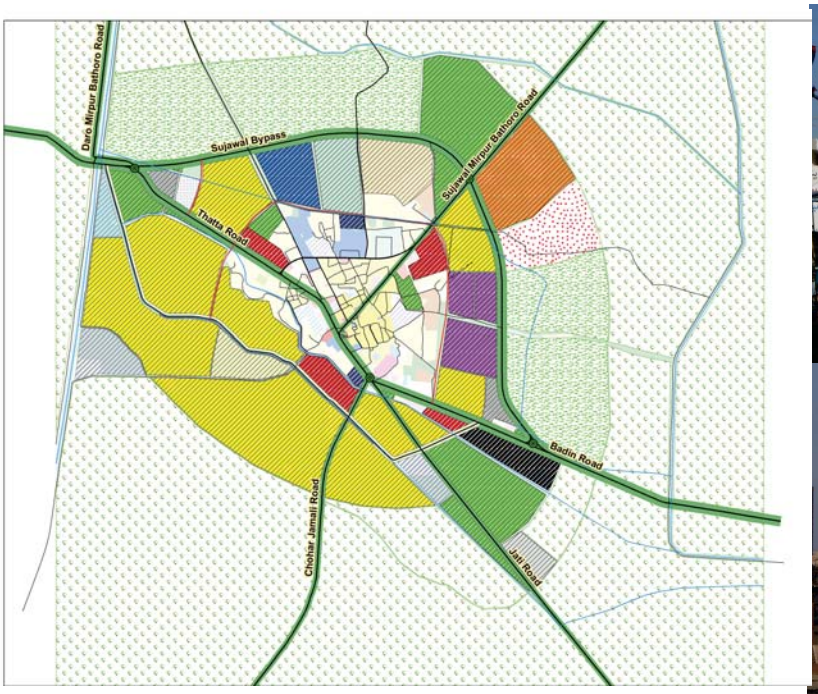
Directorate of Urban Policy Strategic Planning,
P & D Department, Government of Sindh

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)



Sujawal

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 – Sujawal

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LIST OF ACRONYMS AND ABBREVIATIONS

ADP	Annual Development Plan
AGR	Annual Growth Rate
BC	Brick Construction
BHU	Basic Health Unit
BOD	Biological Oxygen Demand
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
GER	Gross Enrolment Ratio
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
GOP	Government of Pakistan
GOS	Government of Sindh
GPS	Global Positioning System
HESCO	Hyderabad Electricity Supply Corporation
HH	Household
HQ	Head Quarters
KV	Kilo Volt
LPG	Liquid Petroleum Gas
LULC	Land Use/Land Cover
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
PR	Public Representative
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
SS	Sample Survey
SSGC	Sui Southern Gas Company
STP	Sewerage Treatment Plant
SWM	Solid Waste Management
SWOT	Strength Weaknesses Opportunities Threat
TAY	Tando Allahyar
TOR	Terms Of References
TSS	Total Suspended Solids
TVC	Traffic Volume Count
TW	Tube Well
UC	Union Council
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

Sujawal District is a new district of the Sindh province of Pakistan. In 2013, Sujawal was made a district after carving it out of District Thatta. Before 2013, Sujawal was a Taluka of District Thatta. It is located at 24°36'23" of North and 68°4'19" of East and is bordered in the northwest by the Indus River which separates it from Thatta District. The district has an area of 7335 km². According to Population and Housing census of 2017, population of District Sujawal is recorded as 781,967 souls. The district consists of four talukas namely; Sujawal, Jaati, Mirpur Bathoro and 30 union councils.

Sujawal Town is the district headquarter town of the district. Sujawal got its name from its illustrious resident, Sujawal Khaskheli, who was a loyal servant of 19th century Sindh ruler Mir Fateh Ali Khan. Sujawal is an agricultural town with a few industries located near it. Sujawal is a multi-community and ethnic city containing different sects and religions. The built-up area of Sujawal Town comprises of around 565 acres of land but the spread of urban area as estimated by the consultants is about 1525 acres. The land use analysis indicates that almost 20.6% of total urban boundary area is in residential use and 47.9% of the area is covered by agriculture fields.

Town shaped like an oval pattern of irregular shape. The city extended in two directions i.e. north-east and north-west along National Highway N-5 (Thatta-Sujawal road). Town's spatial growth during last 7 years was hardly 5% of built-up area increased at outskirts of town area mainly Sujawal-Bathoro road. The city grew mainly in north-east and north-west directions. The administrative complex and offices i.e. DC office, Session Court, police station, SSP office etc. are situated along Thatta-Sujawal Road which passes through the centre of city.

