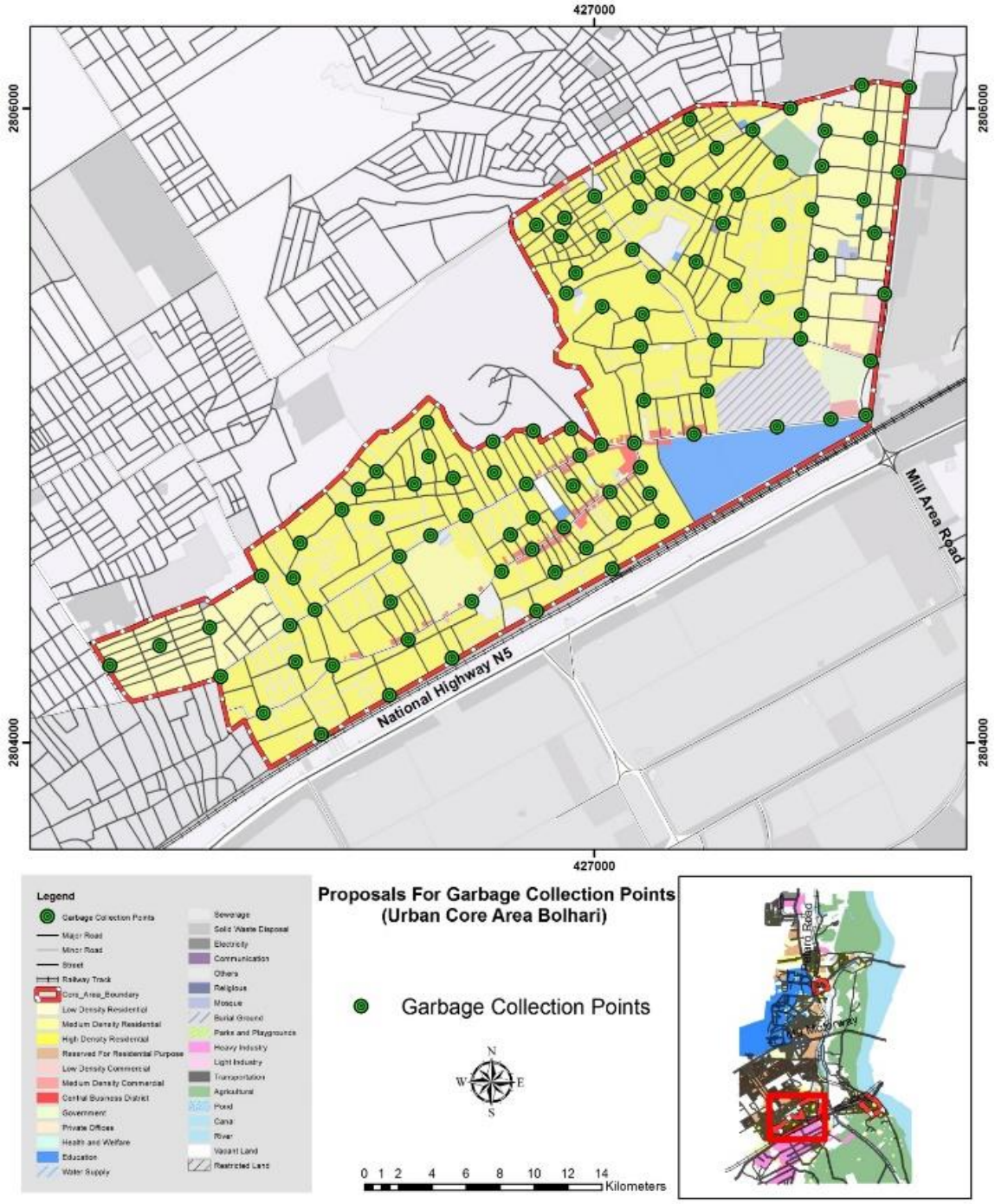


Figure 8:13: Proposed Garbage Collection Points for Core Urban Area of Bolhari

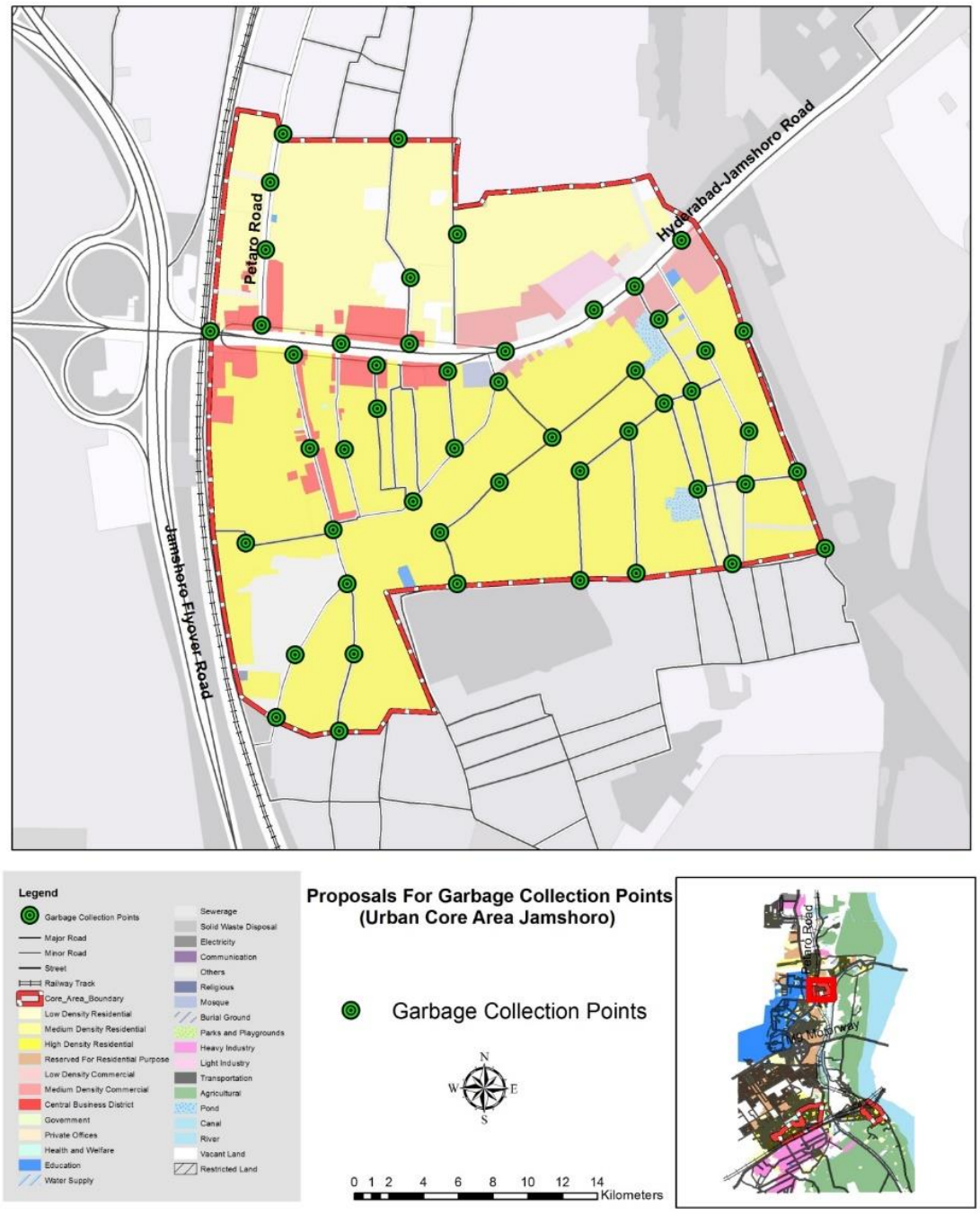


Figure 8:14: Proposed Garbage Collection Points for Core Urban Area of Jamshoro

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8.4 Firefighting

8.4.1 Existing Situation

Currently there is one fire brigade station situated in Kotri with 11[44] firefighting staff and one functional firefighting vehicles. The Municipal committee has no separate budget for firefighting and no vehicle maintenance facility in the station.

8.4.2 Need **assessment**

As the current total population of (Kotri MC + Jamshoro TC+ Bolhari MC) is 293,798, which will be 624,277 in 2037. 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 eleven more vehicles are needed for DHQ Town.

8.4.3 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

[44] MC office Kotri

9. INFRASTRUCTURE

9.1 Transportation

9.1.1 Existing Situation

Regional Connectivity (Air, Rail, Road)

- **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.

Figure 9:1: Hyderabad Airport

- **Railway Station (Junction)**

  Pakistan Railways carried 52.2 million passengers in 2016 and operates 28 mail, express and passenger trains. The railway carries a daily average of 178,000 people approximately. The City is also linked with the national network of Pakistan Railways through the Karachi railway line via Kotri. Kotri Junction station is among the oldest railway stations in Pakistan. This was the first railway line for public traffic between Karachi and Kotri, a distance of 108 miles (174 km). Jamshoro is connected to Quetta via Kotri – Dadu railway line through a railway station present in Jamshoro. Kotri junction is count one of the busiest railway junction in Pakistan.

Figure 9:2: Kotri Junction

- **Inter City Modes of Transportation**
  (Bus and Truck Stand)

  There are no major Bus and Truck stands within the DHQ Town. Inter-city buses are very limited and do not operate with regulations or proper stands. Inter-city buses are overloaded due to high number of passengers using public transport. Illegal buses and Qinqui stands of public transport are evident in the DHQ Town and passengers prefer this mode of transport over buses. Unregistered Qinqui and Rikshaws are more than buses. Some bus and truck stands are observed on the periphery of Jamshoro. Most of the Private transporters run passenger buses and vans on all the regional and national routes.

- **Intra City modes of Transportation**

There are no major Bus and Truck stands within DHQ Town, some of the private bus stands are located in Jamshoro TC under the newly constructed flyover at Jamshoro Phatak. Due to the national highway which is crossing the DHQ town, there are a lot of bus routes in DHQ Town. The Indus highway connects the DHQ town With Dadu and Larkana, other routes are Jamshoro-Hyderabad, Kotri-Thatta through N-5, and Jamshoro-Karachi through M9 etc. are being used the residents of the DHQ Town.

5.1.1 Local Road Network

- **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.

Figure 9:3: 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 of Jamshoro TC, Kotri MC, and Bolhari MC are not satisfactory with deteriorated physical conditions, encroachments on roads, congestion, and roadside parking and drainage issues. Although the main roads are much better. The main internal roads of Jamshoro TC, Kotri MC, and Bolhari MC includes M-9 Road, N-55 Road, Jamshoro-Hyderabad Road, Kotri-Hyderabad Road, Sandoz Road, Liaquat Road, Khuda ki Basti Road, and Mill Area Road.

- **Parking/Street Furniture/Street lightning**

No separate parking is available except roadside parking. Similarly no street furniture is observed. Street Lighting is available but needs to be upgraded and maintained where installed and as need extension, in other areas are required.

5.1.2 Major Completed Projects (Kotri & Jamshoro)

i.) Construction of Bridge over Railway Line at Jamshoro Phatak (Project Cost 1127.417 Million) *(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 at the cost of Rs 1277.406 million *(Highway Volume of turning movements and closure of Railway gate at this cause significant delays in traffic flow coming from Industrial Area Kotri and education city Jamshoro* ***"City of Universities****).*

9.1.2 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.
- There is unplanned street network and absence of public transport also poor maintenance of bus bays.

9.1.3 SWOT Analysis:

STRENGTH	WEAKNESSES	OPPORTUNITY	THREATS
Land Use Pattern & Transportation			
1. Mixed land uses (residential, commercial, industrial, administration) 2. Good national / regional connectivity through railway and road networks 3. Strong network of inter and intra city. 4. Sufficient road right of ways are	1. Unplanned street network 2. Narrow streets 3. Absence of public transport 4. Ribbon type commercial development in residential neighborhoods. 5. Poor traffic management. Less opportunities for integrated transport provisions.	1. Workability 2. Promotes compact development. 3. Activity centers (support local business) 4. Wider road space can be used to facilitate multiple transport activities by implementing road space design standards 5. Proper management can promote public transport services in a better way.	1. Encroachments 2. On street parking (paid/unpaid) 3. Reduced flow of traffic (low speed) 4. Security issues 5. Economic losses due to transporters strikes and CNG strikes. 6. Inconvenience due to traffic congestion 7. On street parking

STRENGTH	WEAKNESSES	OPPORTUNITY	THREATS
available in intra city routes	6. Lack of coordination between different transport operating agencies. 7. No parking space for rest hours for drivers. 8. Less provision of street furniture 9. Non-aesthetic streetscape 10. Haphazard on street parking reduces road capacity 11. Poor maintenance of railway station 12. Encroachments around bus bays and railway land sites.	6. After removal of encroachments adequate space available for traffic signs, lane markings and foot paths 7. A new transport terminal for goods transport will facilitate timely supply of industrial goods.	
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.	1. River Indus causes severe seasonal floods. 2. Majority of town 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. May grow as a large size green and planned settlement in future, if planned in accordance with appropriate planning measures. 2. 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. 3. Contribution in positive regional and local economic development.	1. Loss to local business. 2. Flooding 3. Contamination of canal. 4. Shortage of clean water for multiple uses. 5. Conversion of agricultural land for housing purpose. 6. Outdated mass transit services may create isolation, joblessness, loss of trade and business and increased fear of alternate transport modes.

9.1.4 Policy Guidelines

- Decrease in private vehicles, especially during peak hours and in CBD areas.
- Decrease in traffic delay.
- Decrease/stability in air and noise pollution.
- Involvement of private sector in transportation infrastructure and services projects.
- Establishment of Mass Transit System.
- Efficient operations and effective regulation of transport services.
- Infrastructure development and up-gradation.
- Integration of public transport services and networks.
- Modernize goods transport and freight facilities.

9.1.5 Sindh Empowerment of 'Persons with Disabilities' Act, 2018 [45]

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 must detect and serve a diversity of users including bicycle operators in the roadway and pedestrians using crosswalks.

[45] 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)

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 store assistive devices such as wheelchairs and strollers. Tra-c signal timing should provide adequate clearance intervals for safe crossing by pedestrians and slow vehicles.

It is suggested that necessary provision of the above recommendation may be mandated in the laws and regulations of SBEA and other agencies which drafting the buildings and highway regulations

9.1.6 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.

9.1.7 Priority Projects:

i. Repair and Rehabilitation and Improvement of Major Roads, Minor Roads and Streets (excluding Core Urban Area)

- **Project Justification**

  The condition of secondary and tertiary roads of DHQ town is in very poor condition. Due to un-availability of proper drainage network, the sewage water is damaging the roads. All the tertiary roads are also damaged due to sewage water. So it is proposed to improve and rehabilitate the internal / town roads of DHQ.

  However, the overall situation indicates narrow street width, poor pavement conditions, encroachments on footpaths and road sides, haphazard and illegal parking, open drains, lack of traffic signals and signs, etc. Space along with major roads is available for provision of missing facilities.

  There is an unplanned & haphazard street network & absence of quality public transportation system in DHQ Town. Major roads & junctions i.e. Raswa Mori Road, Bareja Chowk Road, Juman Shah Road, City Road , Derya Road, National Highway N-5, Malik Road, Memon Road, Nago Nane Road, Eid Gah Road, Kotri Station Road, Shah Latif Road, Shaheed Altaf Hussaini Road, Jamia Masjid Darul Uloom Road, Shirazi Paro Road, Shahi Bazaar Road, Cloth Market Road, Sikandar Ali Chohan Road, M. Waris Chohan Road, Chairmen Imam Bux Chohan Road, Hajji Nawab Chohan Road, Telegraph Colony Road, Cadet College Petaro Road, Main Bazaar Road and Zafar Society Road etc. needs repair rehabilitation with provision of allied missing facilities.

- **Project Benefit** – By implementation of the project agricultural, industry sector could be enhanced.

- **Implementing Authority**-Government of Sindh, Works and Services Department Jamshoro.

ii. Installation of Traffic Signals and new Solar Street Lighting on Main Roads

- **Project Justification**
  Most of the roads & Streets of Jamshoro DHQ Town are without street lights in over all the town and all roads and 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.

- **Implementing Authority** – District Government and Government of Sindh

S. No.	Project Name	Estimated Cost In Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Roads and Communication Network						
1	Repair & Rehabilitation of Major & Minor Urban Roads (Excluding Core Urban Area) 35,000 meters (35.00 Kms) with tentative RoW of 10 Meters @ rate of 4500 per sq.meter) 1,575 Million Repair & Rehabilitation of Streets (Excluding Core Urban Area) 40,000 meters (40.00 Kms) with tentative RoW of 3.00 Meters @ rate of 2,000 per sq.meter) 243.90 Million. **Lump sum Amount 100.00/ Million** • Pedestrian pathways • Designated Parking Spaces • Provision of Footpaths and Street Furniture • Installation of traffic signals & new solar Street Lighting On main roads	1,918.90	-	Non ADP	**Short Term**	-

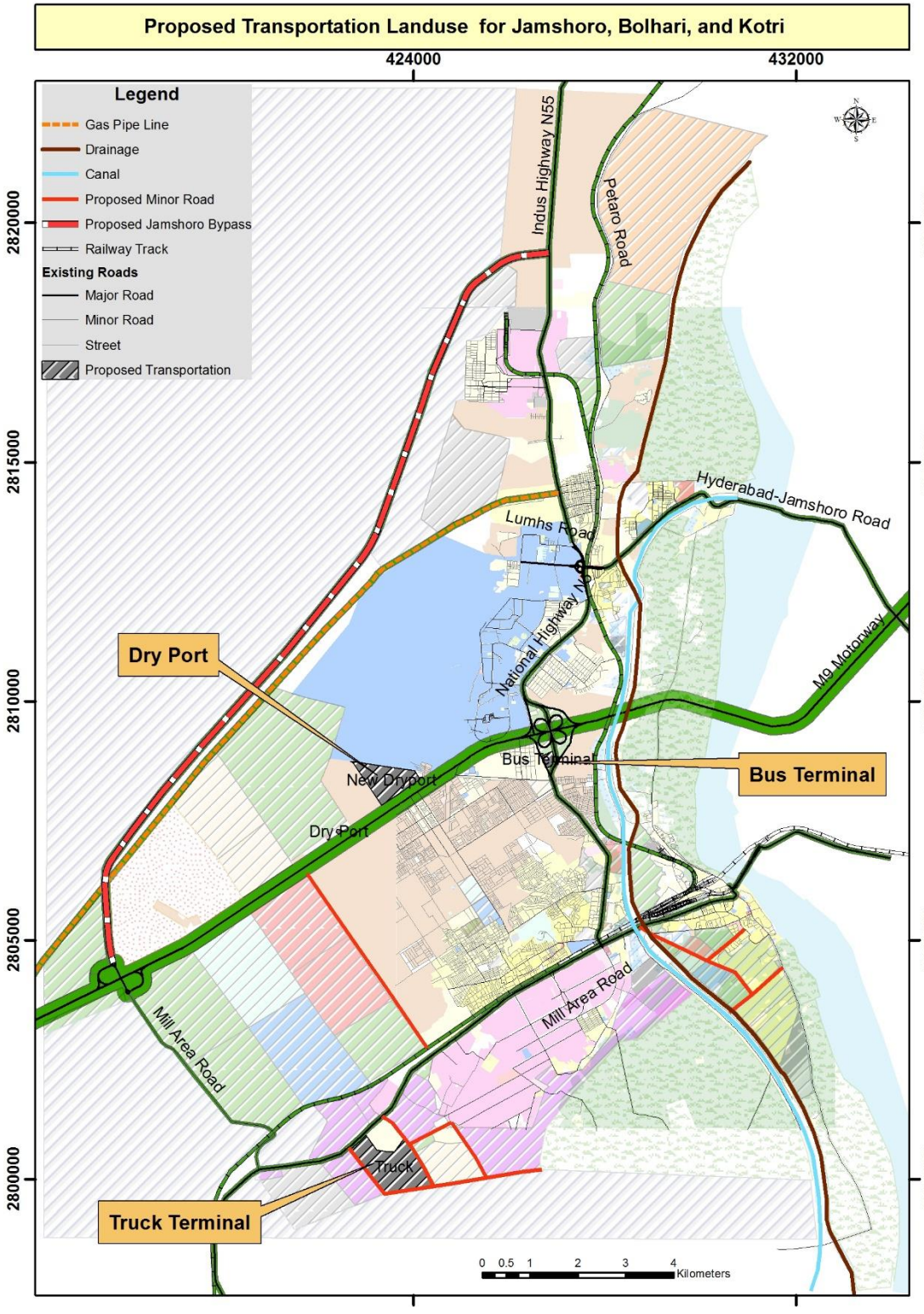
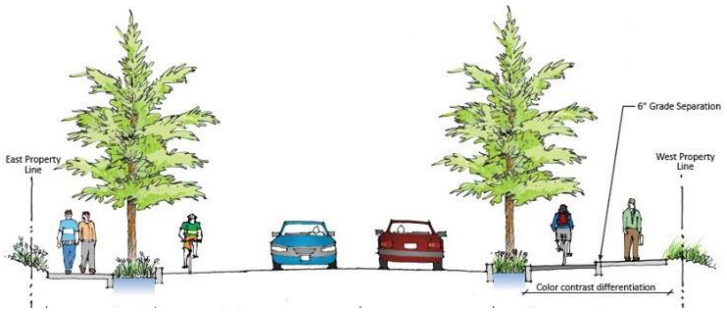


Figure 9:4 : Proposals for Transportation Jamshoro + Bolhari + Kotri Town

9.1.8 Immediate Action Plan

i. Kotri MC

- **Rehabilitation of Roads**



The main parameter for rehabilitation of existing roads is to draw a property line, which require very practical approach in such a way that no massive destruction will happen. In this regard community participation will be highly needed to take them on board and to make awareness that this realignment is for the betterment of their area. Thus, the community ownership will make the idea workable, other than this forceful action will not work in long run.

Immediate action plan for core urban area in Kotri MC requires that the right of way of roads should be restored by removing all encroachments along the CBD roads.
The road pavements will be improved and tree lined medians will be developed on all main roads having a right of way of more than 80 feet.
Rehabilitation of Roads include Kotri Station Road, National Highway-5, Raswa Mori Road, Shah Latif Road, Bareja Chowk Road, Shaheed Altaf Hussaini Road, Juman Shah Road, City Road, Shirazi Paro Road, etc.
Provision of Parking Areas along National Highway-5 and Raswa Mori Road.
Alternatively, parking meters should be installed for Curb-side parking in the city centre / core area at a very high rate of hourly parking charges.

- **Monuments**

Some new monuments and land marks should be placed in the Chowks of core urban area for beautification purposes. Monuments should be rehabilitated at the intersection of Kotri Station Road and National Highway-5 in the core urban area of Kotri MC which will represent the history and grandeur of the town.

- **Pedestrian Movement and Street Furniture**

Pedestrian movement will be encouraged in core urban area by restoring footpaths on both sides of the roads in the city center. All existing encroachments on the footpaths should be removed to allow walkability in the city canter. Additionally some walkways should be designed in the CBD area by applying the pedestrianization policy there.

- **Provision of Footpath and Street Furniture**

Provision of street furniture in the core urban area also needs immediate attention. Street lights, benches, footpaths restoration, traffic signals, zebra crossings and bus stops with shades should be installed on immediate basis.

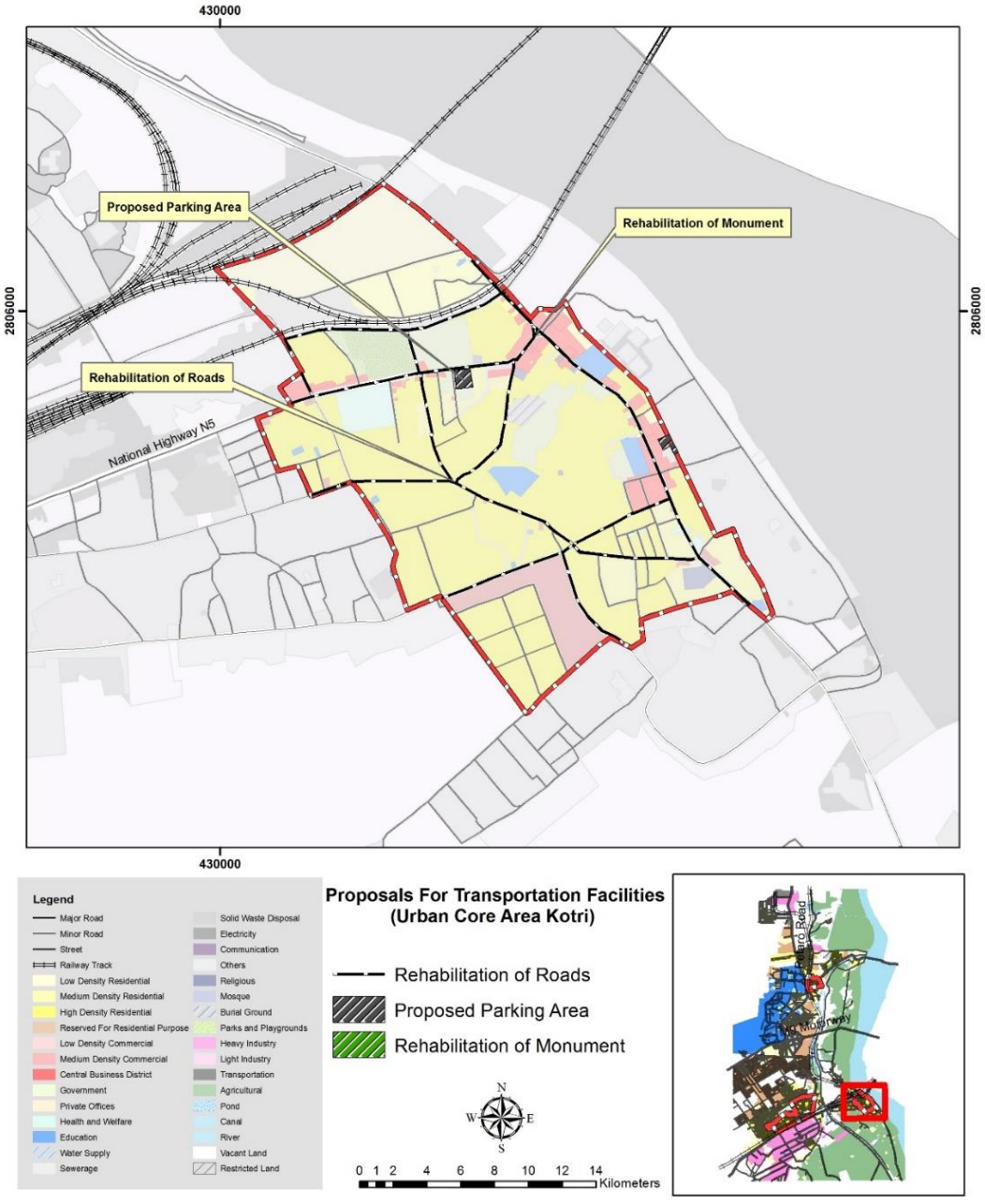


Figure 9:5: Proposal for Rehabilitation of Water Supply Scheme-Core Urban *Area*

ii. Bolhari MC

- **Dualization and Rehabilitation of Roads**

The main parameter for rehabilitation of existing roads is to draw a property line, which require very practical approach in such a way that no massive destruction will happen. In this regard community participation will be highly needed to take them on board and to make awareness that this realignment is for the betterment of their area. Thus, the community ownership will make the idea workable, other than this forceful action will not work in long run.

Immediate action plan for core urban area in Bolhari MC requires that the right of way of roads should be restored by removing all encroachments along the CBD roads.
The road pavements will be improved and tree lined medians will be developed on all main roads having a right of way of more than 80 feet.
Dualization and rehabilitation of Major Road i.e. National Highway-5
Rehabilitation of Roads include Sikandar Ali Chohan Road, M. Waris Chohan Road, Chairmen Imam Bux Chohan Road, Hajji Nawab Chohan Road, Telegraph Colony Road, etc.
Provision of Parking Area.
Rehabilitation of Road Junction.

- **Monuments**

Some new monuments and land marks should be placed in the Chowks of core urban area for beautification purposes. Monuments should be rehabilitated on important chowks and junctions of the core urban area of Bolhari MC which will represent the history and grandeur of the town.

- **Pedestrian Movement and Street Furniture**

Pedestrian movement will be encouraged in core urban area by restoring footpaths on both sides of the roads in the city center. All existing encroachments on the footpaths should be removed to allow walkability in the city canter. Additionally some walkways should be designed in the CBD area by applying the pedestrianization policy there.

Figure 9:6 Model of Footpath with Street Furniture

- **Provision of Footpath and Street Furniture**

Provision of street furniture in the core urban area also needs immediate attention. Street lights, benches, footpaths restoration, traffic signals, zebra crossings and bus stops with shades should be installed on immediate basis

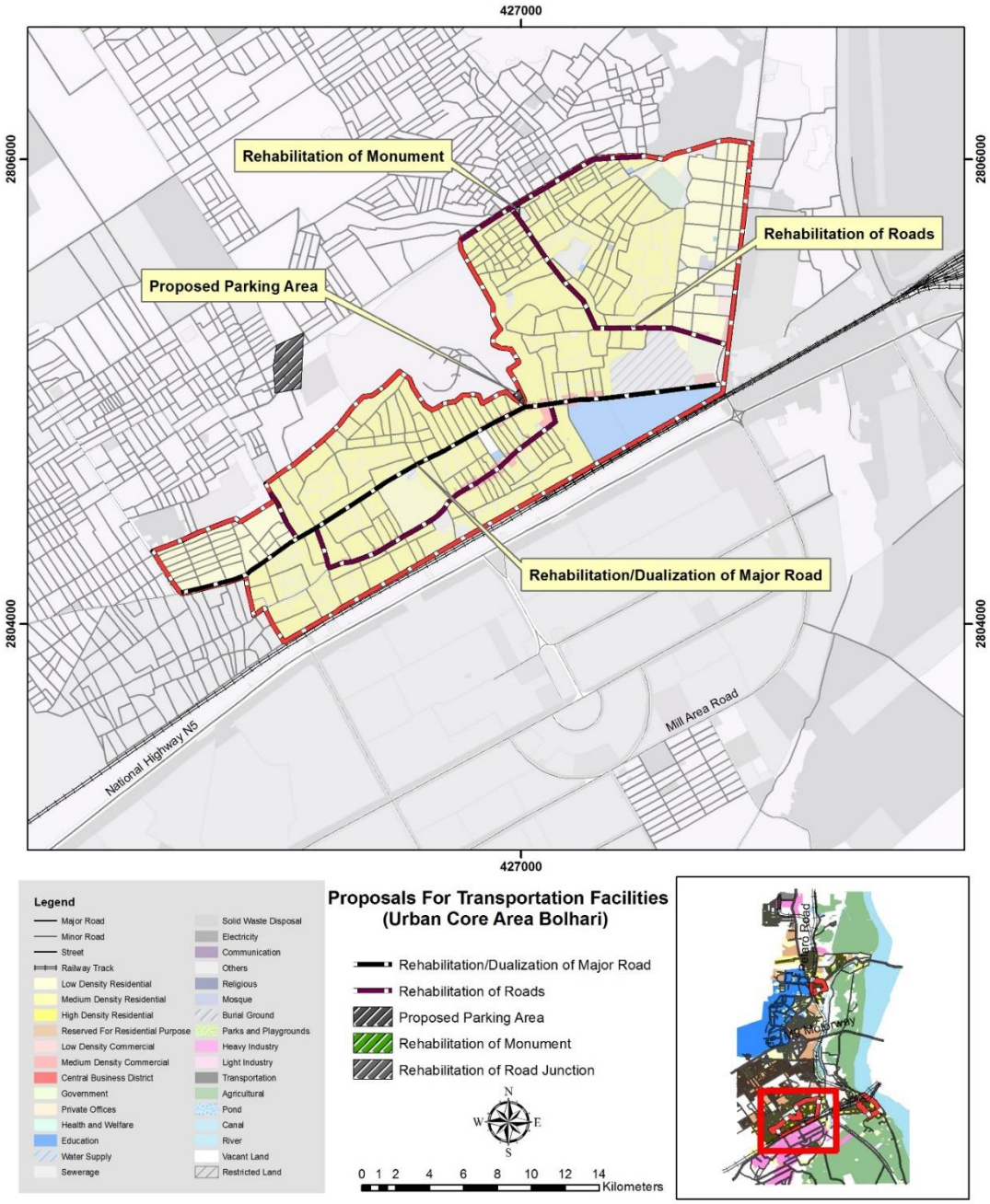


Figure 9:7: Proposal for Rehabilitation of Water Supply Scheme-Core Urban Area Bolhari

iii. Jamshoro TC

- **Rehabilitation of Roads**

The main parameter for rehabilitation of existing roads is to draw a property line, which require very practical approach in such a way that no massive destruction will happen. In this regard community participation will be highly needed to take them on board and to make awareness that this realignment is for the betterment of their area. Thus, the community ownership will make the idea workable, other than this forceful action will not work in long run.

Immediate action plan for core urban area in Jamshoro TC requires that the right of way of roads should be restored by removing all encroachments along the CBD roads.

The road pavements will be improved and tree lined medians will be developed on all main roads having a right of way of more than 80 feet.

Rehabilitation of Roads includes Cadet College Petaro Road, etc.
Provision of Parking Areas.

- **Monuments**

Some new monuments and land marks should be placed in the Chowks of core urban area for beautification purposes. Monuments should be installed on important chowks and junctions of the core urban area of Jamshoro TC which will represent the history and grandeur of the town.


Figure 9:8: Model of Monuments

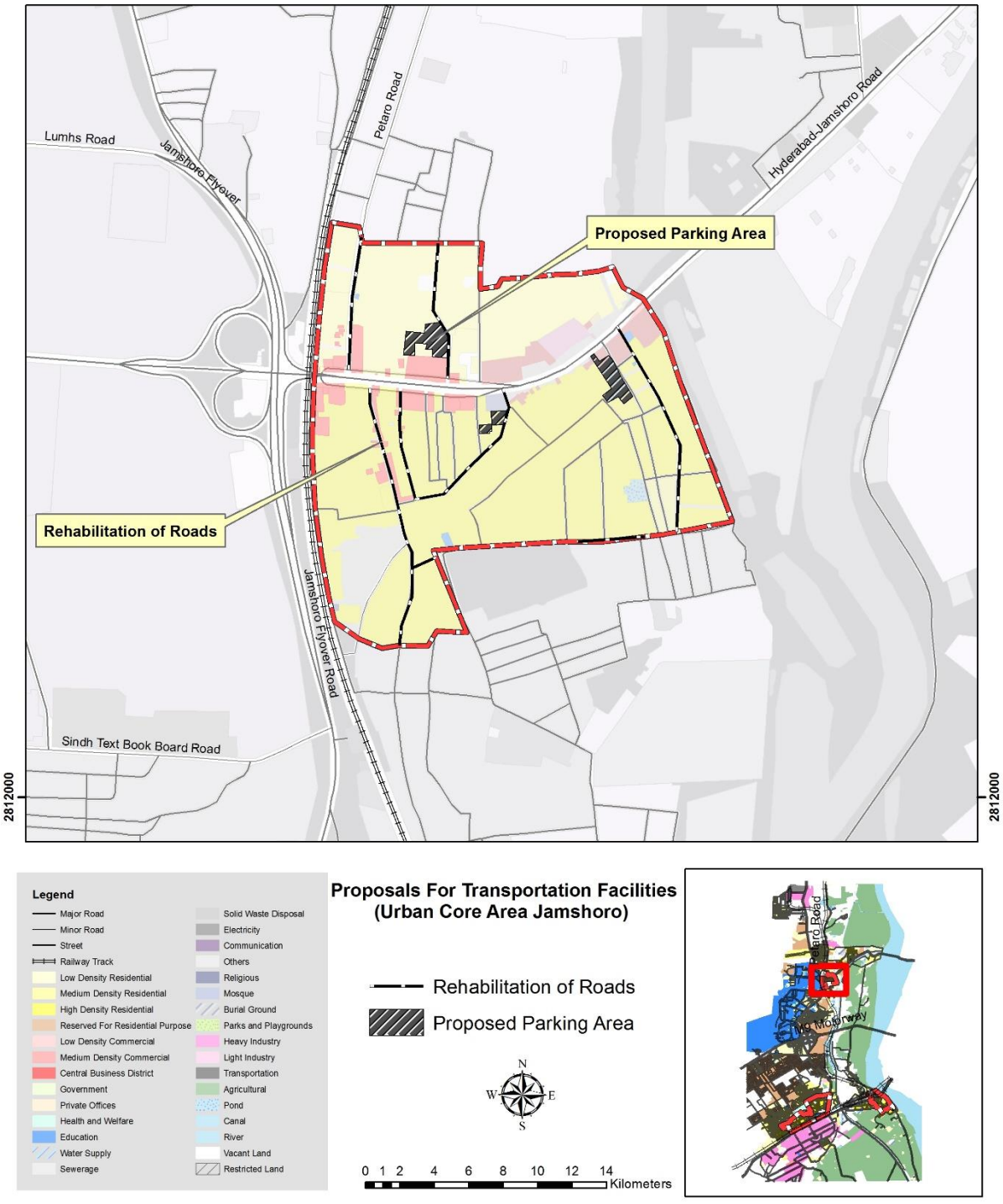
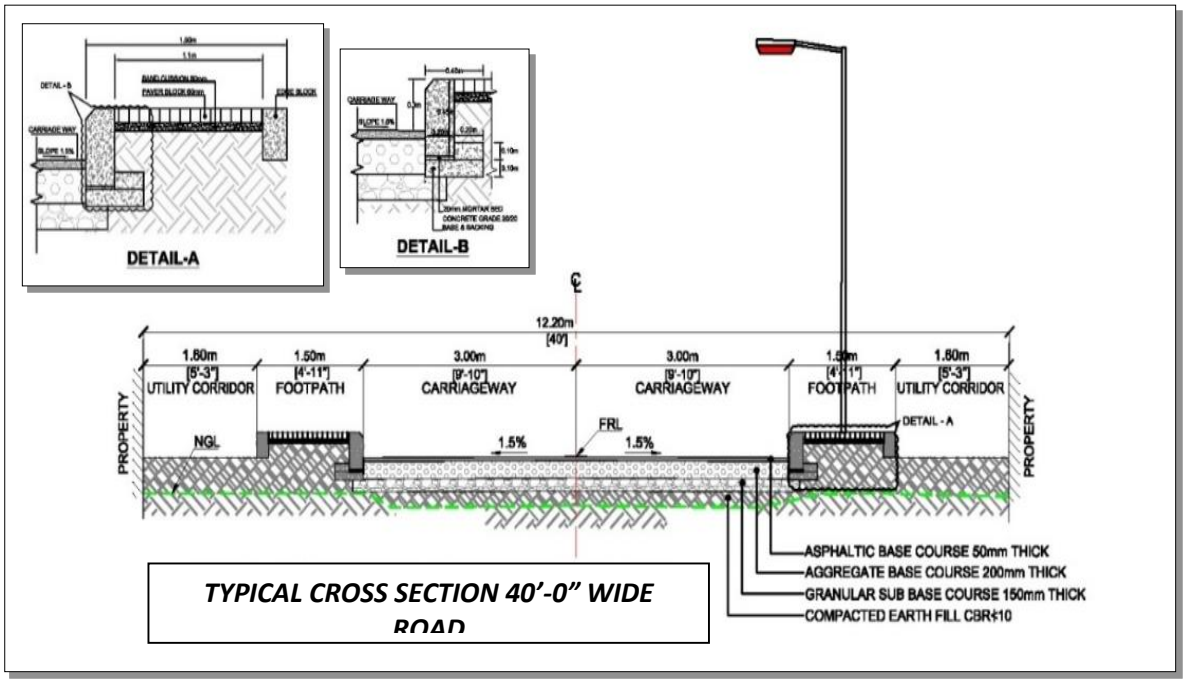
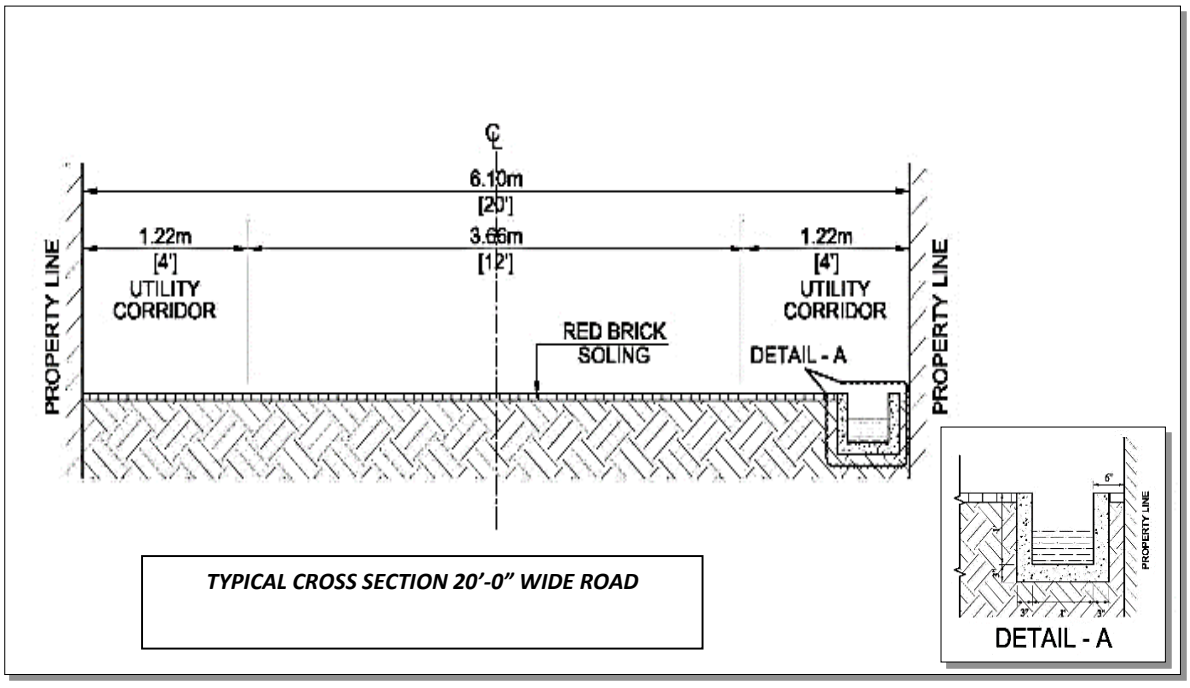


Figure 9:9: Proposal for Rehabilitation of Roads & Proposed New Parking Spaces Jamshoro

Typical cross section is given as below;



TYPICAL CROSS SECTION 40'-0" WIDE ROAD

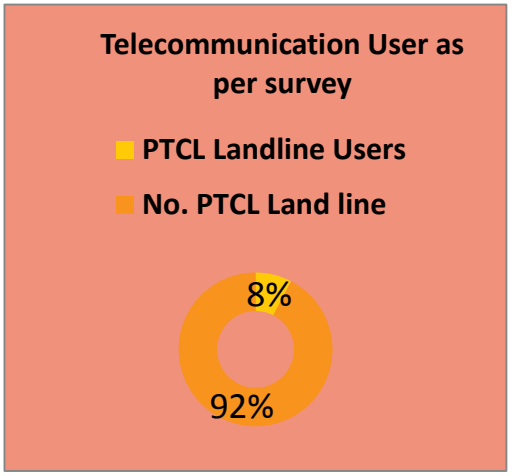


TYPICAL CROSS SECTION 20'-0" WIDE ROAD

Kotri, Bulhari & Jamshoro - Core Town Area						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 Flyover Road	**1.17**	**1,172.81**	**40.00**	**12.20**	**14,302.62**	**4,500**	**64.36**
2	National Highway N5	**1.02**	**1,021.21**	**40.00**	**12.20**	**12,453.74**	**4,500**	**56.04**
3	Hyderabad-Jamshoro Road	**0.33**	**326.76**	**40.00**	**12.20**	**3,984.93**	**4,500**	**17.93**
							Total PKR Rs. Million (A).	**138.34**
Minor Roads								
1	Petaro Road	**0.27**	**265.65**	**40**	**12.20**	**3,239.58**	**2,500**	**8.10**
2	31 Un-Named Roads	**12.54**	**12540.00**	**20**	**6.10**	**76,463.41**	**2,500**	**191.16**
							Total PKR Rs. Million (B).	**199.26**
Streets								
1	DHQ town Streets in Kotri, Bulhari & jamshoro	**25.00**	**25,000**	**20**	**6.10**	**152,439.02**	**2,000**	**304.88**
							Total PKR Rs. Million (C).	**304.88**
							(Rehabilitation of Roads) - Total PKR Rs. Million (A+B+C).	**642.47**

9.2 Communications

The present-day situation of Kotri (MC) at Jamshoro falls in the developing urban area; there are about 8% households are using land line connections while 92% households have no PTCL landline.



The epicentre of growth in mobile phone services Kotri is gradually covering to semi-urban and rural areas localities. Remote areas have started showing growth, led by the expansion in cellular networks, increasing awareness of the usage of voice and data connections and availability of mobile handsets at affordable prices.

A significant rural population uses phones to remain connected with their outstation relatives and friends, who have gone there for education and in search of livelihood.

S. No.	Availability of PTCL/ Telephone/ Landline connection	No. Respondents	Percentage
1	No	497	92%
2	Yes	45	8%
	Total	**542**	**100%**

Source: Consultant's Survey, 2017

9.2.1 Internet / Wi-Fi

At present, the internet usage is limited to educated families, and it is 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 18% of households are using the internet and the remaining 82% are still not using this new technology.

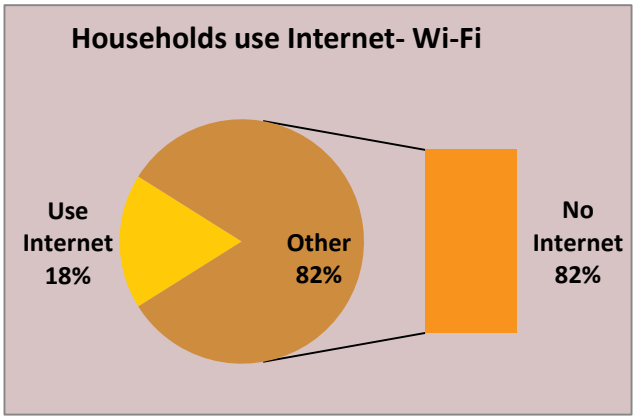


Figure 9:10: Communication tower in Jamshoro

9.2.2 SWOT analysis

Strength	Weakness	Opportunity	Threats
Information & Communication Technology			
1. Strong networks available for advanced technologies, e.g. internet, cellular networks, broadcasting, satellite communication 2. All cellular service provider offer facilities and service station	1. Only a small amount of population is served by PTCL services, station and network 2. Lack of information sharing regarding agricultural activities, public health, veterinary, disaster forecasting etc. 3. The internet usage is limited to educated families	1. Media can play important role in economic development and prosperity 2. Immediate disaster forecasting through disaster emergency response centre 3. Marketing campaign support of development initiative	1. Negative cultural and ethical exposure to young minds (youth), if not regulated properly 2. No check and balance of non-authorized/ non-biometric SIM's usage

9.2.3 Strategic Development Plan

- **Importance of Communication Infrastructure in Agriculture Sector:**
  - Swift transportation facilities, farmer friendly marketing arrangements and, above all, a well-maintained Communication network are the basic requirements for an efficient and profitable agricultural sector.
  - The District government needs to improve market and support service infrastructure including farm-to market Roads. This sector will need increased and sustained investments in communication infrastructure in rural areas.

9.3 Energy

9.3.1 Existing Situation

The power supply is through HESCO-WAPDA transmission system. Results of socio-economic survey reveals that 87% of the households have availability to electric power from HESCO, whereas 13% of the households does not have HESCO electric supply.

Table 16-1: Electricity Power Availability

Availability of Electric Power	No. of Respondents	%age
Available	462	87 %
Not Available	68	13%
Total	**530**	**100 %**

Source: Consultant's Survey, July 2017

Nooriabad Industrial Area and Kotri Industrial area are two big zones of Industries where more than 500 different industries are located. Kotri is a small city and the headquarters of the Kotri Taluka of Jamshoro district of Sindh province in the Pakistan. It is on the right bank of the Indus River.

WAPDA has 3 power plants in region specifically; Jamshoro Power Station, Lakhra Power Project and Kotri Power Station are the key power units in this district.

HESCO Supply Urban Feeders

The power supply from HESCO HT feeders 220KV is stepped down to 11KV at grid stations and distributed to consumers via power main transformers which further reduce the voltage to 420V/220V as required by the individual households. The distribution network has been improved by using Aerial bundled cables (ABC) to avoid theft of electricity.

Figure 9:11: Jamshoro Power Station

The survey also brings the fact that about 486 Nos. i.e. 92% households have no alternative power source, some 44 households i.e. 8% have alternative source to enlighten their houses during load shedding time. There is Solar Power facility to 8% households surveyed and none household has wind power. Some consumers use diesel generators during the load shedding hours.

S. No.	Source of Alternate Energy	%
1	**None**	**92 %**
2	**Solar Power**	**8 %**
3	**Total**	**100 %**

9.3.2 *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.

9.3.3 *SWOT Analysis:*

Power Supply & Distribution			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Electricity supply network is available for district. 2. Good recovery outcomes as business community in urban area want quality services. 3. The industrial sector demands supply of natural gas and electricity as well.	1. Short fall of electric power. 2. Poor maintenance of electricity supply infrastructure. 3. Electricity theft, line losses and power theft.	1. Opportunities available for alternative energy production through solar energy and wind power. 2. Renewal of outdated network to meet existing and future demand.	1. Load shedding. 2. Threat to agriculture and industrial production and overall economy. 3. Licensing and legal issues. 4. Investment protection, law & order.

9.3.4 *Current Power Supply/Demand (Need Assessment)*

Electric power network exist in the city, but the production is going through a national energy crisis and power supply has become erratic. The Power Supply to District is through Hyderabad Electric Supply Company (HESCO) WAPDA via 132KV grid station feeding district by 11 KV feeders.

Table 9-1 : Consumption of Electricity

S. No.	Consumption of Electricity in KWH	No. of Respondents
1	400~500	3
2	200~300	13
3	100	10
4	Below 100	1

Source: Consultant's Survey, July 2017

The power demand is not only for houses & business, but also for street lighting, industry and irrigation. The electricity consumers in the district are categorized as domestic, commercial, industrial, agriculture and other services. The major portion of electricity generated is being consumed by industries, followed by domestic consumers, markets, street lights and irrigation. There is industrial zone in SITE Kotri, which has heavy power demand to keep wheel running.

s

9.3.5 Strategic Development Plan

Strategies for Electricity includes:

i. Short Term

- **Upgrade Transmission and Distribution Process:**
  Transmission and distribution losses are directly connected to Leakage Current Losses, Dielectric Losses, open circuit Losses and theft of electricity.