B. VISION 2037

As per the objective of the Provincial Government the planning process was carried out in Consultation with the stakeholders.

A vision formulating workshop was carried out with the main stakeholders on November 08, 2018. The stakeholders were mainly local citizens, government officials, businessmen and member of civil society. They were so logged down with the immediate day to day problems that they could not articulate a long term vision. However the collections 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."

C. DEMOGRAPHY

Sujawal City is the district headquarter town of Sujawal District. It is the Town Committee. According to 1998 census, town had a population of 23,286 souls with a growth rate of 2.63% during 1981-1998. The 2017 census reveals that the population of Sujawal Town has reached to about 31,676 souls with a growth rate of 1.63% during 1998-2017. Projected population of Sujawal City works out to be 43,769 souls by 2037.

D. SECTOR WISE ANALYSIS AND PROPOSAL

The Consultants had carried out data collections in three layers:

- Primary source including sample Socio-economic Survey.
- Secondary Source including data from government sources published and unpublished documents
- Discussions with the officials, Consultations with Stakeholders.

The present need analysis and constraints were compiled and submitted in the form of Situation Analysis Report. Consultative Workshops were held in respective DHQ Towns with an objective to validate the accuracy of data and verify the data analysis with the Stakeholders.

Keeping in view the stakeholder's comments and suggestions, the draft strategies were developed to fulfill needs in the most efficient way. The Draft Strategic Development Report submitted by the Consultants was again shared with the Stakeholders and their feedback/comments. Being solicited.

Thereafter, the Final Strategic Report will be submitted. Based on the approved strategies the final action will be the preparation of Long Term/Short Term Plans, Priority Plan and Immediate Action Plan for Core Urban Area.

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. According to 2017 census population results, Sujawal TC had household size of 5.7 persons and a total housing stock of 6,205. The major issues in the housing sector are scarcity of developed urban land, poor land administration, housing in dilapidated condition, unafforable housing cost for low income groups, unchecked growtrh of squatter settlements and shortage of finance.

On the basis of projected population for year 2037 the number of households have been estimated around 8,574 on fixed household size of 5.1 persons out of which additional housing requirement will be 2,257. 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, master planning and infrastructure designing of low income public housing project for additional population. The immediate action plan includes revitalization of core urban area, regularization of land tenure, urban face lifting program, provision of street lights in residential areas and development of green median.

2. Social Amenities

2.1 Education

At the district level, 75,632 children are enrolled in schools with 2,466 classrooms. The schools have shortage of 55 classrooms on the basis of 30 students per classroom. At the taluka level, 25,351 students are enrolled in schools with 610 classrooms. These schools are short of 235 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.

The future need is 2,882 classrooms in schools of district level and 650 classrooms in schools of taluka level by the end of plan period in 2037 to achieve 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 girl's 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 centers 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 and provision of technical education. The priority projects need to focus on the construction and rehabilitation of schools with allied infrastructure and rehabilitation and construction of STEVTA institutes in Sujawal. A skill development organization for women should be established, because for the economic growth of the country women empowerment is necessary. The immediate action plan includes the rehabilitation and up gradation of schools in core urban area. The recommendations for economic development plan area; rehabilitation and improvement of educational institutes, establishment of new units, provision of special funding for special children and participation of private sector.

2.2 Health

In District Sujawal, there is one civil hospital having 80 beds, there are two Taluka HQ Hospitals at District having 60 beds, 29 BHUs at district having 58 beds and two RHCs having 30 beds, 76 Dispensaries having

10 beds. There are four private hospitals with 48 numbers of beds, having the total number of 286 beds serving the district. The major issues are insufficient 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 LHW and paramedical staff. The NRM recommends 2 bed per thousand as the medium term target. On this basis, currently approximately 1,278 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 724.

On the basis of NRM recommendation approximately 2,148 beds will be required to be provided gradually until 2037. According to WHO standards the future requirement of doctors comes out to be 1,159. The strategies for short term plan are; improve access to healthcare facilities, availability of skilled workforce, unavailability of laboratorial facilities and poor condition of BHUs and RHCs. The long term plan includes the provision and enhancement of Mobile Health Unit, upgradation 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, upgradation of BHUs, RHCs and MCHCs, research and development propgramme for doctors and paramedics staff, provision of diagnostic facilities. The immediate action plan involves the rehabilitation of Civil Hospital. The recommendations for economic development plan area; rehabilitation and improvement in existing hospitals, establishment of new units and participation of private sector.