- **Upgrade Streetlight Network**
  The maintenance is required in order to keep lights working. In some locations conventional street lights have been replaced with LED bulbs, it is recommended the street lights to be switched with power supply by means of solar panel and a storage battery. This can save energy and light can be lit even during the load shedding hours.

ii. Long Term

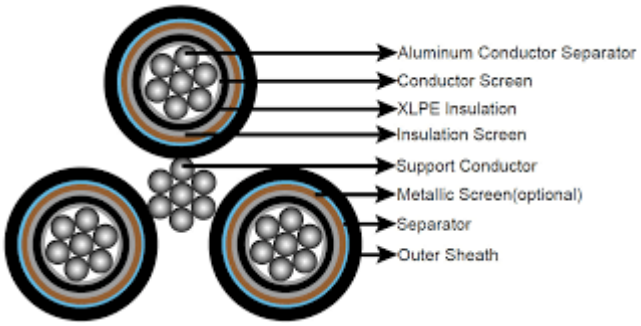
- The effective development of low cost energy production systems can be used
- To offset water scarcity by either deep drilling for freshwater or direct desalinization of brackish water.
- Success in achieving fuel efficiency, adopting new technologies and altering existing fuel-use
- habits depends 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

9.3.6 Immediate Action Plan

ABC wires should be used in the core urban area to avoid short circuits and thefts. This will also increase the beauty of the core urban area.

i. Arial Bundle Cable wires

In present circumstances it is suggested that Arial Bundle Cable wires should be used to avoid short circuits and thefts issues. This will also increase the aesthetics and beauty of the core urban area.

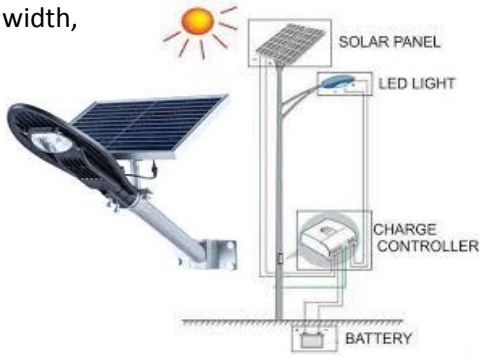


ii. Streetlights

It is proposed to install and rehabilitate streetlights in all over core urban area of Kotri MC, Bolari MC and Jamshoro TC. It is suggested to use streetlights with LED panel and solar power battery support. This can save energy and light can be lit even during the load shedding hours, but need

regular maintenance. Considering narrow street and road width, it is recommended to use wall mounted poles in narrow streets, while floor mounted poles on other roads.

- Promote energy efficient appliances and devices.



Proposed Wall Mounted Street Lights				
S. No.	**Name**	**length (km)**	**length (feet)**	**Cost (PKR)**
1	Proposed Total Length of Street (km) for wall mounted streets lights.	30.00	98,400	24,600,000
			Total Cost (PKR). Million	**24.00**

- Wall mounted street lights approximately should be placed on distance of 15 to 20 feet apart.
- Each wall mounted street light cost (Rs.10,000/-).
- As per total length of Streets for this proposal 2,000 No.s of street lights/wall mounted streets should be placed in core town area.
- Operation and maintenance is the 1st priority to ensure after installation of all equipment's and machinery and kept under strict control of TC office for proper usage of facilities.

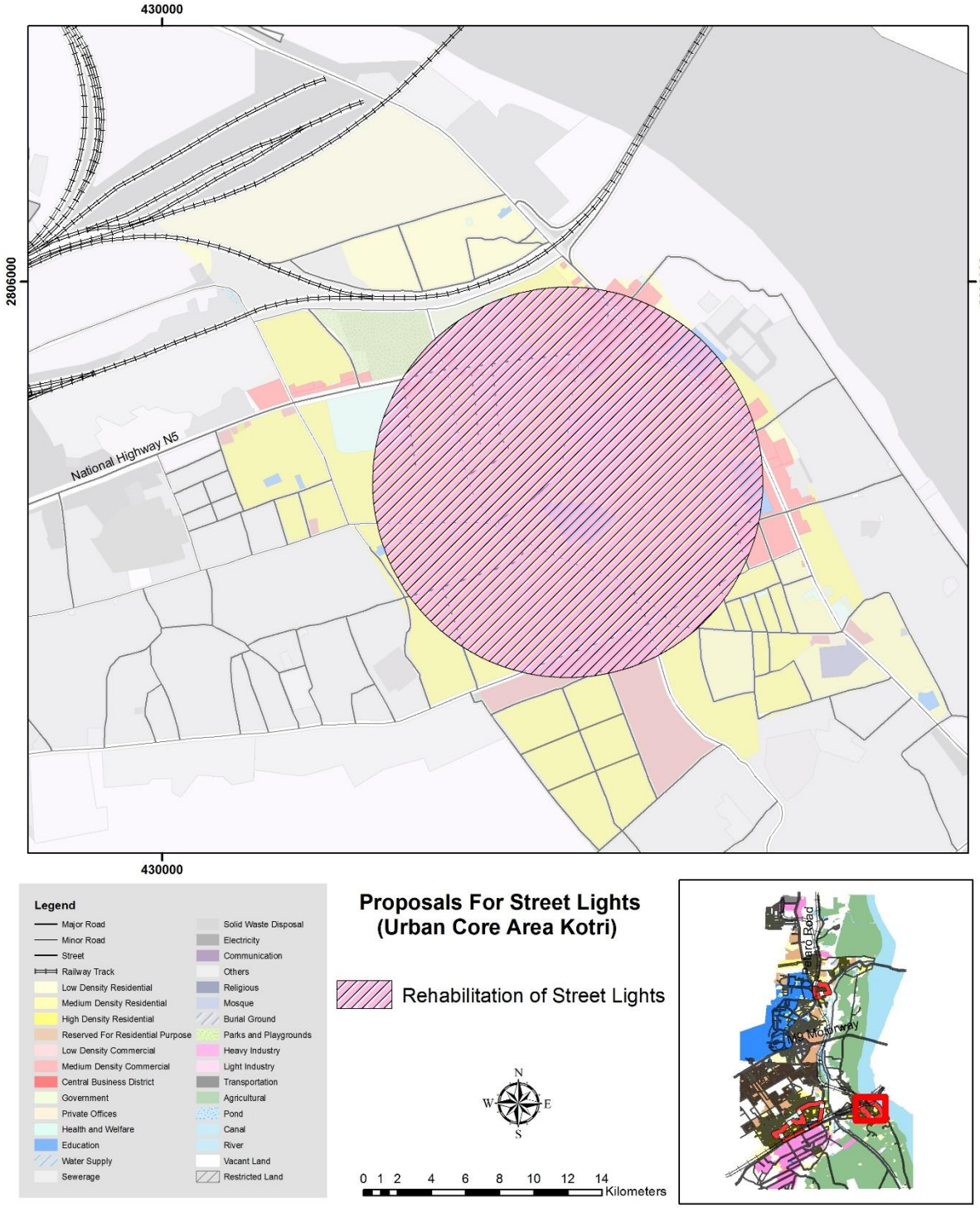


Figure 9:12 : Street Lights (Urban Core Area Kotri)

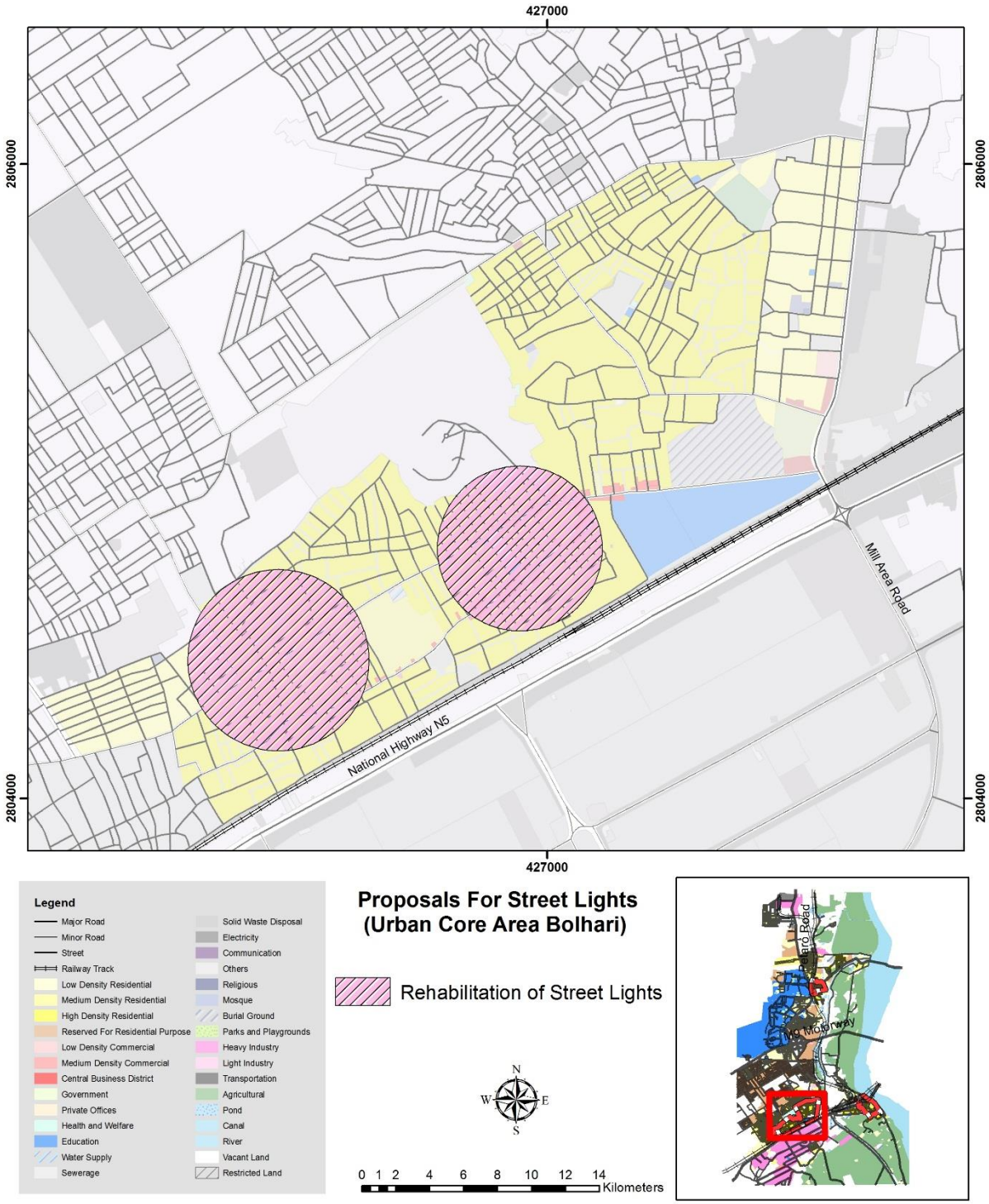


Figure 9:13 : Street Lights (Urban Core Area Bolhari)

9.4 Gas Supply

9.4.1 Existing Situation:

A maximum of 539 houses residents had responded to the questions asked on availability of Gas. As given in the Table below, 467 houses had the gas available to them, while the gas was not available to 72 houses. Therefore about 87% households have the gas supply by SSGC and 13% were using alternate source of fuel for their daily household needs.

Availability of Natural Gas	No. of Respondents	Percentage
Available	467	87%
Not-available	72	13%
Total	**539**	**100%**

Households not having Natural Gas provided by SSGC are dependent of alternate sources. 72 out of 539 respondents not having gas availability are using following alternate resources.

S. No.	Gas Alternate Source	No. of Respondents	Percentage
1	Coal	63	88%
2	Wood	3	4%
3	Kerosene oil	5	7%
4	Gas Cylinder	1	1%
	Total	**72**	**100%**
Source: Consultant's Survey, July 2017			

9.4.2 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

10. ENVIRONMENT

10.1 Existing Situation

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.

Soil Loss and Degradation

Barani lands are subjected to heavy soil erosion, primarily due to improper land use by crop cultivation, livestock grazing and illegal removal of vegetation cover.

Deserts have acute problems of shifting sand dunes and salinity. The irrigated areas are infested with the twin-menace of water logging and salinity. The following are the key issues for Jamshoro District related to soil loss and degradation:

- **Water erosion**

  Sedimentation of canal irrigation system decreases water and land use efficiency. Some 40 million tons of soils are brought into the Indus basin each year, which shortens the life span of major reservoirs and reduces their efficiency. The upstream riverside infrastructure is destroyed and top soil is washed away declining productivity of the area. In downstream, the sedimentation reduces the efficiency of hydropower generation and irrigation systems.

- **Loss of Biodiversity**

  Due to the ever-increasing human and livestock population there is enormous pressure on natural vegetation in almost every agro-ecological region of the country. Aridity and prolonged drought in arid lands have affected the vegetation cover in these areas. All these factors have contributed towards the loss of biodiversity in various regions of the country.

- **Water logging and Salinity**

  The major factor contributing to water logging in cultivated areas is excessive percolation from the canal system, which builds up the ground water level. Human activities can also aggravate water logging problems through actions which include the following:
  - Cultivation of high delta crops on highly or moderately permeable soils
  - Obstruction of natural drainage channels through construction of buildings and roads
  - Improper alignment and poor maintenance of artificial open drainage system
  - Inefficient disposal of excess rain water, etc.

Total waterlogged area with water table depth of 5-10 feet in Pakistan is about 11 million hectares. Salinity and sodality are associated with irrigation but these also occur as a consequence of soil formation process over the centuries.

- **Drought and Flooding**

  The effects and impacts of drought in fragile eco-systems assume serious proportions of land due to misuse of marginal areas, unwise land use practices and overexploitation of natural resources. Adverse effects of drought on human activity usually last for many years.

- **Soil Nutrient Degradation**

  A significant portion of cultivated soils are low in retained important plant nutrients. This nutrient deficiency, mainly of nitrogen, phosphorus, potassium, sulphur, zinc, copper, iron and manganese, has been indicated by various fertilizer experiments conducted on soils in different parts of the country. The problem is particularly severe in the case of irrigated sandy soils, moderate in the case of irrigated loamy soils of old river terraces, and of a minor degree in other soils.

10.1.1 Seismicity

The Seismic zoning map of Pakistan (2015) places Jamshoro in Zone 2A which corresponds to peak ground acceleration (PGA(g)) of 0.08 to 0.16 and a possibility of minor to moderate seismic hazards i.e. probability of earthquakes of intensity (MM Scale) 6 to 7.5. While the western region of the District, along the Kirthar Mountain range, lies in the Zone 2B. This corresponds to peak ground acceleration (PGA (g)) of 0.16 to 0.24.

10.1.2 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.

10.1.3 ***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.

10.2 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. 2. Inland of fisheries water ponds exists.	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
Climate			
1. Suitable for producing crops.	1. Rainfall shortages affect the efficiency of river water 2. Ponds contaminated by Industrial effluents put damaging impact.	3. Agricultural practices can be changed in accordance with weather condition for maximum production.	1. Droughts 2. Heavy rains affects agricultural production
Air			
1. Rich Air quality is good for human health, and also keeps ecological	1. Inner city air is polluted by high volume of traffic. 2. Burning of garbage or other disposable	1. Development planned with respect to air circulation can provide relief to inner	1. Air pollution 2. Respiratory diseases

ENVIRONMENT			
Strength	**Weakness**	**Opportunity**	**Threats**
balance in atmosphere.	effluents also put damaging impact on the air quality.	city's polluted environment. 2. In future the town can be planned as Green City.	
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.

10.3 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.

10.4 Policy Guidelines[46]

- 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.

10.5 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

[46] National Forest Policy 2010

- 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

11. DISASTER RISK MANAGEMENT PLAN

11.1 Existing Situation

District Jamshoro is one of the oldest districts of Sindh. It was hit by 2010 and 2011 rains/ floods. River Indus, after receiving water from five of its tributary rivers, causes floods in the northern and southern parts of Sindh province.

These districts on the right and left banks of River Indus are prone to severe threat when River Indus is in high flood. The districts in the lower Sindh, prone to riverine flooding, include Dadu, Jamshoro and Thatta on the right bank of River Indus and Tando Muhammad Khan, Matiari and Hyderabad on the left bank of the river. The length of River Indus along the province is 750 kms long.

Vulnerable UCs of District Jamshoro are Allah Bachyo Shoro, Jamshoro, Morhojabal, Unerpur, Amri, Lakha, Manjhand, Manzoorabad, Sann, Unerpur, Bubak, Channa, Dal, Jhangra, Sehwan I and Talti.

Hazards Matrix of Jamshoro[47]

Hazard	Frequency	Area Affected / union council	Severity / Force	Year
Riverine floods	Monsoon	Entire district	High	2010,2011
Flash floods	Monsoon	Western part of district	Low	
Heavy Rainfall	Monsoon	Entire district	Low	2011, 2012, 2013, 2014
Epidemics	Seasonal	Entire district	Low	Every Year
Drought	Rare	Entire district	High	1999-2002
Earthquakes	Rare	Entire district	Low	2013
Transport Accidents/Fire	Frequent	Entire district	Low	Every Year

[47] Pakistan Emergency Situational Analysis: District Jamshoro

11.1.1 Disasters in District Jamshoro

i. Floods / Rains.

District Jamshoro is one of those districts of Sindh who was hit by 2010 and 2011 rains and floods the relative severity of floods was ranked as High in district Jamshoro. River Indus, after receiving water from 5 of its tributary rivers, causes floods in the northern and southern parts of Sindh province. The upper region of Sindh Province comprises of the districts of Jacobabad, Shikarpur, Kashmore, Larkana and Kamber Shahdadkot on the right bank of River Indus and Ghotki, Sukkur, Khairpur, Naushahroferoze and Shaheed Benazirabad districts on the left bank of River Indus. These districts on the right and left banks of River Indus are prone to severe threat when River Indus is in high flood.
Rain/Floods brought great misery to the Sindh province. Only in District Jamshoro, flood 2010 affected 69,421 households and damaged 553 villages in the district. This flood caused 8 injuries.

As mentioned above, district Jamshoro was severely hit by the floods/rains in 2010 and 2011. The district falls under the category of low risk districts, as declared by PDMA Sindh.[48] But in 2010 rains/floods, the extent of damage was not moderate at all as assessments showed that 49% of population was affected in 16 union councils of talukas of the district Jamshoro. A population of 395,700 persons was affected and there were 8 injuries. In total, 84,088 houses were damaged.

Along with the demographic loss due to floods 2010/2011 and 2012, the loss to agriculture sector exacerbated the sources of livelihood for the people of this district. The crop area affected in 2011 was 39,133 acres. The following table shows the loss to agriculture sector of this district.

District Jamshoro is on the borderline of food insecurity. Floods of 2011 and 2012 worsened the existing situation of the population. Thus the indicators of food security i.e. availability, access, utilization and stability showed dismal situation in this district.

ii. Earthquakes

The Jamshoro district also does not exist in earthquake disaster zone area of Pakistan. The Pakistan hazard maps highlights district Jamshoro position in the category of safe zone.

iii. Droughts

In routine, within a normal year, between 15 to 20 percent of poor families migrate towards areas of province Sindh which have barrages such as Badin, Sanghar, Mirpurkhas, Hyderabad, Tando Allahyar and Tando Mohammad Khan to work as the seasonal labor and other livelihood opportunities. Due to droughts, approximately 25 to 35 percent population of region migrated to work in friendly environments.[49]

[48] Flood 2010, Disaster Management Apparatus in Sindh, PDMA Sindh

[49] https://www.dawn.com/news/1132994, published on sept 19,2014.

For example, in 2014 it has been observed that approximately 40 to 50 percent families were forecasted to migrate towards barrage areas. Most of these people prefer to settle and work at low wages, leaving them with little opportunity for bargaining power, and where their identity is counted as susceptible as exploited by their employers.

In case of arrival of drought if the government is already informed about the situation government should take concrete measures to provide permanent solutions to save water and boost water resources through which the situation can be tackled.

iv. Seismicity

The Seismic zoning map of Pakistan (2015) places Jamshoro in Zone 2A which corresponds to possibility of minor to moderate seismic hazards i.e. probability of earthquakes of intensity (MM Scale) 6 to 7.5.

11.1.2 Impacts of Floods

i. Food

As established in the previous section, district Jamshoro was on the borderline of food insecurity. Floods of 2010 and 2011 worsened the existing situation of the population. Thus the indicators of food security i.e. availability, access, utilization and stability showed dismal situation in this district.

Since district Jamshoro is agro-based and majority of the households are engaged in agriculture farming and livestock rearing activities, and there are still others involved in non-agriculture activities/casual labour. Among these three types of the households, empirical studies have shown that poverty is relatively higher in the non-agriculture households, followed by livestock households and small farmers37. It has been shown in the previous section that many individuals of this flood affected district lost their homes (128,038 houses were damaged), their crops (39,133 acres of crop area affected) and heads of livestock (81 livestock died). Due to the lack of strong industrial base, the sources of income of households, situated in this severely affected district, are less diversified, with their heavy dependence on agriculture, livestock and casual labour. The deplorable social indicators i.e., large household size, poor literacy level, higher mortality rate, infrastructure with poor access to education and health facilities show the higher level of poverty and deprivation in this district.

Through the destruction of roads, transport and market infrastructure, the floods had a significant negative impact on commodity market. As a result, the functioning capacity of the markets (transporters, processors, wholesalers and retailers) decreased with upward movement of transaction costs and shortage of food commodities. This phenomenon hindered the socio-economic access to food in the district.

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.

ii. Health

Severe floods can not only cause destruction to heath care infrastructure but also affect health indicators of the affected population.

Jamshoro district was declared as flood affected district in floods 2010 but no damages to health infrastructure were reported, whereas the district was badly hit by rains in 2011, which resulted in damage to the public health infrastructure**.**

iii. Education

Due to the floods/rains of 2010, 373 school facilities were damaged, out of which 172 were fully destroyed and 201 were partially damaged. 67 schools were rehabilitated soon after the floods. Also, heavy rains affected the school going children. Due to the damages to the schools, houses and roads; education of 29,840 students was affected (Girls: 12,831, Boys: 17,009). Teachers numbering 1,119 were also affected. Due to the floods/rains of 2011, 85 school facilities were damaged, out of which 23 were fully destroyed and 47 were partially damaged. 15 schools were occupied by IDPs. Due to the damages to schools, houses and roads, education of 6,800 students was affected (Girls: 2,924 Boys: 3,876). Teachers numbering 227 were also affected.

iv. Livestock

Beside loss to natural resources, crops, agricultural lands and human life and activities, livestock's life is always endangered by droughts. Thus, alternate arrangements for emergency response facilities like nutritious fodder, vaccines and livestock sanctuaries must be established to prevent the migration or demise of livestock during droughts. The responsibility to implement such measures falls upon the Livestock Department. As the fodder depletes, livestock are fed on dry grass, leading to a host of digestive problems such as diarrhea, toxemia and metabolic disorders; compromising their immune systems and affecting milk production. This adds to the woes of livestock owners, whose total income generation dependency is upon production of milk produced by cattle, for the benefit of their families and affordability.

As weak and diseased livestock migrate with their owners to barrage areas, a trend of collapse in livestock prices has also noticed, with a healthy goat that sold at full price, once weakened by drought, normally worth only 35% of its original price.

v. Infrastructure

The district Jamshoro is mostly rural populated district with 77% population residing in rural area and 23% population residing in urban area[50]. Residential units in the DHQ Kotri are constructed cement bricks and RCC roof. Steel girder roof is also common. However, in the village or rural areas houses are also constructed from mud brick wall and wood log or bamboo roof with leaves. Similar is the situation of the residential units in other talukas and villages.

[50] PAKISTAN EMERGENCY SITUATIONAL ANALYSIS, District Jamshoro, August 2014,

The total number of public sector health facilities in district Jamshoro is 43[51]. There is only one teaching hospital and four tehsil headquarter hospitals with a capacity of 90 beds. Liaquat University of Medical & Health Sciences is the only teaching hospital situated in Jamshoro city. These health facilities are sufficient for only 21% of the estimated 2014 population of the district[52].

Jamshoro district covers an area of 11,517 sq. km yet it has only 179 kilometers of good quality roads, which are inadequate for the area and its population4. A National Highway (Indus Highway, N55) and Express Way (M-9) connect Jamshoro with other major cities of the province. The district headquarter of Jamshoro is linked with its taluka headquarters of Thano Bula Khan, Manjhand and Sehwan through metaled roads. Roads in the DHQ Kotri city are metaled but not very wide and are in dire need of repair. Dirt and garbage are often seen along the roads. The streets in the suburban areas of Kotri are narrow and not carpeted.

The drainage system of the DHQ town is sufficient to cater the domestic sewage water. In the main town, the sewage lines are covered with cement cover. However, in the residential areas, the smaller channels, that receive sewage water from homes, are open and shallow. Sewage line choking is a common problem that cause inundation of roads and street from sewage water. And in case of heavy rain, the water inundates the low lying areas and remains stagnant for many days. Ponds of sewage and rain water become breeding spots for mosquitoes and other insects.

Two talukas of district Jamshoro have industrial estates. 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 and providing employment to its inhabitants and outsiders. Mining is also a source of income for the inhabitants of this taluka.

*11.1.3 **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).

[51] Health Facility Assessment 2012 (HFA) by Technical Resource Facility (TRF)
[52] PAKISTAN EMERGENCY SITUATIONAL ANALYSIS, District Jamshoro, August 2014

- **Responsibilities of National / Provincial / Local Government**

  Police and Local Administration Government have the primary responsibility for preventing, preparing for, responding to, and recovering from terrorist attacks in their jurisdiction.