2.3 Recreational

There is one park in Sujawal Town, there is dire need of parks and recreational facilities in town. Some issues are; disappearance of incidental open spaces, lack of preservation of recreational spots, lack of planned open spaces, in-active tourist development program, weak tourism marketing, unavailability of basic facilities, encroachments and no provision of playgrounds.

The short term plan includes the restoration and maintenance of open spaces, preservation of cultural heritage, and construction/rehabilitation of parks, playgrounds and recreational facilities, construction of auditoriums and upgradation of art councils. The strategies for long term plan are to provide recreational infrastructure, feasibility study for establishment of museum and research centre, youth development programme and promote tourism. The priority projects includes the rehabilitation/construction of parks and playgrounds, provision of missing facilities in existing services, construction of auditoriums, upgradation of art councils and feasibility study for establishment of museum and research centre. The immediate action plan involves the provision of parks, construction of multi-purpose sports complex, provision of community hall and public library.

3. Economic Development

3.1 Irrigation

District Sujawal is irrigated, mainly, by Indus River and canals. However, other modes of land irrigation like tube wells are also used. Irrigation is done mostly through canals and tube wells. Land utilization was decreased due to unsupplied of irrigation water and high rates of fertilizers and pesticides.

3.2 Agriculture

This area produces Rice, Wheat, Sugarcane and Cotton. Total reported area of the district is about 1,735,000 hectares, out of this cultivated area is up to 336,000 hectares. The major issues are that the high price of inputs, absence of farm to market roads, lack of development of agricultural research centres, water logging and salinity, lack of tube well installation facilities, shortage of irrigation water, irrigation and drainage.

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.

3.3 Livestock and Fisheries

District Sujawal is richly populated area having a population of large and small animals. Animal population of district is highest number of cattle having 411,000 heads followed by buffaloes 36,700 heads and Goats 351,000. Unfortunately, this the sector despite being the second most important sector in the local economy, has not been given due importance in the past. The scattered cattle farms will need to be consolidated away from population outside the town. The issues include limited knowledge and facilities, secondary source of income, reduced area for natural grazing and climate change. The annual production of fish in district is approximately 17,204 M.Tons. There is need to develop and implement a broad-based fisheries policy which is required for accelerated development of 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, and collection of statistical fish data and enforcement of fisheries enactment. ADP has already initiated a project on sustainable livestock development for rural Sindh. The recommendations for economic development plan are; establishment of new cattle and fish farms. There is need to develop broad-based fisheries policy to modernize the fisheries sector, including construction of landing areas business halls.

3.4 Industries

Most of the industries in Sujawal Districts are pertaining to the Textile, Sugar and agriculture Field. Famous among these include sugar mills, textile mills, flour mill, ice factory, Rice Husking Mills etc. Recent addition

to the industrial units is the Car manufacturing plant near Budho Talpur, belonging to the Dewan Group. Vocational training for women should be encouraged and small industrial zone should be established.

The short term plan includes to modernize the service sector, support industrial development, 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 project should focus on the construction and rehabilitation of Cottage Industries. The projects for economic development plan are; addition in industrial units, provision of training to local workers, extension of industrial estate's area and provision of incentives to private investors.

3.5 Trade and Commerce

There is the presence of strong local retail market along the main road with numerous food shops. There are several banks and mobile facilitation centers. The major issues of this sector are; failure of PPP, demise of local agriculture market and un-planned local business activities.

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 storages and warehouses. The immediate action plan focuses on the rehabilitation of commercial area along Mirpur Bathoro Road-Thatta and Sujawal-Thatta Road, provision of pedestrian facility in the Bazaar area, upgradation of Bazaar area's Roads, and rehabilitation of residential cum commercial areas, banned heavy vehicles during peak hours and removal of encroachments. An important step towards economic development will be encouragement for establishment of micro-financial services in Sujawal.

4. Basic Utilities

4.1 Water Supply

Indus River is the main source of potable water that simultaneously off takes through several canal systems from left side of Kotri barrage such as Phuleli, Pinjari and Paro which feeds to the Sujawal Town. There are two pumping stations on main Sujawal Road and storage reservoirs from where water is pumped into distribution networks. The present supply of water is 0.13 mgd while the per capita daily demand is 1.06 mgd. The issues of water supply are; high proportion of non-revenue water, ageing infrastructure, leaking of water mains, poor water quality, inadequate water treatment facility, no provision of water sample testing, inadequate existing supply, contamination of water by sewage and intermittent water supply.