  The protection and resilience of crowded places—particularly those at an elevated security risk—is a key focus of National / Provincial Police / Local Government Administration. While the owners and operators of crowded places remain responsible for implementing protective security measures, National / Provincial Police / Local Government Administration acknowledge that responsibility for building and sustaining resilience to terrorism is shared between government, owners and operators, and communities.

  National / Provincial Police / Local Government Administration are responsible for providing threat information to owners and operators of crowded places. This includes material developed by National / Provincial Police / Local Government Administration, Law Enforcement Agencies (LEA) etc. Police provide specific information on the local threat context to help owners and operators develop protective security measures.

  Police are also responsible for running and administering Crowded Places Forums. These Forums are the primary means of collective engagement between police and local owners and operators of crowded places, including businesses and local councils. Members of the Crowded Places Forum can share information, guidance, and lessons learned relevant to their local circumstances.

- **Responsibilities of Stakeholders**

  Implementation of protective security measures and reducing the vulnerability of crowded places to terrorist attack was not just a job for the Government (Federal / Provincial / Division / District) and the police alone. To be most effective, this work requires engagement from a range of local partners, including local authorities and businesses, in order to identify vulnerable sites and prioritize work to reduce those vulnerabilities.

- **Identification of Land uses for Potential Terrorists Attack**

  Consultant identified different land uses in Jamshoro 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/DCO Office/SSP Office/District Jail/Police Head Quarter/LEA
6	**Recreational**	Tourism Places
7	**Transportation**	Bus Stop/Railway Station/Airport

Existing Situation for Public Safety

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.

Possible Terrorist Intensity Places of DHQ Town Jamshoro

Consultants identified some possible terrorist Intensity places of DHQ Town Jamshoro on the basis of Crowd and most visiting places by the residents of DHQ Town Jamshoro, the places are classified according to the given the above table

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.

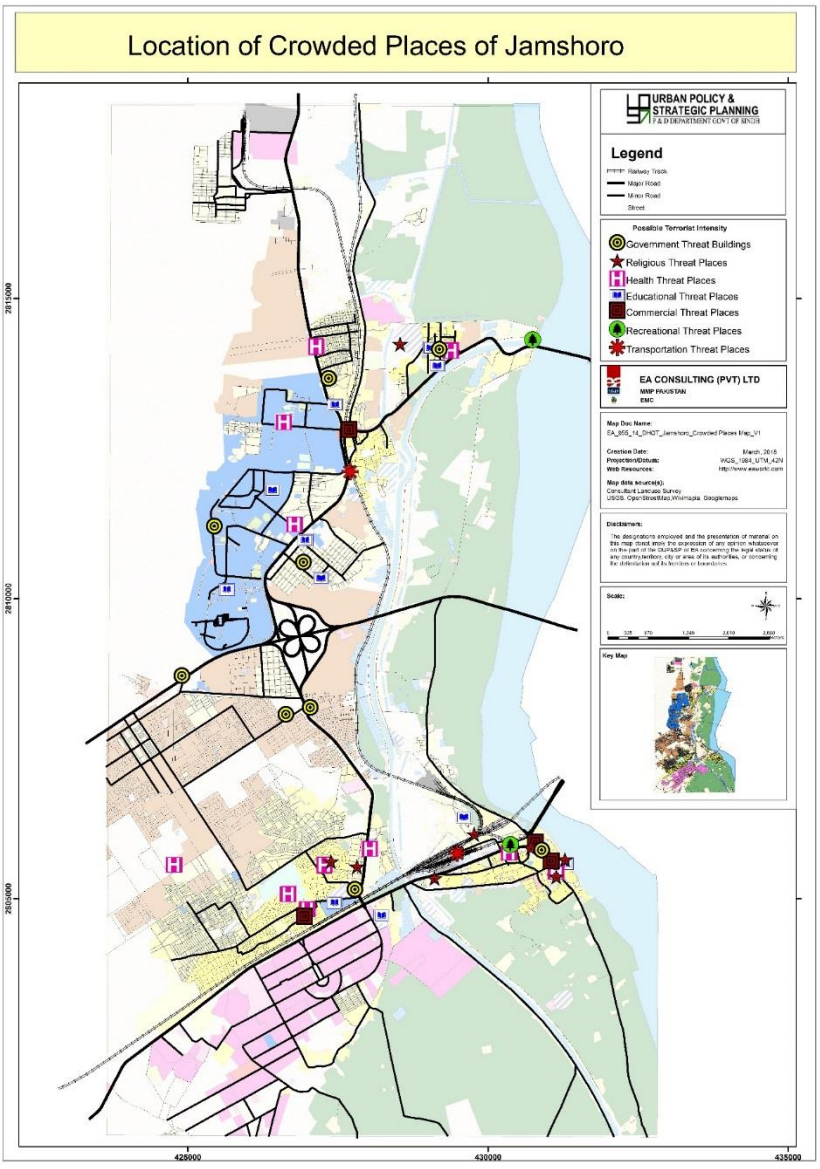


Figure 11:1: Crowded Places of DHQ Town Jamshoro

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.

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.

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;
- 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

11.2 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

11.3 Policy Guidelines[53]

- 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.
- 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.

[53] National Disaster Risk Reduction Policy 2013

11.4 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.
- 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.

11.5 Priority Projects

- There is a need to set criteria for the identification and declaration of "disaster affected" areas. Disaster declarations may temporarily restrict individual rights (such as property rights or mobility).
- DRM strategies and initiatives need to be based upon clear assessments of disaster risks i.e. a quantitative and qualitative understanding of the underlying causes and vulnerabilities, geographical distribution of vulnerability and hazards , the probability of hazard occurrence and predicted losses.
- Vigilance of canals / drains round the clock.
- Closure of canals at the heads as soon as possible in case of any breach or heavy downpour, etc.
- Ensure smooth flow of water, plugging up of breaches, if any, in the shortest possible time.
- Prompt dewatering of stagnant water from affected and low lying areas of the district.
- The Executive Engineers, HESCO Division shall ensure uninterrupted supply of electricity particularly to municipal services such as pumping stations for draining out rain water from the low lying and slum areas. Shall make arrangements for immediate removal/repair of fallen live wires to avoid any untoward incident of electrocution
- Arrange and provide adequate stock of medicines and medical supplies including Anti-Snake Venoms (ASVs) and Anti-Rabbi Venoms (ARVs), blood plasma, Saline Water, and other medical fluids for victims.
- Arrange medical teams for providing medical cover to the IDPs settled in any relief camp.
- Fumigate the affected areas and areas at risks of spread of any of epidemic disease.
- Ensure that all ambulances are in working order and road worthy conditions.
- Ensure vacant possession of all schools buildings at the time of emergency for setting up relief camps.
- Ensure sanitation and cleanliness as well as clean drinking water facilities wherever possible at all school buildings declared as relief camps through by binding down their concerned Headmasters.

12. CLIMATE CHANGE EMERGENCY CONTINGENCY PLAN

➢ **District Level Plan**

Jamshoro district is prone to canal flooding and floods caused by heavy rainfall.

➢ **Broad `Contours of the Plan**

- Early warning of approaching weather system will be provided by Pakistan Meteorological Department (PMD) and communicated to the District Disaster Management Authority (DDMA). DDMA is expected to translate weather forecast and flood warnings into usable early warning for vulnerable communities and ensure its timely dissemination to all concerned.
- In case, there is continuous rise in major canal water level the people residing near major canals will be evacuated to safer places.
- Threatened population will be evacuated by DDMA.
- DDMA would be responsible for provision of search and rescue, medical and emergency responses.
- Camps will be established at pre-selected sites by DDMA.
- DDMA would be responsible for effective and transparent relief distribution including relief provided by Provincial Disaster Management Authority (PDMA), National Disaster Management Authority (NDMA) and other Humanitarian Agencies.
- All stakeholders would take necessary actions to facilitate early recovery and rehabilitation of affected population.
- In case the district falls short of meeting the humanitarian needs, PDMA will assist by making available the required stocks. In case when disaster exceeds capacities of the provincial government, NDMA will be requested to make available the additional stocks from national reserves, prepositioned across the country.
- When required, Armed Forces may be requested for assistance by PDMA Sindh at any stage, particularly for rescue, evacuation and emergency relief phases. Thus, the DDMA will have to submit the request to PDMA for assistance of armed forces in aid of civil administration.
- Special requirements of Aviation / Naval support by any agency will be coordinated by PDMA.
- Resources of Government Departments and Agencies such as, Pakistan Red Crescent Society and domestic philanthropy may be requisitioned, if the intensity of the situation so entails for an effective response.

- **Early Warning**

Pakistan Meteorological Department

- Pakistan Meteorological Department (PMD) has a broad mandate of supporting agro-based economic activities, air and maritime traffic safety, disaster mitigation efforts and disseminating weather forecast to numerous end users. PMD will ensure the following during monsoon season:
- Inform public on the weather forecast and issue warning in case of potential threat like Rainfall.
- Collect rain data on a regular basis, consolidate and share it with all concerned.
- Disseminate flood information to the NDMA/PDMA on a daily basis during flood season.
- Share weather forecasts and early warning information with NDMA, F/G/S PDMAs, and the media on a regular basis in the monsoon period.
- Coordinate with FFC, WAPDA, PCIW, FFD, and SUPARCO in the Monsoon period to generate flood warning where wanted.

I. Flood Forecasting Division (FFD)

- FFD is an affiliated organization of PMD. It disseminates flood early warning and river flow updates to relevant National, Provincial and District Governments and National Response Agencies, especially in the context of Monsoon Season.

II. Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)

- SUPARCO deploys its satellite imagery capacities for disaster impact mitigation and for early warning of disaster occurrence and trends monitoring. SUPARCO will play the following role during monsoon season:
- Provide remote sensing and satellite maps before and during disasters in order to show their impact.
- Provide remote sensing and satellite maps for hazard risk zones to enable relevant agencies to take measures for minimizing damage to population and property.
- Assist post-disaster damage assessment.

III. District Disaster Management Authority (DDMA) Response

- DDMAs shall activate District Emergency Operation Centers (DEOCs)
- In the event of a disaster, organize emergency response through the District Emergency Operation Center (DEOC)
- Setup early warning mechanisms and dissemination of proper information to public, prepare district level response, plans and guidelines, establish stockpiles of relief and rescue material; provide information to PDMA on different aspects of Disaster Management.
- Inform/update PDMA regarding the overall situation.
- Organize evacuation on priority basis.
- Conduct initial and subsequent assessment of disaster affected areas and determine the extent of loss and damage.

- Collect information on damage status and promptly plan for the resources requirement for relief operation and share it with the PDMA.
- Provide food, drinking water, medical supplies and NFIs to the affected population
- Preferably, set up tent cities / relief camps on open land and provide relief to the affectees in camps.
- Coordinate with PDMAs to deploy resources for emergency response.
- Mobilize community volunteer groups and civil defense for emergency operations.
- Forward timely situation reports (SITREP) on daily basis to PDMA for its timely dissemination to concerned quarters.
- Ensure registration of all relocated population in the camps and overall affected population on gender-segregated basis.
- Prioritize vulnerable segments of society in their relief operations.
- Facilitate early return of relocated population and help in restoring their livelihoods.

12.1 Health Department

I. Pre-Disaster

- Provide specific information required regarding precautions for epidemics
- Establish a health mobile team in district & town headquarter hospital
- Setup an Information Center to collect and share information amongst relevant stakeholders.
- Collaboration with relevant organizations/partner NGOs.
- Stocking of life saving drugs and vaccines.

II. During Disaster

- Providing emergency treatment to the affected
- Provision of First-aid & water testing kits, chloramines and anti-snake venom serum & other emergency support
- Deployment of mobile medical teams & health staff
- Collaboration with all relevant stakeholders

III. Post Disaster

- Establishment of medical camps, vaccination, ensuring safe food & water in camps
- Conduct impact assessment on health, intervene to stop outbreak of diseases
- Rehabilitation of health infrastructure

12.2 Education Department

I. Pre-Disaster

- Providing the necessary information, training to teachers & students regarding disasters with tips to save their families & themselves during disaster.
- In collaboration with Civil Defense and Boy Scouts / Girl Guides Association and gear up the volunteer's force.
- Educate students about Healthcare Precautions

II. During Disaster

- Mobilize the human resources for intervention during disaster
- Arrangement for evacuees to setup relief & temporary shelter camps
- Deployment of volunteers for camp management & emergency support

III. Post-Disaster

- Assessment of damages & needs of affected educational institutes
- Rehabilitation of affected educational institutes
- Continuing education of children at camps and helping them to recover from shock by providing toys etc.

12.3 Agriculture Department

I. Pre-Disaster

- Assessment of high risk prone areas and estimation of possible damage
- Create community Seed Bank at UC level
- Regular surveillance of Irrigation water supplies
- Close coordination with Meteorological Department & other stakeholders for weather information.
- Testing, functioning and pre-positioning the available machinery.

II. During Disaster

- Immediate mass awareness and update of situation
- Arrangements for relief & temporary shelter camps in canal rest houses
- Vigilance for protection of agriculture crops.
- Immediate activation of machinery and equipment.

III. Post-Disaster

- Assessment of damages & needs of affected crop area and submit to DDMA
- Assistance in repair & rehabilitation of Irrigation Systems.
- Timely compensation to affected farmers
- Mass awareness campaigns regarding epidemics & diseases to crops

- Inform the affected population regarding the land use and crop management on damaged/devastated areas.

12.4 Livestock and Fisheries Department

I. Pre-Disaster

- Estimation of possible damage
- Mass awareness regarding precautions
- Close coordination with agriculture, irrigation, meteorological department and other stakeholders.
- Vaccination of livestock.
- Stocking of fodder and vaccines.

II. During Disaster

- Update local communities of ongoing situation.
- Provide livestock vaccination
- Arrangements for relief and transportation of livestock.
- Provision of fodder for livestock in affected area.

III. Post-Disaster

- Assessment and submission of damages and need of affected livestock to DDMA
- Timely compensation to affected livestock owners
- Mass awareness campaign regarding epidemics & diseases to livestock

12.5 Planning and Development Department

I. Pre-Disaster

- Gathering statistical data regarding possible damages and recovery needs from all relevant departments
- Plan and identify potential resources
- Facilitation to other department in planning

II. Post-Disaster

- Gathering statistical data regarding actual damaged and recovery needs from all relevant departments
- Plan and Identify potential resources
- Facilitate other departments in planning and execution of rehabilitation in cost effective manner
- Coordinate with all line departments

12.6 Revenue Department

I. Pre-Disaster

- Assessment of high risk prone areas and estimation of possible damage and needs for recovery.
- Arrangement of financial resources.
- Identification of high grounds for establishment of tent cities.

II. During Disaster

- Establish relief distribution centers/camps and accept relief donation/relief support
- Timely release of funds to DDMA.

III. Post-Disaster

- Assessment of damages to industrial/business, crops and livestock and settlement of applicable taxes accordingly.
- Support DDMA in conduct of authentic damage assessment and compensation need.

12.7 Police Department

I. Pre-Disaster

- Information dissemination through "15 helpline service" to local residents
- Deploying and giving security cover to government agencies, which are working/preparing for the monsoon season in areas where law and order is not good.

II. During Disaster

- Providing easy access and security to rescue and relief teams.
- Maintain law and order and divert traffic on alternative safe routes as and when necessary.
- Maintaining law and order and provide security to relief stockpiles and camps.

III. Post-Disaster

- Ensure security to workers of NGOs/INGOs
- Provide security in unsafe areas
- Facilitating institutions/NGOs/INGOs, which focus on rehabilitation activities.

12.8 Civil Defense

I. Pre-Disaster

- Information sharing regarding technical and personnel expertise with DDMA.
- Conduct training for volunteers in first aid & other activities
- Effectively train & mobilize volunteers and initiate mass awareness regarding necessary first aid rescue activities

II. During Disaster

- Deployment of volunteers at the disposal of DDMA for Rescue, Evacuation and initiated basic first aid.
- Communicate to DEOC any additional resources required for performing rescue and evacuation activities
- Taking precautionary measures to stop fire incidents in camps and perform firefighting in emergency.
- Management of relief camps where required.

III. Post-Disaster

- Identify gaps and make plan to overcome weaknesses
- Assisting District Administration and other Line Departments in Rehabilitation works

12.9 Civil Society And Private Sector Response[54]

The response of civil society organizations and the private sector to floods should be rapid and extensive. Local NGOs, will work extensively with the Government to provide emergency relief support provisions which include ration packs, water purification kits and tablets, shelter items (including tents, blankets and mosquito nets), sanitation kits and hygiene supplies, doctors and medical supplies, mobile and basic health care units especially for women and children. A particular focus will be placed on healthcare services to avoid the spread of water- borne infections and other disease and to provide basic health care services. Media on their part will cover the event extensively and play a significant role in raising awareness and mobilizing local and international resources for the disaster. Individuals and organizations from the private sector, both from Pakistan and the global community will contribute significantly to the flood relief effort alongside the government and donor community.

12.10 Scouts

I. Pre-Disaster

- Nominate the scouts, which can be trained to handle flood emergencies
- Training will be imparted in the scouts regarding boat handling and first response to the affected during the emergency.

II. During Disaster

- Trained scouts will be deployed/placed at the disposal of Deputy Commissioner
- The scouts will perform the duties as per training and will report to respective Deputy Commissioner

III. Post-Disaster

- The trained scouts would continue to impart the training in other scouts and volunteers in the district.

[54] Government of Sindh Rehabilitation Department Provincial Disaster Management Authority, 2012. Sindh Provincial Monsoon/Floods Contingency Plan, Karachi: Government of Sindh

12.11 Standard Operating Procedures (SOPS)

- The Deputy Commissioner shall keep close liaison with all departments like Local Government, Health, Agriculture, Civil Defense, Irrigation, Works & Services, Education & Literacy, Police & other Law Enforcement Agencies. Meetings in this regard are to be held on regular basis with concerned departments and minutes are to be shared with DDMA.
- If there is likelihood of heavy rains, flood emergency would be declared in the District and all government functionaries and NGO's would be kept on high alert.
- Control rooms would be established at District and Taluka level in the offices of the Deputy Commissioner, Assistant Commissioner, Qanoongo (Revenue) and all other line departments during the emergency. These control rooms shall function round the clock.
- The Executive Engineer Irrigation will establish round the clock control room in his/her office for making liaison with all concerned & activate contingency plan of the department. They shall identify the vulnerable points of the irrigation canals and intimate DDMA. Executive Engineer will be in touch with DDMA and the Meteorological Department and inform the concerned agencies about any development emergency. He/She will make special arrangements for watching and patrolling of vulnerable points.
- Immediate arrangements for necessary machinery, sand bags and other material to be used for strengthening of embankments of canals and plugging breach shall be ensured and availability of communication network must be made at all vulnerable points.
- The Executive Engineer Irrigation shall ensure regular, timely and proper de-silting of all canals, distributaries, drains, sub-drains and submit a certificate to his/her higher authorities with an information copy to DDMA.
- The Deputy Commissioner shall ensure activation of Central District Control Room and already established control rooms at each Qanoongo (Revenue) Offices round the clock, under the supervision of Assistant Commissioner concerned. They shall also ensure preparedness at proposed relief camps and ensure immediate evacuation of people residing in low-lying areas to safer place / relief camps, if required. He/She shall also make immediate arrangements for the availability of sufficient quantity of relief material like food, blankets, tents, plastic sheets etc.
- The Deputy Commissioner shall constitute Supervisory Committee for relief works at district level.
- The Deputy Commissioner must further ensure that special attention is given to disabled people, women and children and extra ordinary measures are taken for such purpose.
- The Deputy Commissioner shall nominate the Assistant Commissioner as focal person to coordinate with the Taluka and Town level local council for drainage of accumulated rainwater.
- The Assistant Commissioner shall be focal person in Taluka for the entire operations of rescue and relief. He/She must ensure the respective arrangements for tractor trolleys and labor in coordination with Civil Defence, Boy Scouts Association and Police Department if needed and

mobilize the village staff in the pre-and-post emergency work. He/She shall also ensure proper distribution of relief material among the actual needy persons.

- The Executive Engineer Irrigation Department shall ensure availability of bulldozers, excavators and earthmoving machines in sufficient quantity and in proper working condition in case of emergency.
- The Director Agriculture shall arrange for protection of standing crops from damages and diseases that may be caused from the stagnant rainwater in the fields. He/She shall manage required machinery from mechanical wing and must have the inventory of such machinery and equipment.
- The Deputy District Officer Livestock and his/her staff shall ensure safety of livestock from flood diseases and losses and Veterinary Officer shall ensure regular and timely vaccination of cattle in the district. They shall make all necessary arrangements for fodder for the livestock to be shifted from marooned areas.
- The Deputy Controller, Civil Defense should ensure the enrolment of volunteers as early as possible in order to avoid any chaotic situation during emergency. He/She will continuously remain updated of weather forecast reports and with meteorological departments and will arrange for warnings in emergency through sirens, loudspeakers and media at Taluka and town level. He/She shall ensure presence of the volunteers and scouts for rain relief and rescue activities in case of any emergency.
- The Deputy Director Food shall ensure availability of sufficient stock of wheat and other grains and shall coordinate with Deputy Commissioner for supply of food grains from local food grain dealers in case of need. He/She will also ensure that no stocks of government wheat, placed at depots, are damaged due to water accumulation, fire or rioting.
- The Divisional Engineer Telephone should ensure full function ability of telephones all over the district and provide assistance to all departments on demand at the time of need.
- Continuous supply of gas and proper safety of gas lines in the district must be ensured. Immediate repair work should be performed in case of any damage to the gas lines.
- The Deputy Commissioner shall ensure mobilization of the NGO's and business community in the rescue and relief activities in case of emergency and shall depute volunteers on different emergency tasks.
- The Regional Director Information shall keep close liaison with all control rooms of the district to provide correct and exact information to media regarding emergency. He/She shall also arrange briefings about the latest situation in case of emergency.
- The Red Crescent Society and other welfare associations and NGO's of the district shall provide food packets and other required material to the affected persons in relief camps in case of emergency.
- Proper arrangement for lifting of trees fallen due to heavy rain and gusty winds from the main roads shall be made by the Executive Engineer Provincial Highways department.

- The in charge Utility Store Corporation shall ensure the availability of sufficient stock of edible items in case of need.
- The Revenue Department shall also conduct the survey of any loss of life, houses, cattle, standing crops and other infrastructure after the disaster. In the event of the highest degree of emergency, Pakistan Army may be requested to help the district administration in rescue and relief operations.

12.12 Implementation and Monitoring

Indicators:

I. Quantitative Indicators

OECD (2002) defines an indicator as a ‘‘quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor.’’ Quantitative indicators are numerical representations of complex phenomenon. Quantitative indicators can be useful in determining the level of achievement at all stages of a resilience project and can even be used to measure the strength of resilience characteristics, though this is better attained by using qualitative indicators[55].

II. Qualitative Indicators

Qualitative indicators evaluate the quality of a plan using subjective data (relying on people instead of instruments). Many qualitative indicators use a 1-5 scoring system, however, this is not the only way; Sovacool (2012) points out that indicators could ‘‘rely on a simple scoring technique of ‘positive,’ ‘negative,’ or ‘neutral,’ as in a given metric can worsen, improve, or stay the same over time.’’

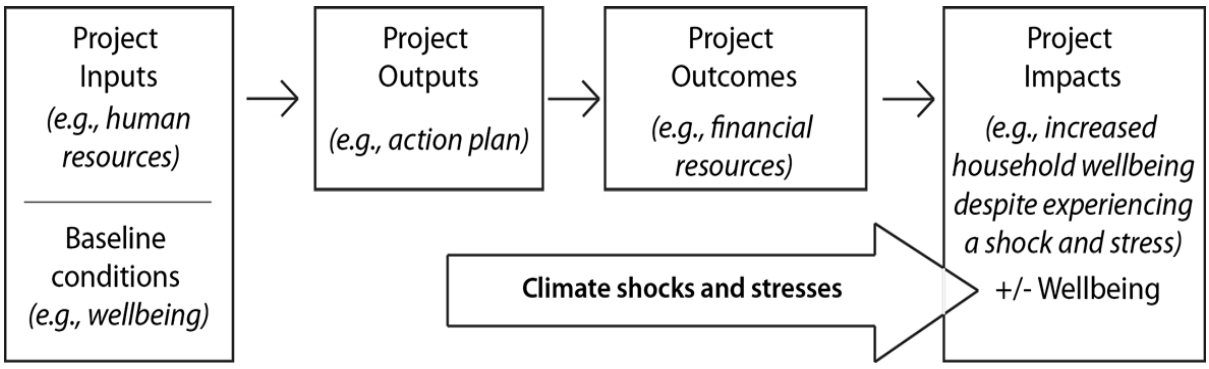


Figure 12:1 Four phases of a resilience initiative, and the timing of baseline and post-shock measurements of wellbeing (Brown, et al., 2018)

These qualitative values can be used to create baselines and/or to indicate that a particular resilience impact/outcome has been achieved. The challenge with a qualitative indicator that uses a scale from 1-5 is that the scale should be created based on criteria that is fair and well informed.

III. Process Indicators

[55] Brown, C., Shaker, R. R. & Das, R., 2018. A review of approaches for monitoring and evaluation of urban climate resilience initiatives. Environment, Development and Sustainability, 20(1), pp. 23-40

There are many processes that underlie resilience planning and action, and process indicators outline the extent to which these processes have been undertaken. Moser and Boykoff (2013) write that given the challenges (e.g., attribution) in adaptation and resilience measurement, ‘‘tracking and evaluating the adaptation process—with all of its individual components (e.g., assessment, planning, stakeholder engagement, decision-making, implementation, institutionalization, monitoring, and social learning)—becomes at least as important as the questions of success in outcomes’’.

An example of a process indicator is the level of participatory involvement in resilience decision making. If one’s definition of resilience encompasses participatory involvement, then the extent to which this has been applied can be used as a process indicator. This can be assessed qualitatively (on a scale of 1-5) or quantitatively (number of stakeholder types represented).

IV. Impact Indicators

Determining the impact of resilience initiatives is a bit difficult, as these impacts are often difficult to interpret or understand and can often not be measured until after a disaster, or at least until the slower onset effects of climate change have started to occur (e.g. sea level rise). One approach could be to assess the process and outcome indicators and inferring from the results that climate change resilience has been reasonably ensured.

Wellbeing and financial losses after a disaster are the two most important climate resilience indicators that can help to assess the success of climate change resilience initiatives. By evaluating these indicators, evaluators can gain an insight to the effect of climate change resilience initiatives on the community. By assessing these two indicators, a city can determine whether it has the adaptive capacity to remain resilient in the face of shocks and stresses resulting from climate change.

V. Identified Indicators[56]

Collection of Data to Perform Vulnerability Assessments to Floods

- Number of exposure and socio-economic datasets on current exposure to floods at district level.
- Geographic coverage of all datasets (% of all exposed areas).
- Number of reports detailing data collection and summarizing information.
- Number of policy and technical documents based on datasets and modeling scenarios.

Building Technical Capacity to Generate Vulnerability Assessments to Floods

- Number of technical staff trained to acquire competence in computer modelling techniques and able to perform Vulnerability Analysis (VA).
- Average staff performance on end-of-training comprehension tests.
- Proportion of ministries using datasets to generate vulnerability analysis or proportion of sectors covered by analysis at district level.

[56] McCarthy, N., Winters, P., Linares, A. M. & Essam, T., 2012. Indicators to Assess the Effectiveness of Climate Change Projects, Washington DC: The Inter-American Development Bank

- Number of policy and technical documents incorporating results from VA's.
- Proportion of government investment/program documents using results from VA's as a priority-setting or screening tool.

Institutional Framework and Mechanisms to Support Adaptation and Adaptive Capacity

- Number of laws and regulations created or amended to clarify land and carbon property rights.
- Existence of a dispute resolution mechanism.
- Number of materials (presentations, briefs, papers) developed for legal literacy programs.
- Number of people participating in legal literacy programs.
- Number of individuals and community groups participating in Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+) financed projects.
- Average number of days and money spent in REDD+ project preparation.
- Total value of REDD+ projects and value per participant.
- Percentage reduction in production variability from forest-based activities and/or farm production at the forest margins.
- Number of early warning and health hazards dissemination outlets, by type of outlet (e.g. radio, newspaper, and website), geographic coverage, level of disaggregation of system information (e.g. district-specific).
- Percentage languages used in dissemination materials of total number of languages spoken in district.
- Number of extension materials containing climate change-relevant materials.
- Percentage change in government budget allocations towards climate change information dissemination.
- Percentage reduction in property damage.
- Percentage reduction in mortality and in disease prevalence for diseases related to weather patterns (e.g. malaria, dengue).

Investment in Projects that Directly Support Adaptation and Improve Adaptive Capacity

- Percentage increase in the number of seed varieties developed, documented and made available in the market.
- Documentation of seed varieties and their characteristics.
- Documentation of procedures and partnerships created to transfer seeds either directly to farmers or to market traders.
- Percentage increase in number of seed varieties available in rural markets.
- Number of climate resistant seed varieties available in the market and percentage increase in use of climate resilient seed varieties.
- Percentage crop yield improvement in years of climate extremes.
- Percentage greater performance in average crop yields.
- Percentage decrease in proportion of rural and urban populations malnourished.

- Number of energy facilities built or retrofitted to withstand greater range of climate shocks.
- Percentage of total capacity built or retrofitted by type of facility and by "threat" level identified in vulnerability analysis.
- Percentage decrease in monetary damages to energy facilities due to climate extremes (adjusted for degree, or extent, of climate shock).
- Percentage decrease in customers losing access to energy due to climate shock-induced power failures.

21.12 Responsibility of Plan Implementation

Table 12-1: Authorities Responsible for Implementation

S#	Department	Designation
1	**Administration**	District Commissioner
		Assistant District Commissioner-I
		Assistant District Commissioner-II
2	**Irrigation**	District Irrigation Officer
3	**Agriculture**	District Agriculture Officer
4	**Health**	District Health Officer
5	**Education**	District Education Officer
6	**Social Welfare**	District Officer
7	**Livestock**	District Officer

Monitoring and Evaluation[57]

There are three ways to monitor and evaluate climate change adaptation and resilience:

- Measuring against project objectives
- Measuring against baselines
- Measuring against emerging understanding of good adaptation measures

a) Measuring against Baselines

Baseline comparisons can be used to monitor and evaluate the effectiveness of climate resilience initiatives. During this process, an initial measurement is taken (e.g., number of civic organization per 10,000 people). This measurement is then taken at different stages of the project to measure the effectiveness of strategies used to improve that particular indicator. This approach could be applied to

[57] Brown, C., Shaker, R. R. & Das, R., 2018. A review of approaches for monitoring and evaluation of urban climate resilience initiatives. Environment, Development and Sustainability, 20(1), pp. 23-40

resilience characteristics (e.g. flexibility). In order to do this, a more qualitative assessment (subjective scoring from 1 to 5) could be employed to create a baseline value.

b) Measuring against Definitions

Relatively straightforward definitions exist for climate adaptation, but in the context of resilience – with its emphasis on system level interaction and inherent qualities – this approach can prove to be much more difficult. How you define resilience is a key determinant in how the monitoring and evaluation approach will be adopted. For example, if resilience is defined as a decrease in post-disaster recovery time, specific indicators will be evaluated which would not be useful when concerned with the resilience characteristics with cities.

c) Measuring against Project Objectives

As mentioned above, the objectives of a resilience program differ depending on the way resilience is defined and also at which phase of the project the assessment is being made. Alexander et al. (2016) define process as the ‘‘inputs, throughput and outputs of the decision-making process,’’ outcomes as ‘‘the implementation of the outputs from the decision-making process’’ and impact as ‘‘the resulting effect of the decision-making process and outcome’’. Similarly, Spearman and McGray (2011) use the following sequence: inputs, initiatives, outputs, outcomes, and impacts. Monitoring and evaluation can take place at each of these temporal locations (i.e., process, outcome, impact). Many people also advocate that monitoring and evaluation be carried out throughout the duration of the project rather than just at the beginning and the end of the project.

d) Key Principles of Monitoring, Evaluation and Reporting System[58]

- **Use of Mixed Methods**

The monitoring and reporting system combines quantitative and qualitative methods to collect and analyze data, and generate knowledge and lessons in implementing the plan.

- **Ownership**

District focal points for each sector (mentioned in the table above) are responsible for collecting, aggregating and submitting their reports annually to the District Administrative Unit.

- **Stakeholder Engagement**

Empowering stakeholders and ensuring their active contribution to the monitoring and reporting process is a key feature of the monitoring and evaluation system. The monitoring and reporting system is rooted in the desire to maintain a programmatic approach in the implementation of the investment plans through projects and programs. It aims to engage the stakeholder groups, including government institutions at national, sub-national and local levels, as well as civil society, local communities and the private sector, in discussing progress with the implementation of the monitoring plan. The monitoring and reporting process

[58] Williams, A., 2016. Options for Results Monitoring and Evaluation for Resilience-Building Operations, Washington DC: World Bank Group

will also be used to share lessons learned and discuss the challenges encountered with a view to identify feasible solutions.

- **Learning by Doing**

Monitoring and reporting is an iterative learning process. It is expected that the quality of monitoring will improve over time as the authorities gain experience.

13. URBAN LAND MANAGEMENT

13.1 Introduction

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.

13.2 Goals

As most of towns in Sindh strive to become centers of global production, trade and development, they are increasingly concerned with improving their attractiveness for foreign direct investment and employment generation. For example, towns must have efficient spatial structures, adequate infrastructure and urban services, affordable housing and healthy environments. Effective urban land management is required to promote urban regeneration and development of new industrial and commercial districts, investments to upgrade and expand critical infrastructure systems, programs to enhance and protect the environment, and initiatives to upgrade social overhead capital (housing, education, healthcare).

13.3 Objectives

To implement these initiatives for Jamshoro, there is a need to develop urban land management strategies to provide land for industrial and commercial development, to facilitate the formation of public-private partnerships, and to finance the provision of infrastructure and social overhead capital investments. Unfortunately, in many cities around the world such strategies do not exist and foreign investment is either stifled or, if it does take place, causes significant adverse side effects.

Cities and towns are crucial to the economic well-being of Sindh. For this, it is imperative that its cities and towns are transformed and pressures of new growth are dealt with so that they are more liveable, efficient, and environmentally sustainable. Only then will the rapid pace of economic growth that Sindh is

undergoing be sustained and the targets of environmental sustainability achieved. To manage the transformation of Sindh's cities and towns and effectively manage new growth requires effective urban planning protocols, processes, and institutions underpinned by effective legislation. To effectively manage the new growth implies that the agricultural land at the periphery of the cities and towns or smaller settlements that are not yet "urban" is transformed to be made suitable for urban or non-agricultural uses. This essentially means that the irregular landholdings and plots will have to be given regular shapes; they must be ordered; each plot must be given access; infrastructure services such as water supply and drainage must be provided; land must be appropriated for providing roads, parks, social amenities, and low-income housing, development controls must be prescribed to result in a good quality-built form and levy development or betterment charges to offset the cost of developing the physical and social infrastructure. But most importantly, all of this must happen in a timely and such manner that it is acceptable to the "landowners" to avoid conflict in the growth management process.

13.4 Urban Land Management in Jamshoro

Due to absence of provincial policy / framework for utilizing Urban Land especially in District headquarter towns, planners / development authorities have not carefully assessed the land use and transportation impacts of foreign investment. Due to non-existence / less effectiveness of Development authority mechanism, schemes / projects in private sector faces low exposure due to non-availability of basic facilities and monitoring mechanism by approval authority. As a result traffic congestion and infrastructure problems with the water supply and sewerage treatment are mounting.

Getting access to land for factories and commercial facilities is problematic, particularly in agricultural rich fertile land. Decades of inefficient allocation of land for industrial uses have literally blighted / dis-courage agricultural activities in the region. Unfortunately, a lack of clarity over land rights, corruption and bureaucratic inertia are impeding redevelopment. To compound matters, land use plans in many transition economy towns have not been planner to reflect the new land use requirements necessary to support post-industrial development.

To effectively exploit the benefits of inward investment flows and to ensure that social and environmental goals are met, the public sector needs to take the lead in planning and formulating urban land management strategies to promote sustainable urban economic development.

13.5 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.

13.6 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, 1894 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 1894. 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.

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%).

13.7 City Survey

City survey is very important to manage land records for city. City survey will help to resolve present hassle in property transactions besides impeding planning & development. It will also help to resolve several issues i.e. Verification of ownership & Land grabbing issues respectively. Therefore it is suggested to conduct city survey & deal as separate project for Jamshoro.

13.8 SWOT Analysis and Need Assessment

Strength	Weakness	Weakness	Threats
GOVERNANCE			
13.9 Planning Actors			
1. Politicians 2. Existence of Local government 3. Public Health Engineering Department	1. Lack of co-ordination among departments. 2. Weak technical support of government departments. 3. Weak financial base of departments. 4. Absence of development authority. 5. Shortage of technical staff, town planners, urban designer and policy makers at SMC, Regional Office of SBCA) 6. Overlapping of administrative functions 7. Need based ad-hoc planning system (day-to-day basis)	1. Strengthen the institutions, responsible for planning and execution 2. Immediate preparation of overall urban development strategy 3. Detailed land use zoning plan 4. Sectoral development plans 5. Detailed subject plans to regulate with density development. 6. Enhancing the role of local government on sustainable basis.	1. Inaccurate funding in development projects. 2. Wastage of local resources 3. Infrastructure development of poor quality, non-standard infrastructure. 4. Failure to provide technical support on issues required innovation. 5. May give birth to unwilling political interference and hidden interests based on nepotism and discrimination.
Coordination of Public Agencies / Department			
1. Town Committee / Taluka Municipal Administration 2. Politicians in charge	1. Weak co-ordination mechanism.	1. Preparation of local co-ordination standard procedures through policy frameworks.	1. Week coordination may give birth to poor governance. 2. Political interference

Strength	Weakness	Weakness	Threats
3. Participation of Sindh Building Control Authority (SBCA)	2. Lack of information sharing between line departments.	2. Organizing events to make strong coordination between different departments.	
Local Council			
1. Availability of Town Committee.	1. Not actively pursuing the stated objectives.	1. With awareness and training of councilors the local councils can be more effective. 2. Workshops and meetings can enhance the coordination as well as clear the vision about development perspectives.	1. Confusion and chaos in the local development affairs at present until local bodies are established.
Financial Resources			
1. Institution and system are in place. 2. Regular provincial grants available for development project. 3. Programme based medium-term donors funding.	1. The council does not affectively generate funds. 2. Less efforts offer by local councils for revenue generation through available local resources. 3. High dependency on provincial grant. 4. Lacking capacity in collection and financial management. 5. Very low capacity for capital investment in development projects.	1. Self-sustainable financial system needs to be effectively introduced. 2. Development of self-reliance and suitable financial model. 3. Resource generation through PPP. 4. Exploitation of local potentials for resource generation. 5. To curb mismanagement and corruption.	1. Poor maintenance of infrastructure relating utility services. 2. Political pressure and financial leakages. 3. Lacking M&E and implementation of strict accountability measures during audits.

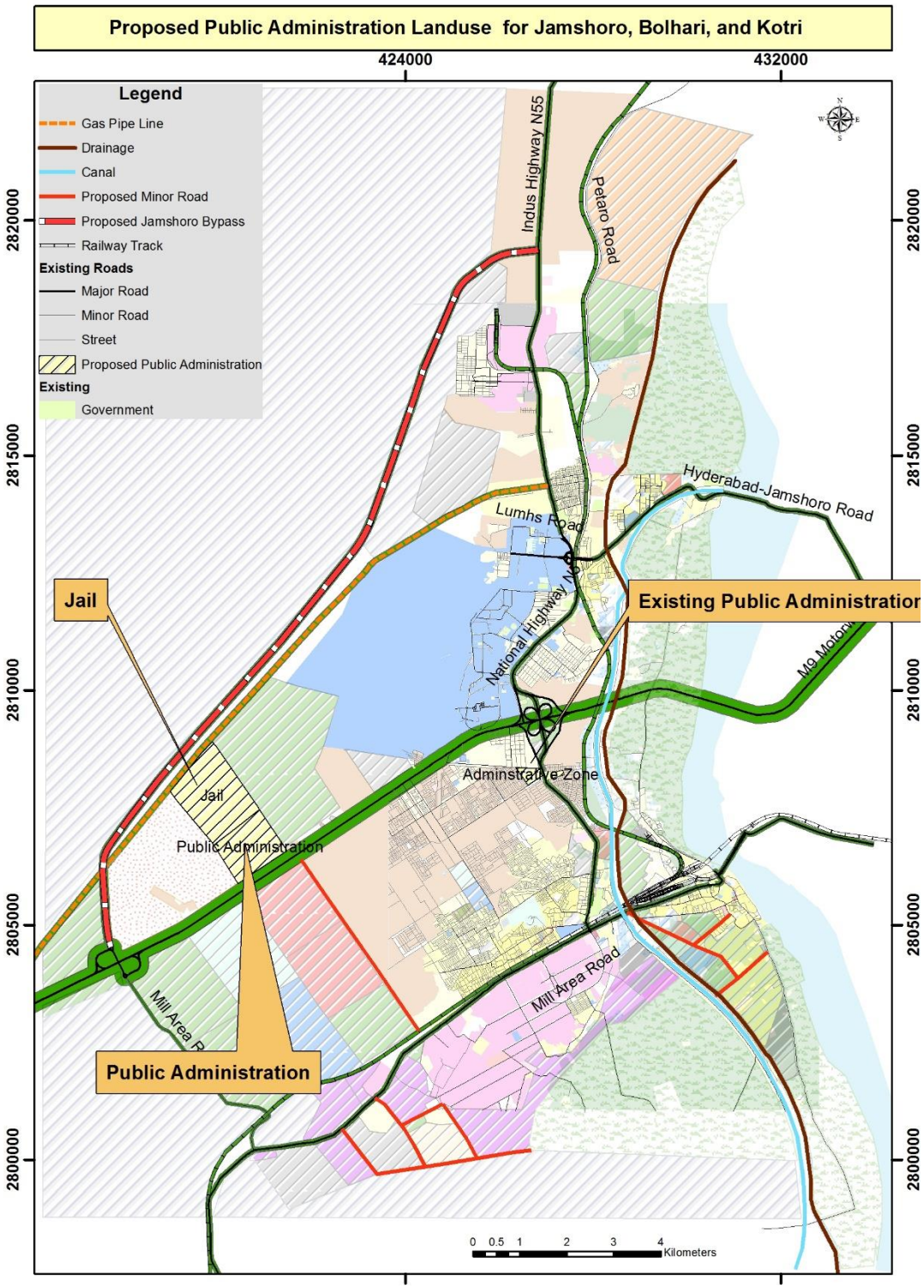


Figure 13:1: Future Administrative Proposal of Jamshoro DHQ Town

14. IMPLEMENTATION STRATEGY

This part of the report aims to provide an implementation framework for various development proposals recommended in 'Strategic Development Plan' to drive future growth of Jamshoro DHQ town up to 2037, under the present governance framework of Government of Sindh.

14.1 Process of Implementation

The implementation of development plan is basically the process of prioritizing, phasing, coordinating, budgeting, scheduling, monitoring and making adjustments. There are number of management systems and charting procedures available to help a city manager to control this process. Issues that must be addressed in this regard are:

- Determine priorities within and among the sub plans
- Determine the phasing or sequence of activities among the sub plans.
- Address timeframes and budget availability
- Creating master schedule of activities with a progressive cost table so that the program can be appropriately expanded or contracted to meet implementation contingencies and budget fluctuations.
- Assign the various activities to be undertaken by qualified managers.
- Establish a timely monitoring and report system to keep the city officials and the public informed of progress and activities.

14.2 Implementation Agency

The office of the Deputy Commissioner and in case of Local Bodies/Local Government, the Chairman of district council and Mayor of metropolitan city will be the key implementation agency to execute Strategic Development Plan Jamshoro 2037.

The Government of Sindh would take responsibility of implementing various development proposals by utilizing its maximum resources and by engaging various public offices of government of Sindh, established in Jamshoro The concerned agency must ensure that the overall process must go after following themes of implementation process.

a) ***The overreaching theme of the implementation of Strategic Development Plan Jamshoro is:***

- Consultation with stakeholders during implementation at all levels.
- Decentralize decision making to the greatest extent possible.

- Promote transparency and accountability of decision making and implementation enforcement.
- Rationalize impacts where necessary;
- Ensure compensation to affected communities
- Enhance the quality of infrastructure provisions, promote utility services opportunities, and focus facilitating poor segments of society.

b) ***The principals that implementation process will follow:***

- The overall implementation process to be carried out in coordination with Town Planning and Urban Development Standards (Frameworks) in which redevelopment will be phased to prioritization;
- The implementation process will be based on updated planning codes and regulations;
- Special consideration will be paid to implement planning standards relating to disaster (Drought) preparedness in all development proposals/projects;
- Facilitate communities, government machinery, and other organizations of community to participate in overall implementation process;
- Educate stakeholders for technical assistance;
- Be comprehensive, coherent, and coordinate to avoid errors through continuous monitoring and evaluation
- Arrange supple of financial resources

14.3 Legal Frameworks

Local governance agencies dealing with any development proposal must ensure that all development related activities and their approval consent should be carried out in accordance with urban planning statutory frameworks of government of Pakistan operational at all government level levels. This includes all legal frameworks substantiated through the relevant articles of constitution of Pakistan and the primary act (LAA 1984) governing land acquisition and compensation.

a) ***National Level Policy Frameworks***

The constitution of the Islamic Republic of Pakistan passed on the 10th April 1973 and as modified thereafter, is the supreme law of Pakistan Government. This constitution provides legal cover to all laws and acts, particularly those embedded in chapter-3 pertaining with land acquisition, development and compensation.

b) ***State level Statutory Frameworks pertaining to planning and development Control***

On 14th Feb 2011, the government of Sindh notified the extension of the jurisdiction of Karachi Building Control Authority to the whole of Sindh. The five Regions of Sindh Building Control Authority notified by the Government of Sindh are: **Karachi, Hyderabad, Mirpurkhas, Sukkur & Larkana,** having the Head Quarter **Karachi. Thus, any development activity within juridical boundary of these districts must be carried out in accordance with the primary planning instrument ' *Sindh Town Planning and Building Control Regulation'*.**

c) *Local Planning Instruments*

There is variety of regulations dealing with municipal services offences and penalties (Fines) in case of violation have been constituted in Schedule-VI (Section 139) 'Offences under the Act' Part-1 of Local Government Act-2013 (Third Amendment 2016) of Sindh Government.

In this regulation, various well defined public activity management and control regulations dealing with Public Health Safety, Land use Planning, Development Control, Encroachments, preparedness of safety measures from Natural & manmade disaster, quality of Drinking water, Solid Waste & Waste Water generating though multiple activities, Preservation of Heritage Sites, Open Space management and associated penalties, in case of violation, have been defined in detail.

d) *Other relevant planning and design standard instruments*

There are varieties of other documents that support assessment of development proposals prior to implementation. e.g. 'National Reference Manual' - Ministry of Housing and works, Environment and Public Affair Division, etc.

If regularization requirements of any of development proposal is beyond the capacity of regularity frameworks mentioned above, the concerned agency dealing with development/implementation process in Jamshoro DHQ may develop their own regulatory frameworks/ building codec's to regularize the status of development with consent of local/provincial government authorities, if necessary.

14.4 Institutional Enhancement

While implementing the Strategic Development Plan "SDP', the respective Provincial and District Government may seek technical assistance from all the line department i.e. DUP&SP, Local Development Authority, Municipal Corporation, secretariat of Commissioner and Deputy Commissioner.

The "*Project Implementation and Management Unit*' will mainly consist of urban planners supported by other technical staff; architects, project managers, engineers, finance officers and any other technical staff expert in their relevant fields.

The "*Project Implementation and Management Unit*' shall supervise and coordinate respective urban developers involved in development activities, conduct monitory audits, preparer evaluation and impact reports and will report to the head of respective governance agency.

Development authorities will be responsible for implementing new approved town planning and building codes with the assistance of office of head of respective governance agency. The office of district coordinator will be responsible for the overall coordination and monitoring and will provide support for development/redevelopment activity from federal to district level.

The district "*Project Implementation and Management Unit*' would also facilitate the office of district coordinator/ deputy commission for all development/ implementation related (a) needs identification (b) revision of annual plans (c) coordination (d) financial management and (e) monitoring of all development activities assigned to developers or government departments.

14.5 Implementation Schedule

Strategy:	**Programs/ Policies**
Balanced Urban Growth	**1. Land Use Zoning** Kotri city is the best example of ribbon development. Entire city is expanding towards the north-west direction of railway track and National Highway N-5, whereas the N-E direction is purely resident and some part is mixed used (residential and commercial). Other part which is south-east, purely industrial use The administrative complex and offices are situated along national highway N-55 and national highway N-5 Road. District headquarter town can be divided into two tracts northern and southern tract. **2. Development Control** • City has started growing on both sides of Kotri-Thatta Dual carriageway road and Karachi-Kotri railway track. Mostly public projects established along the Karachi-Hyderabad Motorway M-9 and Indus Highway road longitudinally. A well know low income housing project Khuda ki Basti also present north-west of the Kotri town. • High prices of houses and developed land • Required Amendment in Zoning Bye laws • Restrict the provision of utility services for approved planned areas **3. Transportation** • The district is well-connected with other districts through good quality roads • Contribution in positive regional and local economic development • Internal road pattern of city is based on grid iron pattern. **Roads** • Need Dualization & Rehabilitation of Existing Roads.

Responsibilities to Plan: Detailed Urban Design Strategy Development Assessment Impact of property Assessment Environmental Impact Study (EIA,IEE)	**Implementation Responsibilities:** Public Sector/ Private developers
Concerned Agencies: P & D Department Government of Sindh/ District Government/ Line Departments of local Government /Private Developers	**Time of Implementation:** Short Term (1 year to 5 Years) Long Term (5 years to 20 Years)

Strategy: **Future Transport Sector Development & Improvement**	**Programs/ Policies** **<u>(A)Traffic Management Program</u>** • Parking restrictions / Charged parking system • Control traffic movement specially cargo Qingqis and Pick-ups • Manage unidirectional traffic flow. • Enforcement of traffic rules • Improved road infrastructure and street furniture • Implementation of traffic bylaws **<u>(C) Congestion Reduction in Core Urban /CBD Area</u>** • Designated stands for qingqi / rickshaws • Specified spaces for charged parking system • Alternate route for loading and unloading vehicles • Unidirectional traffic flow pattern • Removal of encroachments from major distributors • Development of infrastructure for pedestrian movement in old precinct.
Responsibilities to Plan • Enforcement of encroachment and road space improvement byelaws • Traffic corridors detailed study • Encroachment Removal & Relocation Study • On Street & Off Street Parking Feasibility Study	**Implementation Responsibilities** International Development and Fund Supporting Agencies/Public Sector/ Private developers

• Beautification plan	
Concerned Agencies Provincial Works & Services Department Government of Sindh./ District Highways Department/ Local Municipal Government/District Government/ Private Developers Line Departments of local Government.	**Time of Implementation** Short Term (1 year to 5 Years) Long Term (5 years to 20 Years)
Strategy: **Water Supply System Improvement**	**Programs/ Policies** • In the long term, piped water supply system for 100% population by 2037 • Installation of localize network in the planned housing schemes first and gradually cover the whole population in five year plans. • Reuse of treated effluent • Implementation of Tariff System for utilities through Water Metering (first for water usage above marginal consumption then in long run for all users). • Construction / Rehabilitation Of Water Supply Network • Improvement of Water Intake Works
Responsibilities to Plan • Need Assessment/Demand & Supply Study • Separate Master Plan for water supply and infrastructure development plan	**Implementation Responsibilities** Public Sector/ Private developers
Concerned Agencies Provincial / Local Government/ Public Health Engineering Department	**Time of Implementation** Short Term (1 year to 5 Years) Long Term (above 5 years)

Strategy: **Drainage & Sewerage System Improvement**	**Programs/ Policies** • Improvement and reconstruction of existing Combined system of sewerage and drainage (Phase-wise approach of replacing open drains with covered sewers of PE pipes). • Provision of wastewater treatment plant.
Responsibilities to Plan • Need Assessment/Demand & Supply Study • New Master Plan for Drainage & Sewerage services improvement.	**Implementation Responsibilities** Public sector / Private developers
Concerned Agencies Provincial / Local Government/ Public Health Engineering Department Municipality (MC)	**Time of Implementation** Short Term (1 year to 5 Years)

Strategy: **Solid Waste Disposal System Improvement**	**Programs/ Policies** • Immediate designation of walled Landfill *Site* with special attention for hospital waste disposal. • Collection and disposal of solid waste through specialized waste management companies.
Responsibilities to Plan • Disposal Generation Assessment Study • New Master Plan for Solid Waste Disposal System improvement.	**Implementation Responsibilities** Public / Private Sector
Concerned Agencies Provincial / Local Government/ Public Health Engineering Department	**Time of Implementation** Short Term (1 year to 5 Years)

Municipality (MC)/ Sindh Solid Waste Management Company SSWMB	

Strategy: **Improving Efficiency of Municipal Committee's (MC)** • Municipal Committee	**Programs/ Policies** • Acquire the required additional sanitary workers as per requirement. • Make Municipal Committee self sufficient • Strengthening Municipal Committee's Financial Capacity • In long term introduce 4R Solid Waste Management System (reduce-reuse-recycle-reject)
Responsibilities to Plan • Municipal Committee's Progress Assessment Study	**Implementation Responsibilities** Public / Private Sector
Concerned Agencies Provincial / Local Government/ Public Health Engineering Department Municipal Committee (MC)	**Time of Implementation** Short Term (1 year to 5 Years)

Strategy: **Improving Fire Fighting Capacity**	**Programs/ Policies** • 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.
Responsibilities to Plan Assessment on Municipality's firefighting potential	**Implementation Responsibilities** Public Sector

Concerned Agencies Municipality	**Time of Implementation** Short Term (1 year to 5 Years)

Strategy: **Energy (Gas, Electric Power, Energy Generation through Alternate Resources)**	**Programs/ Policies** • Development of alternative energy resources such as wind, solar and bio-gas etc. • To Improve existing infrastructure of WAPDA • Solar street lights project • Energy generation through solar panel system for residential and commercial purpose. • Installation of Gas Network for entire DHQ Town.
Responsibilities to Plan • Demand and Assessment of various energy resources. • Feasibility study for solar Park • Rehabilitation of solarized street lights.	**Implementation Responsibilities** Public/ Public Private Partnerships
Concerned Agencies • SSGC-Sui Southern Gas Company • WAPDA • Developers	**Time of Implementation** Short Term (1 year to 5 Years)

Strategy: **Health Sector** Improve access to healthcare facilities & minimize the long journeys to access basic medical facilities	**Programs/ Policies** • Check and balance to accomplished existing health care projects. • Addition of 2867 beds to achieve the target of 2 beds per 1000 district population till 2037

	• Hiring of 1248 doctors and paramedical staff to cater future population. • Installation of incinerators.
Responsibilities to Plan • Health reforms	**Implementation Responsibilities** Public Sector and Welfare Agencies
Concerned Agencies State Government/District Health Department. Provincial and District Health Department	**Time of Implementation** Short Term (1 year to 5 Years) Long Term (above 5 year)

Strategy: **Education Sector Strategy**	**Programs/ Policies** • Short term plan provision of 196 classrooms at school and college level. • Repairing of school existing buildings with furniture • Training of teaching staff • 10,043 additional classrooms (school and colleges) by 2037
Responsibilities to Plan • Education Infrastructure Improvement Mater Plan	**Implementation Responsibilities** Public Sector
Concerned Agencies Provincial Government/District Education Department.	**Time of Implementation** Short Term (1 year to 5 Years) Long Term (more than 5 years)

Strategy: **Improving Recreation Sector**	**Programs/ Policies**

	• Repairing of existing recreational facilities and completion of under construction work. • Introduce financial mechanism i.e. facility use charges, to generate revenue to make them self-sustaining. • Special arrangement for security, parking and alternate route during religious and cultural activities in the city. • Construct More Parks And Rehabilitate The Available Parks To Facilitate The People Of Jamshoro DHQ. • Construction of auditoriums and up-gradations for art councils • Conservation and Preservation Of Heritage Sites .
Responsibilities to Plan • Provisions of New Recreation sites	**Implementation Responsibilities** Public Sector
Concerned Agencies Provincial Government / Culture, Tourism & Antiquities Department/ Government of Sindh/ District / Local Government / MC/TC	**Time of Implementation** Short Term (1 year to 2 Years) Long Term (More than 5 years)

Strategy: **Disaster Risk Management**	**Programs/ Policies** • Engage all stakeholders of entire district in overall disaster rehabilitation process. • Recognize the commitment of stakeholders and the need for collaboration across all levels of government, community, industry, commerce, and government owned corporations, private and volunteer organizations and local communities within all aspects of disaster management.

	• Aligned job responsibilities of key stakeholders with job descriptions mentioned in principal guidelines proposed in *Pakistan National Disaster Risk Management Act 2010*, *National Disaster Risk Management Guidelines* and *Disaster Risk Management Plan, Sindh.* • Ensure establishment of straight relationships, trust, teamwork, consultative decision-making and shared responsibilities among stakeholders. • Develop disaster risk assessment system through statistical information, risk maps, emerging hazards information and their affects. • Adopt measures of sustainability of local communities by utilizing local resources available to avoid post disaster cataclysms (dearth, theft, spread of epidemic diseases, etc). • Promote economic sustainability after disasters.
Responsibilities to Plan • Identification of Disaster Prone Areas and Early warning and shelter homes • Development of Community Training and Drill Organization Manual and SOP. • Development Local stakeholders Roles and Responsibility SOP.	**Implementation Responsibilities** Public Sector and National /International Welfare agencies
Concerned Agencies NDMA/PDMA/ P & D department Gos/ SUPARCO/ Provincial Irrigation Department Gos/ Line departments of local government/District Disaster Management Authority.	**Time of Implementation** Short Term (1 year to 5 Years)

Strategy **Economic Development Plan**	**Programs/ Policies** • Rehabilitation of Infrastructure in existing Small Industrial Estate (roads, street lights, parking for loading/unloading goods vehicles, etc.) • Increase strategic storage through construction of cold storage / Godowns for agro products to cater drought situation. • Provide good incentives near peripheries for shifting / re-location of whole sale markets from the inner city to reduce congestion. • Encourage Local Private Investors by giving them subsidies. • Consider changing trends of crop production through periodically revise Economic Policy Framework (feasible studies for economic potentials) • Ensure measures for security / risk recovery plan for economic zone. • Market and logistics should also be added to enhance trade and commerce. • Livestock and dairy sector needs to encourage and facilitated. • Centralize wholesale markets to create connectivity with regional markets. • Drought measures
Responsibilities to Plan Feasible studies for economic potentials	**Implementation Responsibilities** Public /private developers
Concerned Agencies Provincial Government/District Government/Local Government/DHQ Chamber of Commerce and Industries	**Time of Implementation** Short Term (1 year to 5 Years) Long Term (5 years to 20 Years)

Annexure – A

Sustainable Development Goals Acceleration Plan

Sustainable Development Goals (SDGs) Acceleration Plan
Jamshoro DHQ Town

Sustainable Development Goals:

The Agenda 2030 comprises of Sustainable Development Goals (SDGs) which are a call for action by all countries – poor, rich and middle-income – to promote prosperity while protecting the planet. They recognize that ending poverty must go hand-in-hand with strategies that build economic growth and address a range of social needs including education, health, social protection, housing and job opportunities, while tackling climate change and environmental protection.

The 17 goals of SDGs provide a direction for targeting human prosperity and have a global scope – applying on both developed and developing countries. SDGs have come into action since the beginning of 2016 and will continue as the leading global development agenda until 2030. The SDGs targets are defined as aspirational, with each government setting its own national/subnational targets while considering its circumstances and priorities. In consultation with stakeholders, governments are also to decide how to incorporate SDGs in its planning processes, policies and strategies, and to recognize the link between sustainable development and other relevant ongoing processes in the economic, social and environmental fields[1].

Pakistan signed the international agreement on the 2030 agenda in September 2015 during the United Nations General Assembly (UNGA) Session for sustainable development, committing to achieve the 17 SDGs between 2016 and 2030. In February 2016, under a unanimous resolution, the National Assembly of Pakistan endorsed SDGs as Pakistan's national development agenda. The country has thereafter made rapid progress in adopting and formally launching the 17 SDGs.

SDGs in Sindh:

In line with the National Initiative on SDGs, Government of Sindh (GoS) has also made focused 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 GoS 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 the SDGs. Under the project, the SDGs Support Unit Sindh has been established in Planning & Development Department, Government of Sindh with effect from May 2017. The Unit contributes towards accelerating progress on SDGs in the province by working through following four approaches:

[1]United Nations Development Group, Reference Guide to UN Country Teams -Mainstreaming the 2030 Agenda for Sustainable Development, March 2017 Update

Policies and Plans	Data Reporting	Financing	Innovation
Mainstreaming SDGs in local development plans and strategies clearly delineating the resource requirements.	Strengthening coordination, reporting and monitoring mechanisms for SDGs	Financing flows increasingly aligned with 2030 Agenda	Supporting integrated and innovative approaches to accelerate progress on SDGs on priority areas.

GoS has also taken the crucial step towards mainstreaming and localizing SDGs in the province by approving prioritization of SDGs in the immediate, medium and long-term for the province. The prioritization has been done by considering severity of development issues and challenges, resource availability, and Sindh's economic and social endowments, value for money, and magnitude of impacts, in line with Sindh 2025 vision and other policies and strategies.

Sindh's SDGs Priorities

Ranking of Priorities	Goal #	Sustainable Development Goals (SDGs)	Immediate Priorities	Intermediate Priorities (Up-to 2025)	Long-term Priorities (Up-to 2030)
1	Goal 4:	Quality Education			
2	Goal 3:	Good Health and Well Being			
3	Goal 6:	Clean water and Sanitation			
4	Goal 7:	Affordable and Clean Energy			
5	Goal 2:	No Hunger			
6	Goal 8:	Decent work and Economic Growth			
7	Goal 9:	Industry, Innovation and Infrastructure			
8	Goal 16:	Peace and Justice			
9	Goal 11:	Sustainable cities and communities			
10	Goal 1:	No Poverty			
11	Goal 12:	Sustainable Consumption and Production			
12	Goal 10:	Reduce Inequalities			
13	Goal 5:	Gender Equality			
14	Goal 17:	Partnership development			
15	Goal 13:	Climate Change			
16	Goal 14:	Life Below Water			
17	Goal 15:	Life on Land			

The above table indicates that the SDG Goal # 4, 3, 6,7,2 and 8 are on the Immediate priority, whereas Goal # 1,9,16,11,12 and 10 are on Intermediate priority i.e. upto year 2025. The remaining goals which are Goal # 5, 17, 13, 14, and 15 will be on the Long term priority i.e upto year (2030).

Urban Development Planning and the SDGs:

Today's common urban development challenges like affordable housing, provision of basic services, municipal functions, controlling crime, poverty, disease and the exhaustion of natural resources do not respect regional borders or limits between the built and the non-built domains. Therefore, the scope of urbanization should always include the livable environment while also considering the regional dimension. In this connection, the rigorous consultation and analysis being done by GoS to prepare Development Master Plan of 14 DHQ Towns of Sindh, it is being realized with even more significance that sustainable development cannot be achieved without significantly transforming the way we plan, build and manage our urban spaces. The rapid growth of cities resulting in rising population and increasing migration that has led to a boom in urban areas and slums, is becoming a more significant challenge for urban areas.

Under the contract of the preparation of development Master Plan of 14 DHQ towns, SDG Acceleration plan was not part of the approved TORs but keeping in view the Sindh government's initiatives to mainstream SDGs targets in provincial planning (taking Islamkot as a model SDG Taluka) the Directorate and Consultant after due consultative process felt the need to include brief SDG Acceleration Plan as part of Development Master Plans. Accordingly in consultation with SDG unit Sindh, SDG 11 was selected for SDG Acceleration Plan for 14 DHQ towns since is pertinent to urban planning and development.

SDG 11 – *Sustainable Cities and Communities* sets the basis for urban-planning techniques and policies for the future. For a tangible acceleration towards achievement of SDG 11, simultaneous interventions will need to be executed directly through urban-planning interventions. While this involves investments in public transport, housing, creating green public spaces and improved urban planning and management in participatory and inclusive ways, an in-depth review of SDG 11 targets reveals a much stronger interlinkage with other SDGs such as poverty, health, education, clean energy, provision of basic services (social services as well as urban municipal services), etc. thereby generating a holistic societal impact, which is of prime importance in the context of Agenda 2030.

Using the key mechanism for periodic updating of the Development Master Plan after every five years, the SDGs Acceleration Plan also proposes embedding SDGs agenda targets against projects and schemes designed at local level and assesses the available and potential financing flows in context of future opportunities. Therefore, the targets and indicators of

SDG 11 – Sustainable Cities & Communities is being reviewed against the Master Plan, along with identification of supportive plans, policies and interventions.

The SDGs Acceleration Plan table below explicitly underlays the outline for how the Master plan of the town addresses the targets and indicators under SDG 11 – Sustainable Cities & Communities. The plan also takes note of the local social and economic data to identify services provision gaps at the local level, as well as key challenges at district level.

SDG Acceleration Action Plan - Jamshoro DHQ Town

SDG Goal 11 : Make Cities and Human Settlements Inclusive, Safe, Resilient and Sustainable

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable				
	11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing	[2]7.42% of the urban town population lives in katcha houses	- Increase in proportion of small size plots (Plot size will be depend on land value) could be made for low income groups in all new housing schemes. - Affordable housing program for low income group in different phases up to 2037, through one window operation (including technical guidance, easy loan provisions, legal procedures)	Sindh Katchi Abadis, Squatter Settlements & Slums Policy - The process of regularization and up-gradation of the pre-1985 katchi abadis shall continue as per current policy. However, katchi abadis, which are hazardous by virtue of being close to railways tracks or located under high tension power lines, or are on or close to the riverbeds, or on lands needed for operational /security purposes, need to be relocated at appropriate places by LOAs. - Formation of new katchi abadis shall not be allowed and shall be discouraged by exercising strict development controls in all urban areas. - Formation of Resettlement Plans - Resettlement plans shall be prepared by the concerned Land Owning Agencies (LOAs) in consultation with

[2] Data provided by Sindh Kacthi Abadis Authority, December 2019. Katchi abadi is defined as by Katchi abadi authority

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
					affected communities for shifting of katchi abadis dwellers who fall within hazardous or security/operational zones. These plans shall primarily be on a self-financing basis. - The internal infrastructure and services shall be provided on incremental basis depending on the needs and priorities of the residents to make them affordable and cost effective. Trunk infrastructure and services shall be provided by public sector organizations and the cost shall be met from Government exchequer
	11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in	11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities	61% people have access to public transport.[3]	- Improve road design to make safer roads. - Prevent encroachments on footpaths through litigation. - 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.	Sindh empowerment of Persons with Disabilities' Act, 2018[4] 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 must detect and serve a

[3] Socio Economic Survey 2017
[4] https://depd.sindh.gov.pk/sindh-empowerment-of-persons-with-disabilities-act-2018

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	vulnerable situations, women, children, persons with disabilities and older persons			- Reduce traffic growth and congestion by achieving a mode shift. - Enhance institutional efficiency to improve service delivery. - Dualization of main arteries - Improve road design to make safer roads. - Prevent encroachments on footpaths through litigation. It is suggested that necessary provision of the above recommendation may be mandated in the laws and regulations of SBEA and other agencies which drafting the buildings and highway regulation	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 store assistive devices such as wheelchairs and strollers. Tra-c signal timing should provide adequate clearance intervals for safe crossing by pedestrians and slow vehicles.

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	11.3.1 Ratio of land consumption rate to population growth rate 11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically	Baseline will be established at the start of implementation of Master plan. Vision formulation exercise through multiple consultative workshops were conducted to establish a shared and common vision for the development of Jamshoro DHQ town in the future.	o The total extent of the area included in the overall proposed Jamshoro Master Plan is 55,000 acres approx. for a population of 624,300 by 2037.	Sindh Colonization of Government Lands Act 1912 and Disposal of Government Lands Rules, 2005.[5] National Housing Policy 2001[6]
	11.4 Strengthen efforts to protect and safeguard the world's	11.4.1 Total expenditure (public and private) per capita spent on the	Baseline will be established at the start of	• Protection of historical places and cultural heritage	Heritage act for policies 2012[7]

[5] http://sindhlaws.gov.pk/setup/publications_SindhCode/PUB-16-000113.pdf
[6] http://mohw.gov.pk/mohw/userfiles1/file/National%20Housing%20Policy.pdf
[7] https://antiquities.sindhculture.gov.pk/index.php/about-us/acts/343-heritage-act-1994

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	cultural and natural heritage	preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)	implementation of Master Plan.		(2) An agreement under this section may provide for the following matters or 'for such of them as it may be found expedient to include in the agreement--- (a) the maintenance and custody of the protected heritage and the duties of any person who may be employed to watch it; (b) the restriction of the owner's right to destroy, remove, alter or deface the protected heritage; (c) the facilities of access to the public or to any portion of the public and to persons deputed by the Committee to inspect or maintain the protected heritage; (d) the notice to be given to Government in case the land on which the protected heritage is situated is offered for sale by the owner, and the right to reserve by Government to purchase such heritage, or any specified portion of such heritage, at its market value; (e) the payment of any expenses incurred by the owner or Government in connection with the preservation of the protected heritage; and (f) any matter connected with the preservation of the protected heritage which is a subject of agreement between the owner and Government.

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	11.5.1 Number of deaths, missing persons and persons affected by disaster per 100,000 population	Sindh Data [8] No of deaths (1988-2013) = 241 No of People effected (1988-2013) =24,096,173 Deaths per 100,000 population = 0.2491 Affected people per 100,000 population = 241	• 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. • Arrange medical teams for providing medical cover to the IDPs settled in any relief camp. • Fumigate the affected areas and areas at risks of spread of any of epidemic disease.	National Disaster Risk Reduction Policy 2013[9]

[8] PDMA (2017)
[9] http://www.pdma.gos.pk/new/resources/Sindhidrr-policy.pdf

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
				• Ensure that all ambulances are in working order and road worthy conditions. • Ensure vacant possession of all schools buildings at the time of emergency for setting up relief camps. • Ensure sanitation and cleanliness as well as clean drinking water facilities wherever possible at all school buildings declared as relief camps through by binding down their concerned Headmasters. • The creation of an integrated multi-hazard damage loss data-base is therefore a prerequisite for systematic vulnerability and risk monitoring	
	11.6 By 2030, reduce the adverse per capita environmental impact of cities,	11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of	[10]Present Total solid waste generation in Jamshoro DHQ town is 132 tons per day. Regular	- The collection and disposing of solid waste is the responsibility of the MC. - The collection system needs to be made more effective and efficient. - Town Municipal Committees has already initiated some work on	THE SINDH SOLID WASTE MANAGEMENT BOARD ACT, 2014 [11]

[10] Town Committee Matiari
[11] http://www.pas.gov.pk/uploads/acts/Sindh%20Act%20No.IV%20of%202014.pdf

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	including by paying special attention to air quality and municipal and other waste management	total urban solid waste generated, by cities	collection by municipal is about 50-60%	biomedical-waste management. It should immediately start segregation practice for biomedical waste collection system. - 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	
	11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and	Only 0.28% (46.77 acres) out of total 16,711(67.62Sq KM[12])acres park area is available in Jamshoro	• Existing open spaces in core urban area should be restored and maintained. New open spaces should be identified and created. • Development and preservation of cultural heritage	Adopt-a-park policy 2019 (PPP unit, Finance dept. GoS) is still in progress

[12] Based on Landuse Calculations

Annexure – B

Atlas

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	particular for women and children, older persons and persons with disabilities	persons with disabilities		• Cater the problem of Shortage of water facility to maintain green spaces, green belts and trees plantation. • Availability of sports infrastructure. • Provision of infrastructure to accommodate visitors into cultural events	
	11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	11.a.1 Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city	Through inclusive and participatory development of SDP and collaborative implementation, the target for development plan integration is achieved	• Build a local / district / regional transportation system. • Rehabilitation of existing roads should be scratched from its compaction level and reconstruct as per specification of design perimeters. • Discourage direct link roads with bypass • The Consultant suggest that the Master Planning should be reviewed every five years to estimate the land use and area requirement according to the growth rate and economic investment	• Preparation of Development master plans of DHQ towns by Govt of Sindh • Poverty Reduction Strategy for Sindh approved by cabinet 2018 The key conceptual underpinnings of this strategy are:[13] • The policy is focused on creation/facilitation of rural hubs: • Using principles of agglomeration to support and drive growth • Focusing on those interventions that will have a catalytic effect • Consolidation of services, for improved service deliver and better impact.

[13] Poverty Reduction Strategy for Sindh

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
					The combined effect aims to provide improved facilities, services and opportunities for households in the surrounding cluster of villages served by the hub
	11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and	11.b.1 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030a 11.b.2 Number of countries with national and local disaster risk	Provincial policies and strategies in placed	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. • Arrange medical teams for providing medical cover to the IDPs settled in any relief camp. • Fumigate the affected areas and areas at risks of spread of any of epidemic disease. • Ensure that all ambulances are in working order and road worthy conditions.	National Disaster Risk Reduction Policy 2013[14]

[14] http://www.pdma.gos.pk/new/resources/Sindhidrr-policy.pdf

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels	reduction strategies		• Ensure vacant possession of all schools buildings at the time of emergency for setting up relief camps.	

Annexure – B

Atlas

Proposed Master Plan for Jamshoro, Bolhari, and Kotri

418000 421000 424000 427000 430000 433000

2820000 2818000 2816000 2814000 2812000 2810000 2808000 2806000 2804000 2802000 2800000

Legend

- Gas Pipe Line
- Drainage
- Canal
- Proposed Minor Road
- Proposed Jamshoro Bypass

Existing Roads

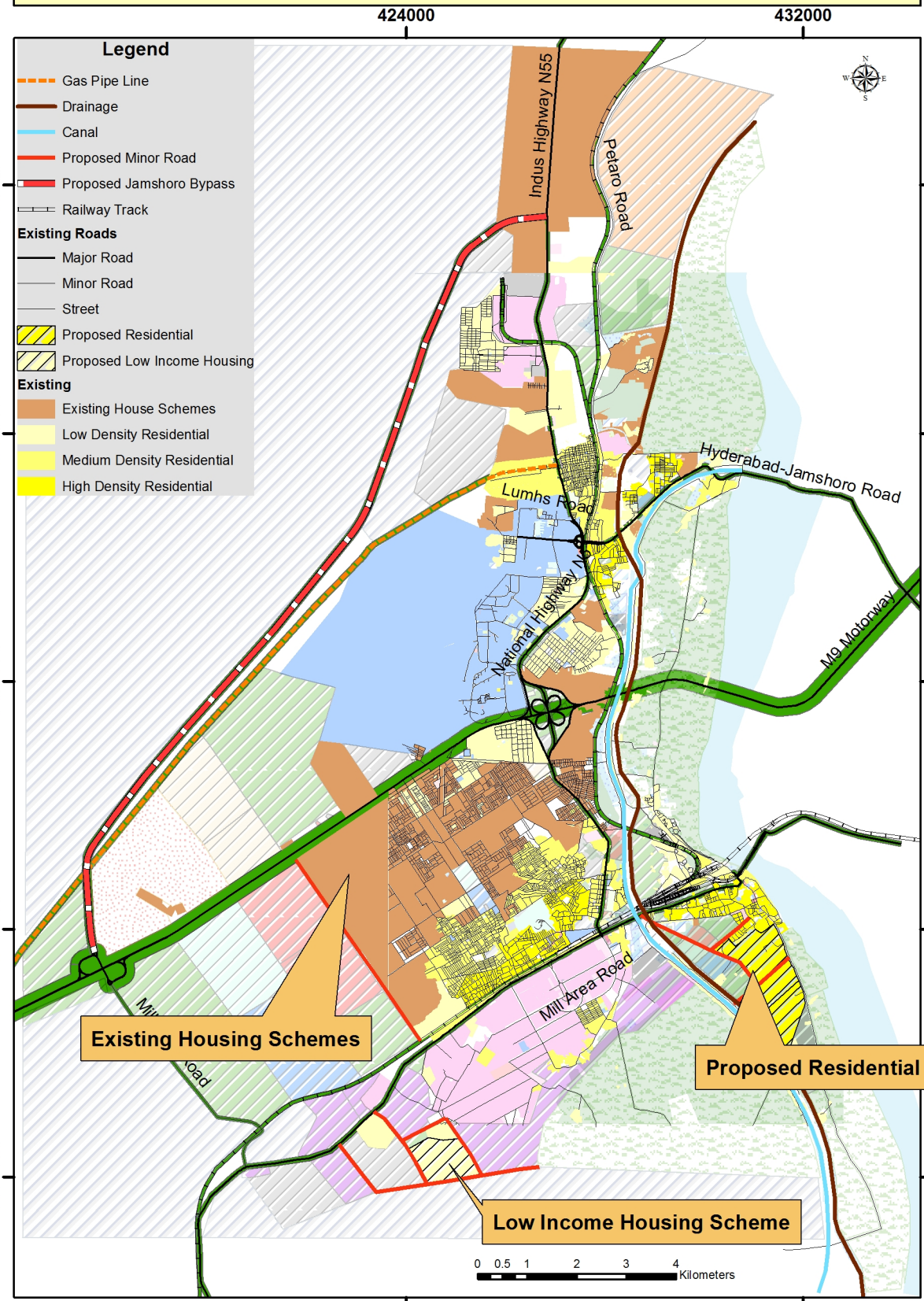
- Major Road
- Minor Road
- Street
- Agricultural Reserved
- Cattle Farm
- Commercial
- Educational
- Emmergency Reserved
- Graveyard
- Health
- Economic
- Landfill Site
- Low Income Housing
- Protected Area
- Public Administration
- Recreational
- Relgious
- Residential
- STP
- Transportation
- Water Supply
- Railway Track

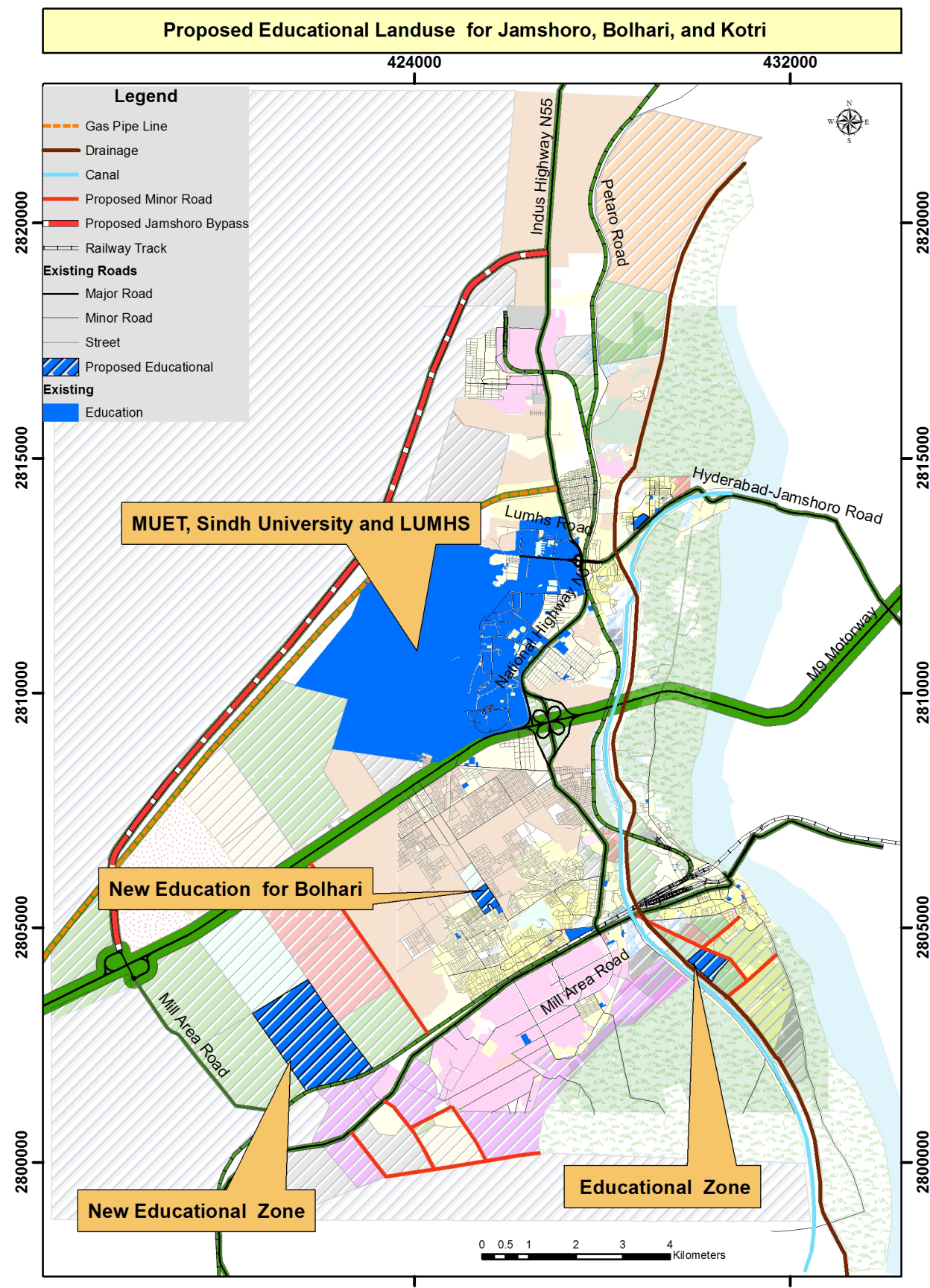
N W E S

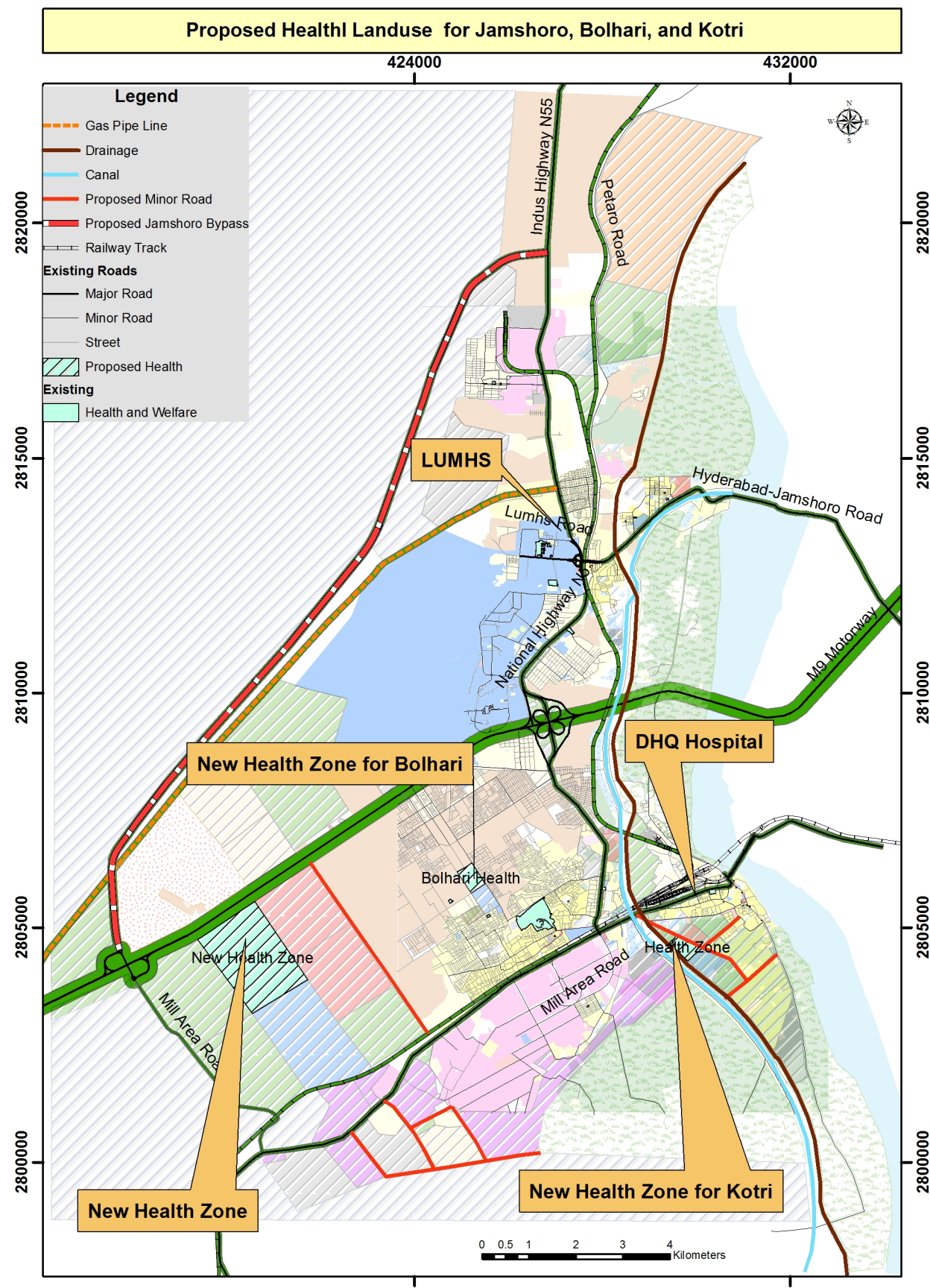
Indus Highway N55
Cattle Farm
Landfill Site
Botnical Garden
Religious
Centeral Park
Urban Forestration
Graveyard
Petaro Road
CBD Jamshoro
Hyderabad-Jamshoro Road
Vocational Tranning Center
Lumbs Road
Visual Parks
Sindh Text Book Board Road
Extension of WS
SWT
National Highway N5
Highway Link Road
M9 Motorway
Open Green Space
Bus Terminal
Zoological Garden
New Dryport
Adminstrative Zone
Jail
Dry Port
Commercial
Public Administration
Emergency Reserved
Bolhari CBD
Bolhari Religious
Plantation Area
Bolhari Health
Bolhari Edu:
Commercial Strip
Park
Centeral Park Bolhari
CBD
Water Supply
Central Park Kotri
Kotri CBD
Extension of Water Supply
Residential
Extension of STP
Educational Zone
Sports Complex Kotri
Toursim
Green Area
New Health Zone
Main CBD
Festival Ground
Mill Area Road
Sports Complex
New Educational Zone
Amusement Park
Grean Area
Industrial Extension
Agricultural Reserved
STP
Godwon Extension
Trade and Commerce
New Godowns
Army area
Truck
Labor Colony
Industrial
Technical Services
Bolhari Graveyard

0 0.5 1 2 3 4 Kilometers

Proposed Residential Landuse for Jamshoro, Bolhari, and Kotri




Proposed Educational Landuse for Jamshoro, Bolhari, and Kotri
424000
432000
2820000
2815000
2810000
2805000
2800000
Legend
Gas Pipe Line
Drainage
Canal
Proposed Minor Road
Proposed Jamshoro Bypass
Railway Track
Existing Roads
Major Road
Minor Road
Street
Proposed Educational
Existing
Education
Indus Highway N55
Petaro Road
Hyderabad-Jamshoro Road
Lumhs Road
National Highway N55
M9 Motorway
Mill Area Road
MUET, Sindh University and LUMHS
New Education for Bolhari
New Educational Zone
Educational Zone
0 0.5 1 2 3 4
Kilometers


Proposed Healthl Landuse for Jamshoro, Bolhari, and Kotri
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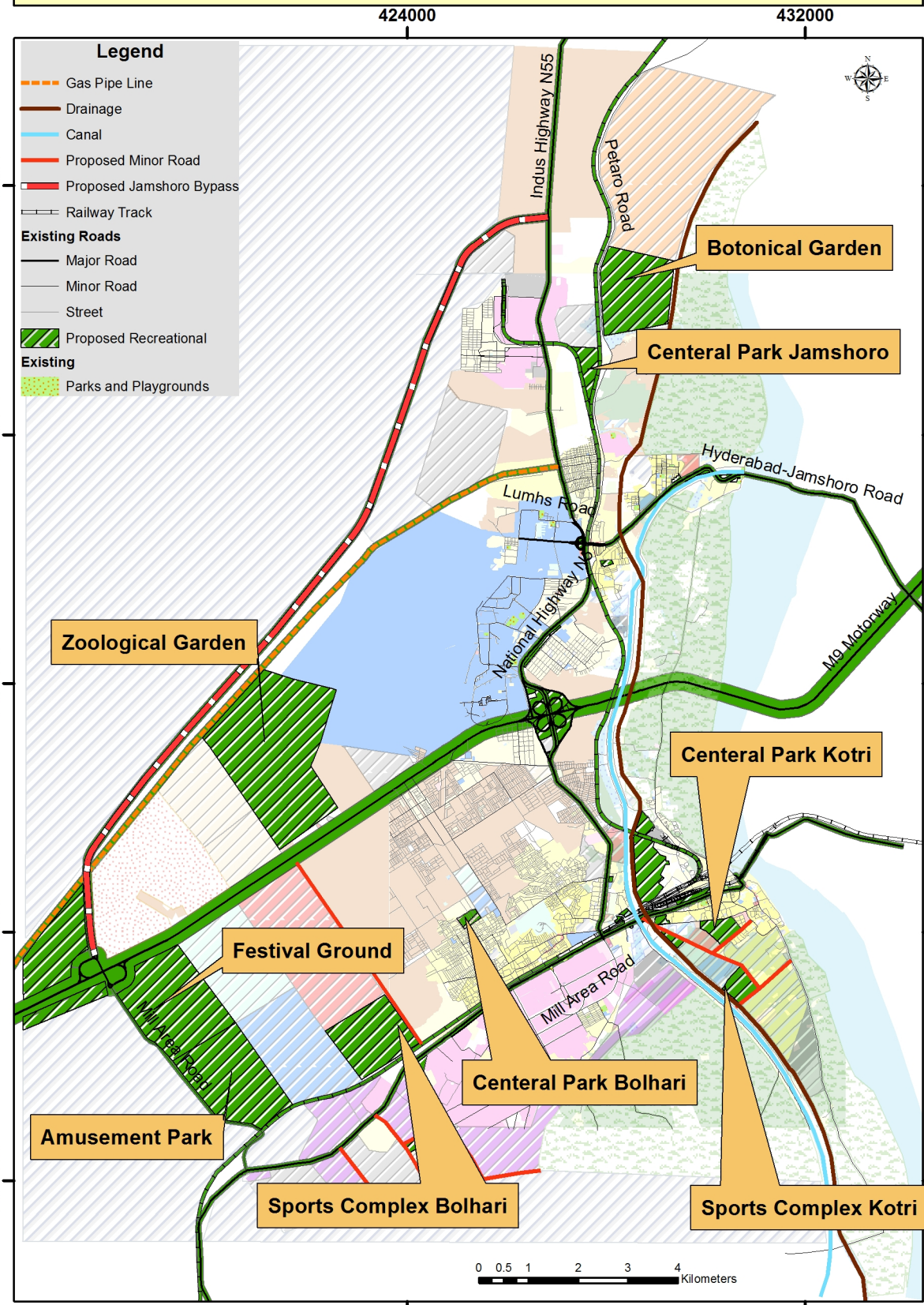
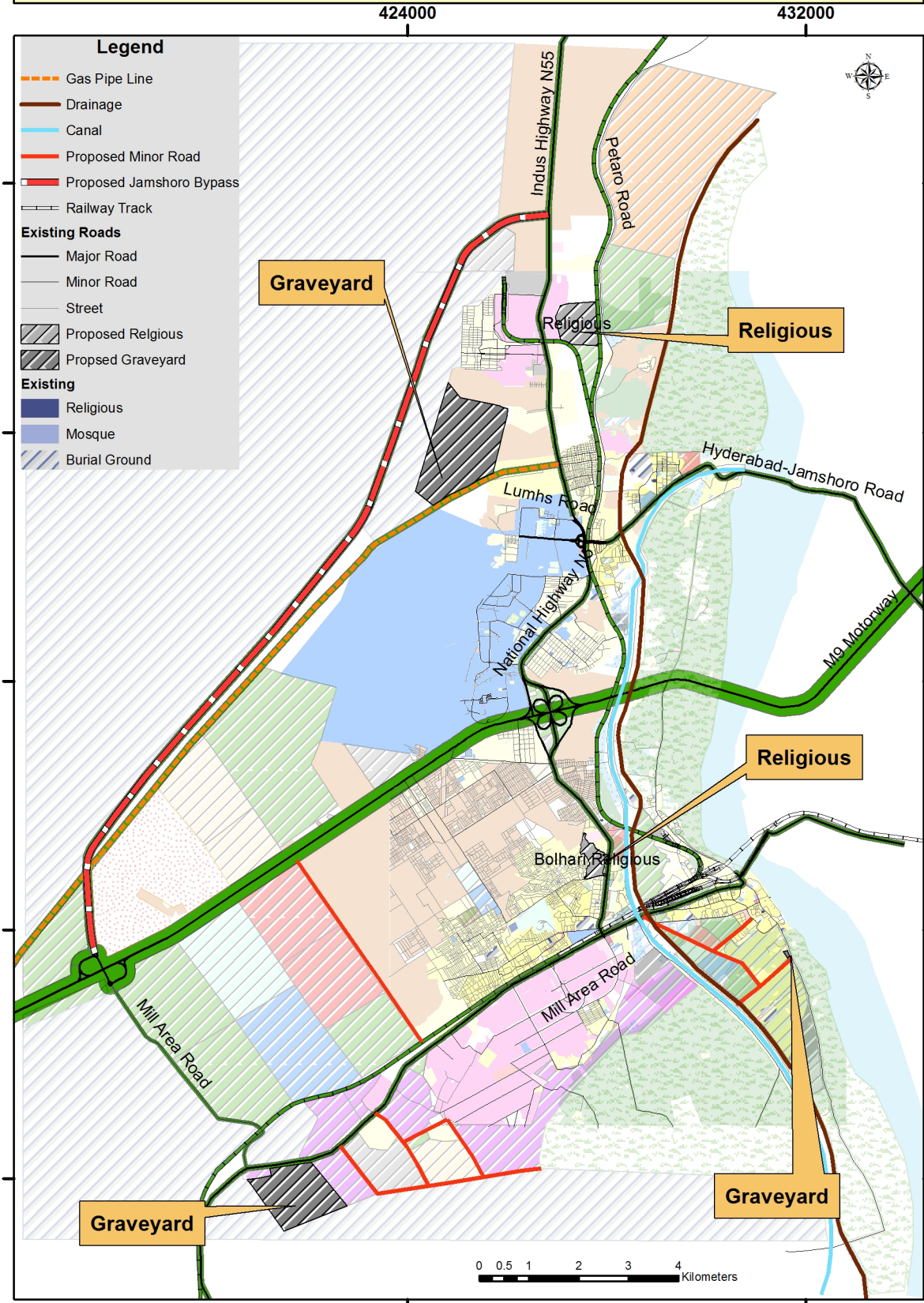
432000
2820000
2815000
2810000
2805000
2800000
Legend
Gas Pipe Line
Drainage
Canal
Proposed Minor Road
Proposed Jamshoro Bypass
Railway Track
Existing Roads
Major Road
Minor Road
Street
Proposed Health
Existing
Health and Welfare
Indus Highway N55
Petaro Road
LUMHS
Lumhs Road
Hyderabad-Jamshoro Road
National Highway N5
M9 Motorway
New Health Zone for Bolhari
DHQ Hospital
Bolhari Health
New Health Zone
Health Zone
Mill Area Road
New Health Zone
New Health Zone for Kotri
0 0.5 1 2 3 4
Kilometers

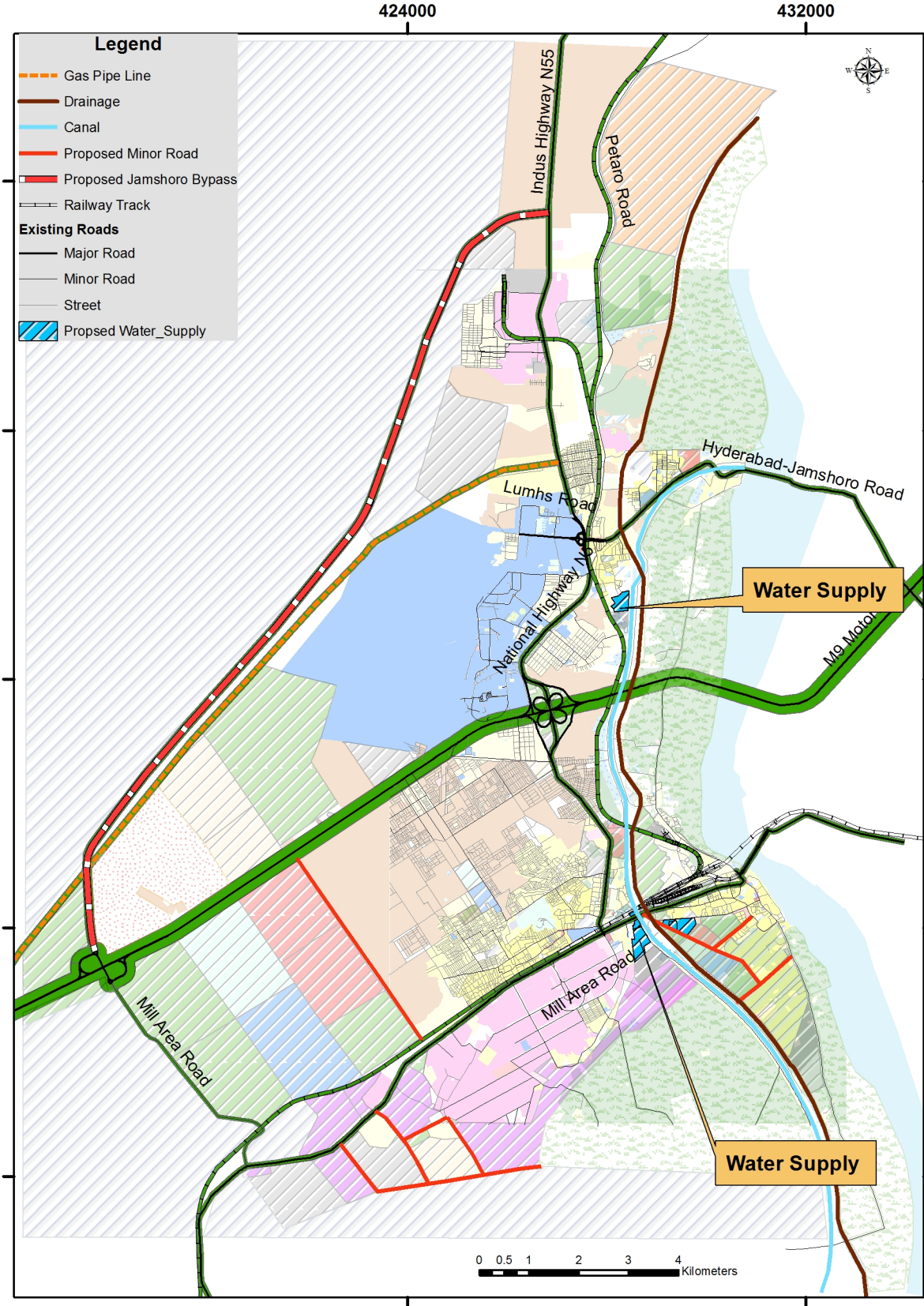
Proposed Recreational Landuse for Jamshoro, Bolhari, and Kotri



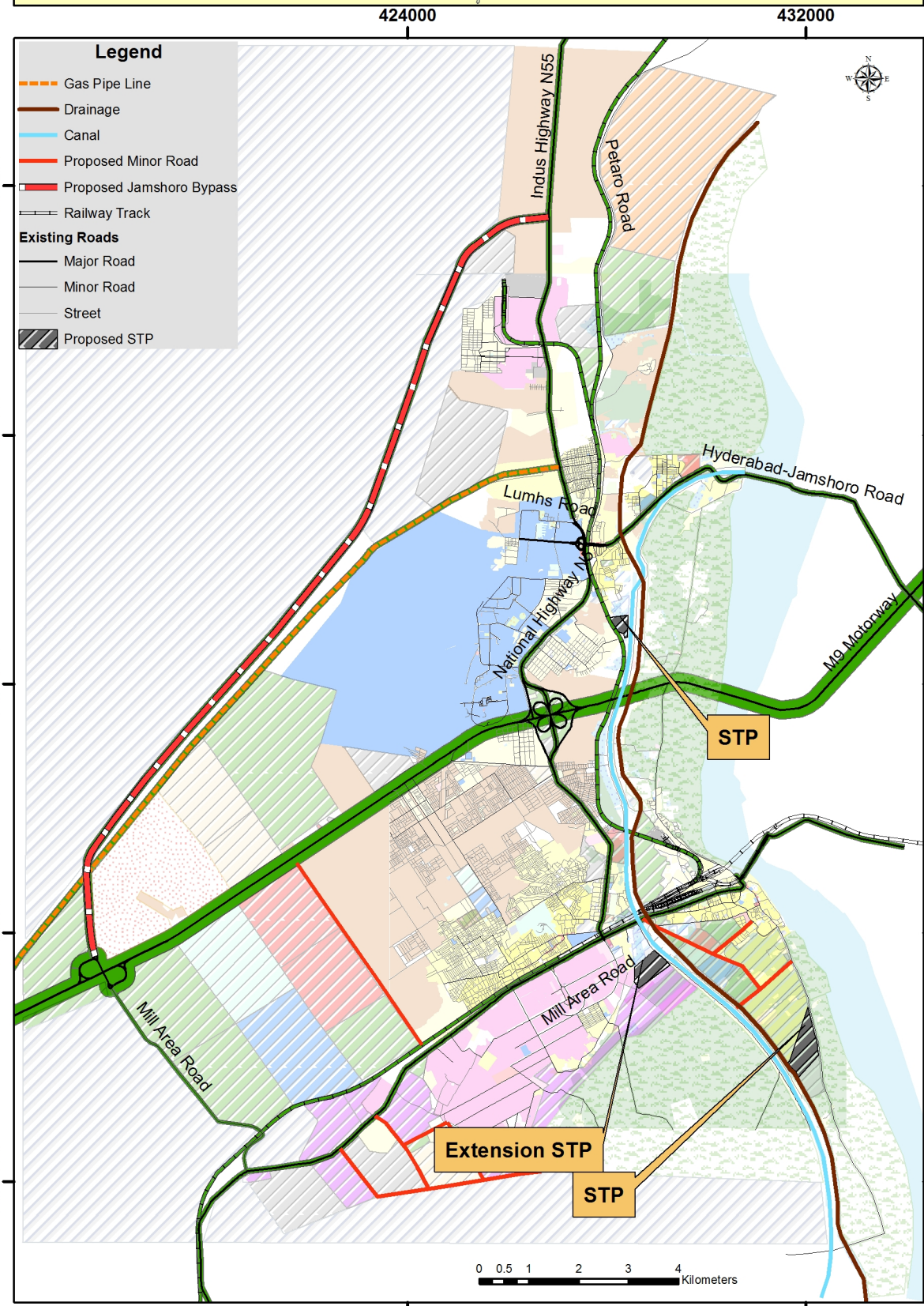
Proposed Religious & Graveyard Landuse for Jamshoro, Bolhari, and Kotri



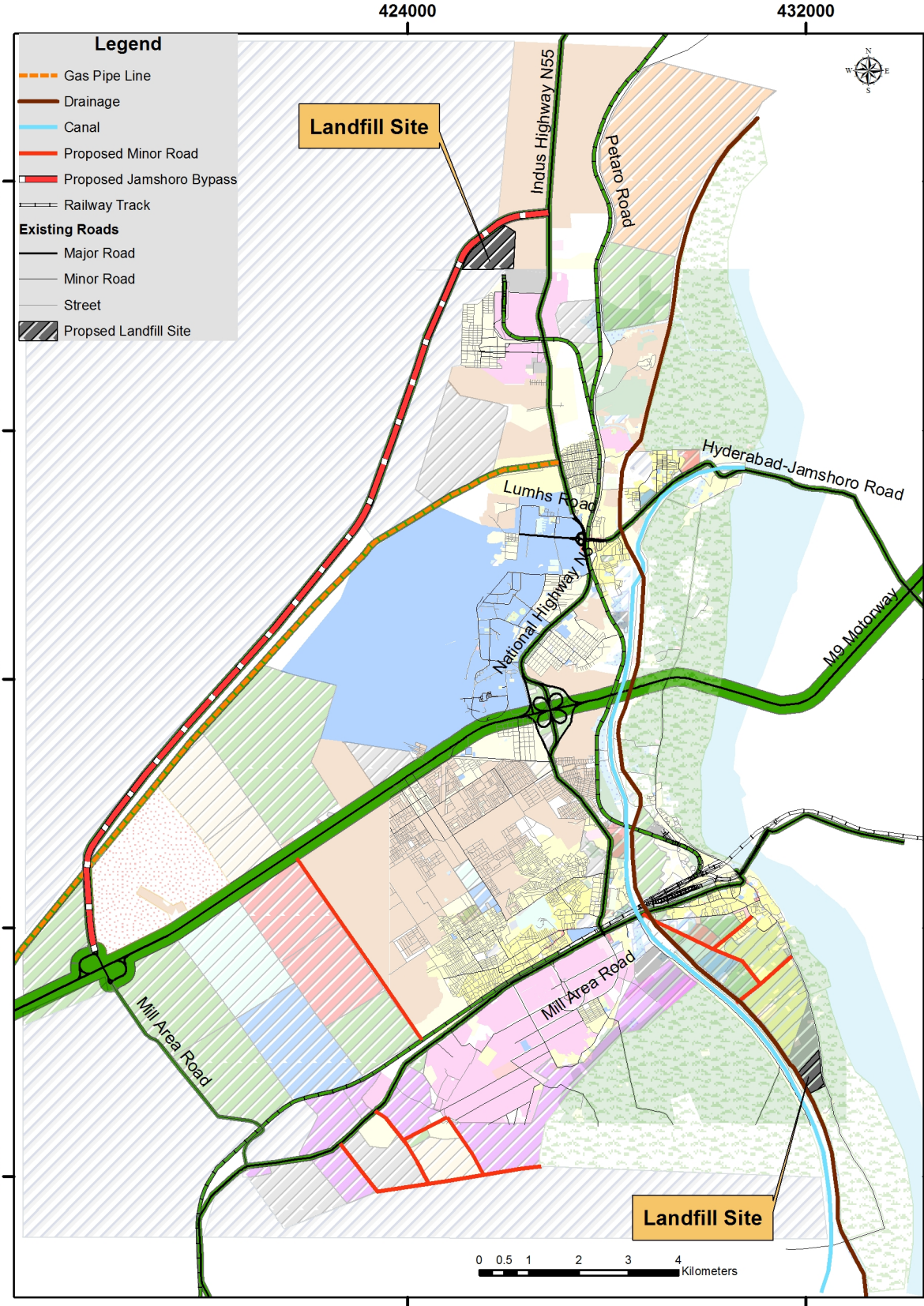
Proposed Utilities & Services Landuse for Jamshoro, Bolhari, and Kotri



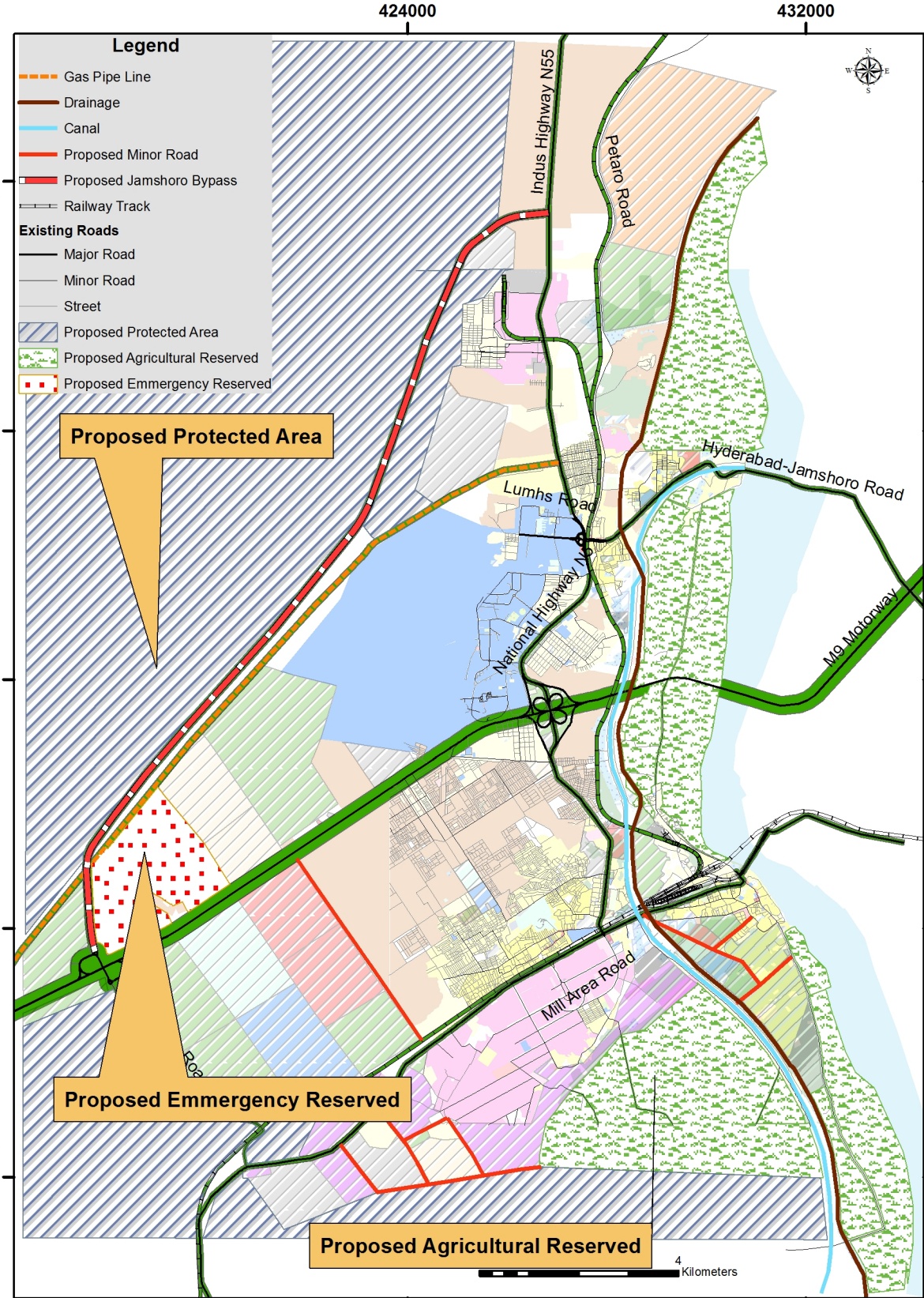
Proposed Utilities & Services Landuse for Jamshoro, Bolhari, and Kotri



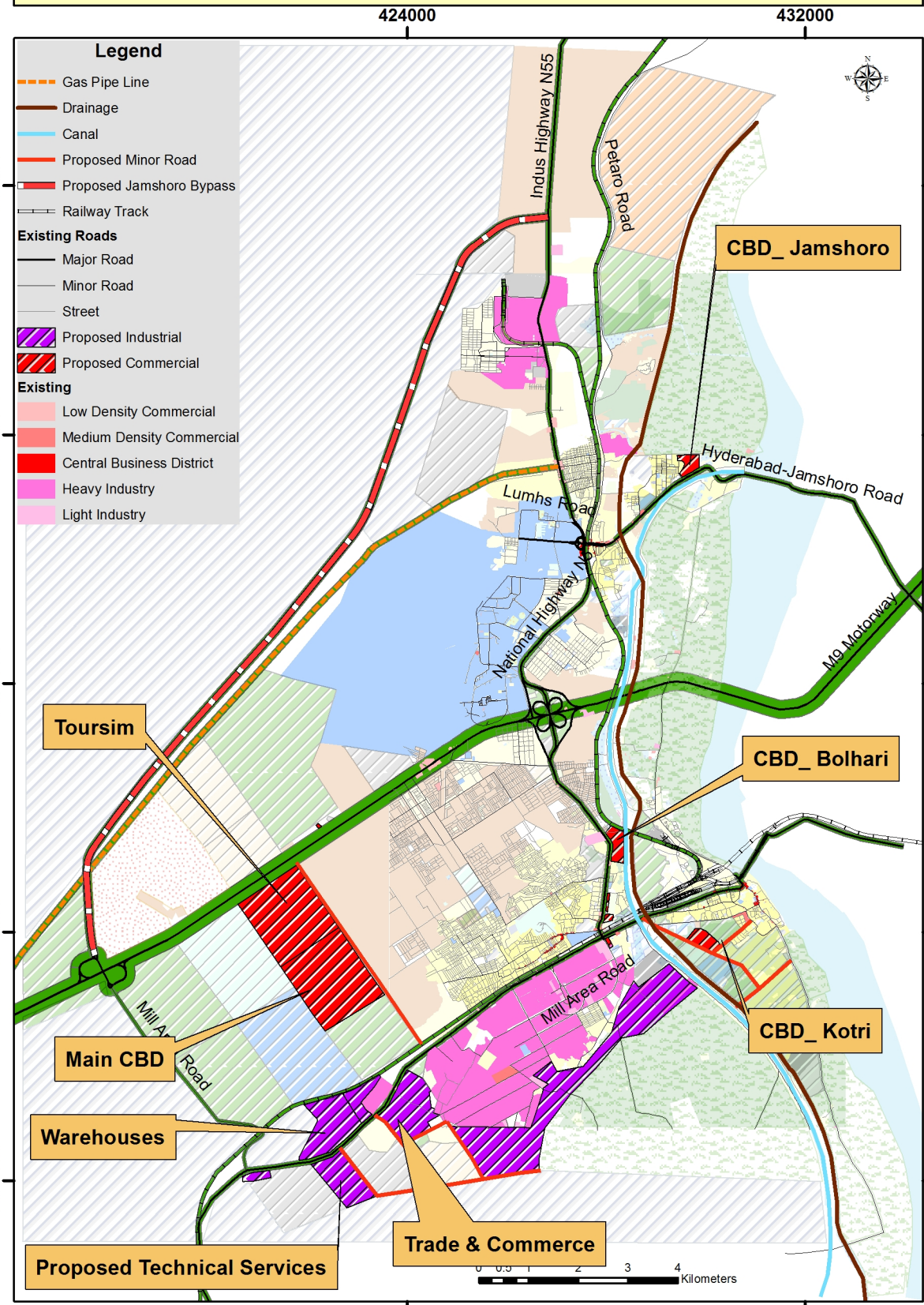
Proposed Utilities & Services Landuse for Jamshoro, Bolhari, and Kotri



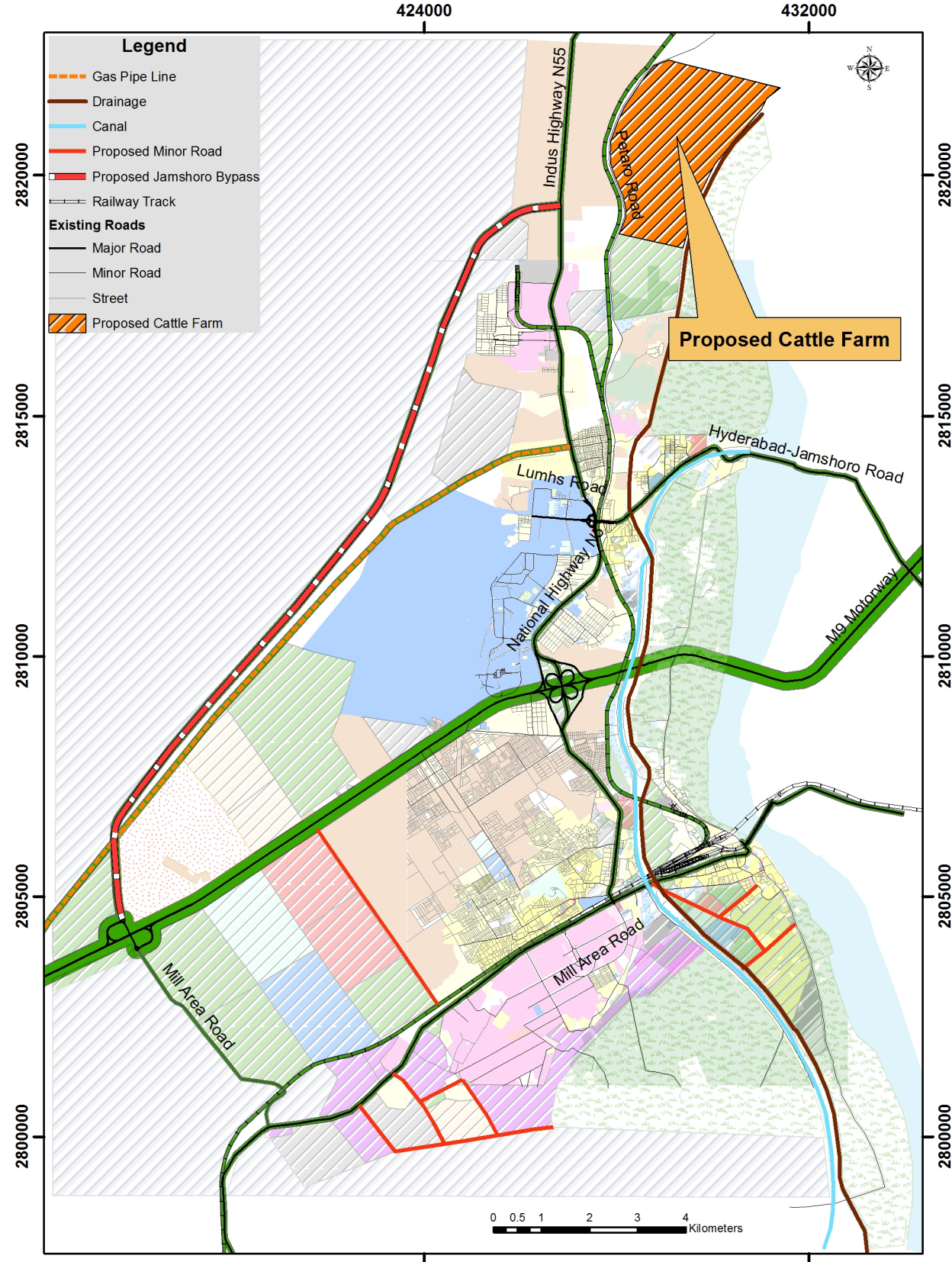
Proposed Agricultural Landuse for Jamshoro, Bolhari, and Kotri



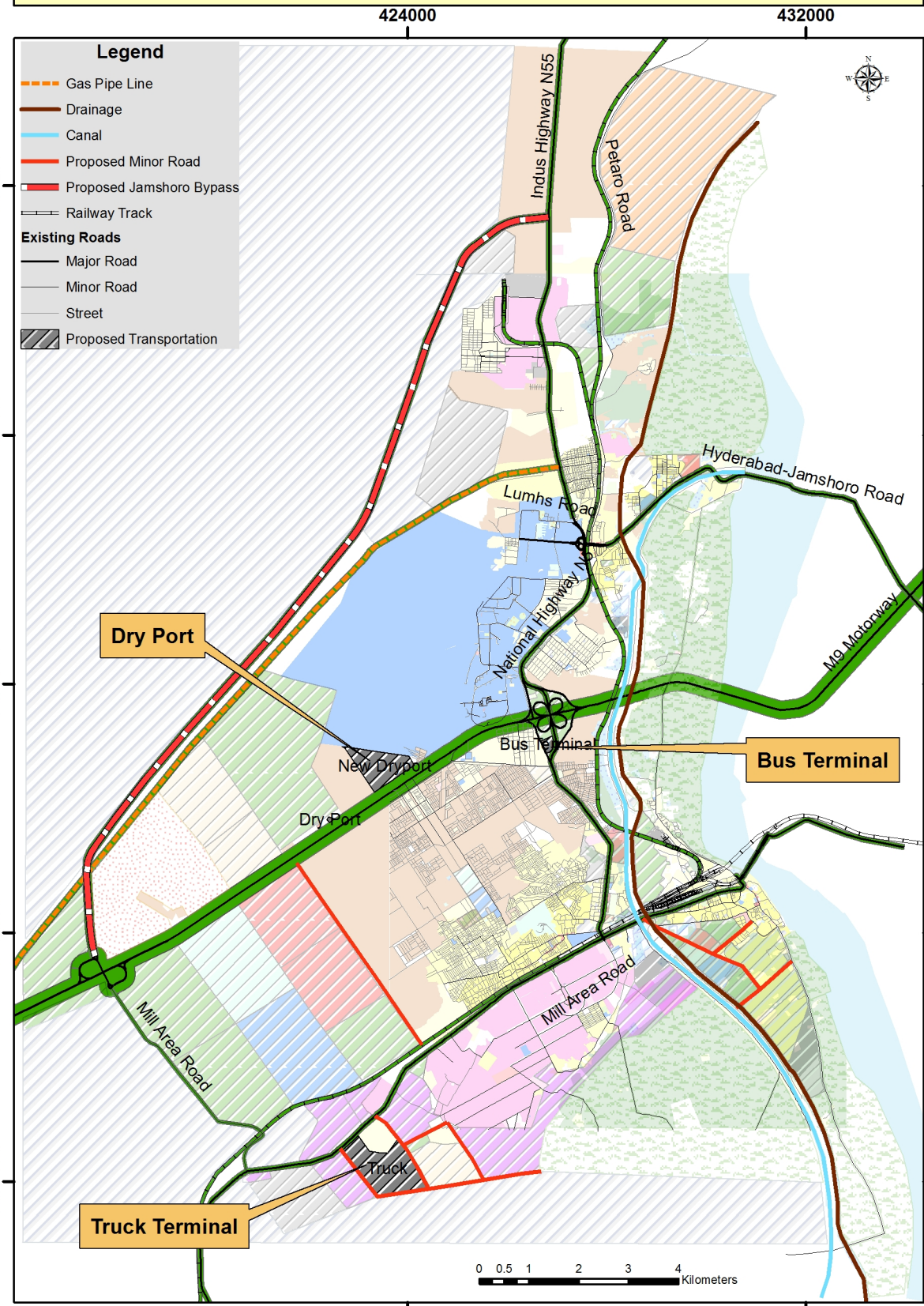
Proposed Economic Landuse for Jamshoro, Bolhari, and Kotri

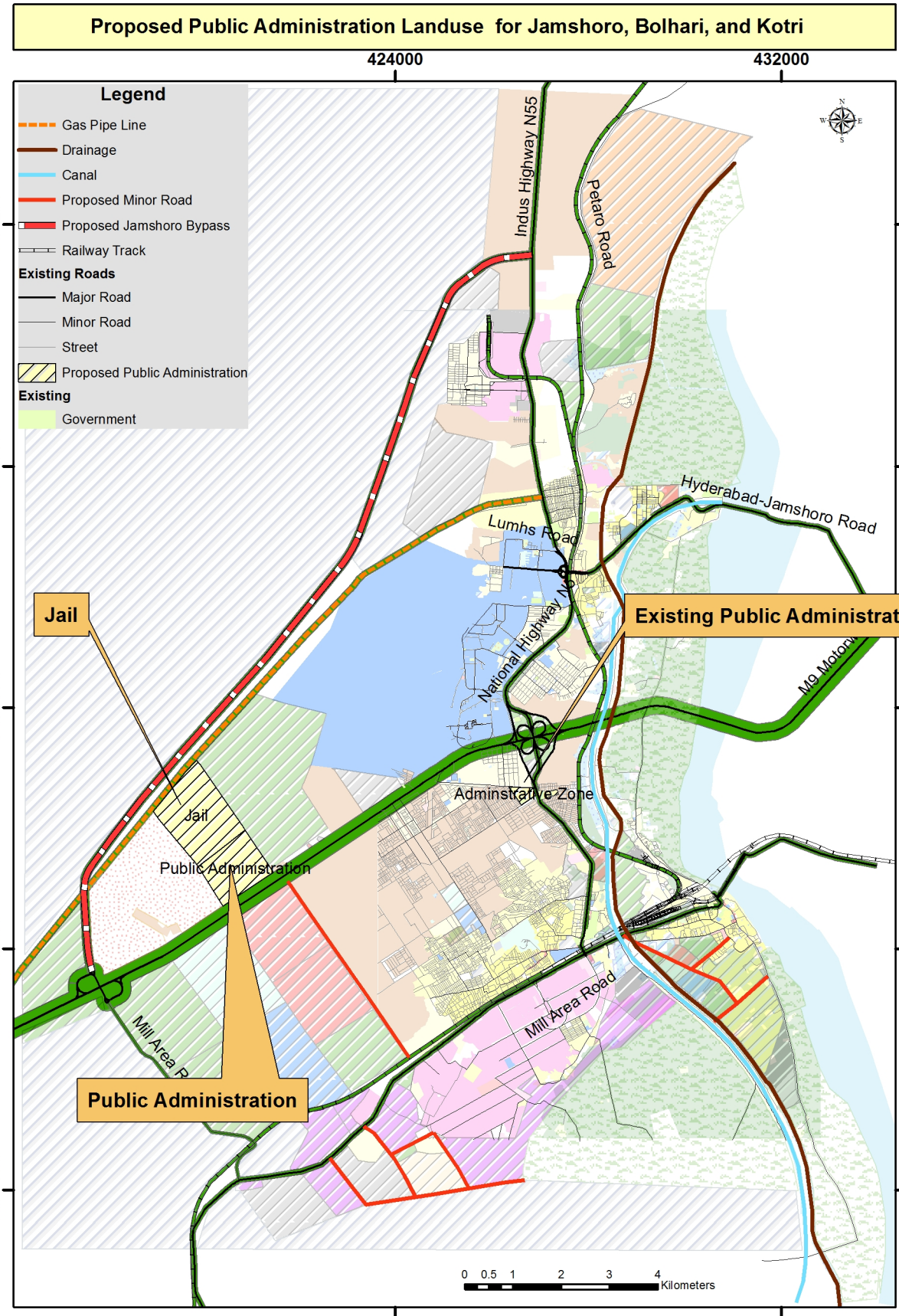


Proposed Livestock Landuse for Jamshoro, Bolhari, and Kotri



Proposed Transportation Landuse for Jamshoro, Bolhari, and Kotri




Proposed Public Administration Landuse for Jamshoro, Bolhari, and Kotri
424000
432000
2820000
2815000
2810000
2805000
2800000
Legend
Gas Pipe Line
Drainage
Canal
Proposed Minor Road
Proposed Jamshoro Bypass
Railway Track
Existing Roads
Major Road
Minor Road
Street
Proposed Public Administration
Existing
Government
Indus Highway N55
Petaro Road
Hyderabad-Jamshoro Road
Lumhs Road
National Highway N5
M9 Motorw
Jail
Existing Public Administration
Adminstrative Zone
Jail
Public Administration
Mill Area Road
Public Administration
0 0.5 1 2 3 4
Kilometers