It is expected that the town of Sujawal will have a population of about 54,777 persons by 2037 and the daily demand of the town will be about 1.64 mgd. The short term plan includes the rehabilitation of existing water supply network, design of water supply pipes should ensure no contamination of water, and preference should be given to rehabilitate existing schemes and construction of water treatment plant. 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, procurement of

land for water works, rehabilitation of existing water supply network, installation of new water supply network and construction of OH tanks. The immediate action plan includes the construction of water filtration plant, construction of OH tanks and construction and rehabilitation of water supply scheme.

4.2 Sewerage and Drainage

The major issues identified are; absence of sewerage and drainage plans, limited budget allocation for sewerage facilities, improper operation and maintenance of sewerage facilities and insufficient sewerage facilities. Sewerage water flows at 70% of the water supply therefor presently against the water demand of 1.06 mgd the sewerage water flows is 0.74 mgd.

In the next twenty years, 1.15 mgd sewerage water will be generated against the estimated water supply of 1.64 mgd. The strategies for short term plan are; priority for sanitation given to un-served areas, development of sanitation plan, 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, and construction of WWTP and land acquisition for stabilization ponds. The priority projects need to focus on the construction and rehabilitation of drains and rehabilitation of waste water disposal station. The immediate action plan involves the removal of existing waste water collection pond, construction of WWTP, and interconnections of open nallis with underground sewers.

4.3 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 and hazardous waste and segregation of organic waste. Considering the waste generation rate for design purpose as 0.45 kg per capita per day, with the current (2017) population of the town committee of Sujawal as 31,676 the total solid waste production in the town is approx. 14.3 tons per day.

It is planned for 2037 there will be 12.5 tons per day solid waste management. The strategies for short term plan are; to develop an effective and efficient solid waste collection system, segregation of 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 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

There are power generation stations adjacent to Sujawal (TC) in Jhimpir and Gharo; they are connected with WAPDA network. Some of the major issues are; of persisting supply short fall, frequent breakdowns and load shedding, distribution and transmission losses.

The strategies for the development 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 and feasibility study for alternate energy sources. The immediate action plan focus on the usage of Arial Bundle Cable wires, upgradation of existing grid station, promote energy efficient appliances, provision of streetlights and installation of wall mounted streetlights.

5.2 Gas Supply

Out of 188 houses surveyed by the Consultants 84% had the piped gas available to them. 16% of the houses having no gas availability are using alternate sources of fuel. 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.

5.3 Transportation

Sujawal has significant connectivity with surrounding towns as well as other parts of the country through the regional and national road network. N-5 National Highway is connecting Sujawal- Thatta and Badin with Hyderabad and rest of the country. Sujawal has direct access to both airports i.e. Hyderabad Domestic Airport via N-5 via Kotri-Hyderabad Road and Jinnah International airport via N5 road. The City is not directly linked with the national network of Pakistan Railways. The issues include poor condition of roads, no formal bus terminal, insufficient farm-to-market roads, traffic congestion, unavailability of traffic signals, absence of street lightening, encroachments on roads, unorganized Qinqui and Rikshaw stands, lack of road safety, drainage issues on road, unplanned street network and absence of public transport.

The strategies for short term plan are; 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 and improvement of roads, construction and rehabilitation of street lightening on roads and construction of Sujawal Bus Terminal. The immediate action plan includes the dualization and rehabilitation of major road, rehabilitation of roads and streets, provision of parking areas and installation of monuments.

5.4 Communication

The survey conducted by the consultants shows that approximately 95% households use mobile phones out of the 188 households surveyed. Only 9% are using internet and remaining 91% are still without using this new technology, the users are increasing day by day. Importance of Communication Infrastructure is that a well-maintained Communication network are the basic requirements for an efficient and profitable agricultural sector.

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.

6. Environment and Disaster Risk Management

6.1 Environment

According to the seismic zone map of Pakistan, the Sujawal district is situated at zone where moderate to severe damage can occur. The DHQ-Town Sujawal is located in the eastern and western side of the Indus River, where there is a number of Reserve Forests. The terrain of Sujawal District is quiet even, gently sloping towards the Arabian Sea. 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 proposed to ensure environmental sustainability, enforcement 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 like Lohiro, Khunbhat, Babul and Kandi.

6.2 Disaster Risk Management

District Sujawal is vulnerable to various natural and human induced hazards including floods, cyclones, droughts, sea Intrusions, deforestation of mangroves, water logging and salinities and earthquakes as natural hazards, while fires, civil unrests, road accidents and health epidemics are prominent human induced hazards. It was hit by 2010, 2011 and 2012 rains/ riverine floods. The relative severity of floods was ranked as medium in district Sujawal.

The strategies 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. “Designated Evacuation Shelters” are provided to the people after the disaster. It is a facility where residents who have fled due to the dangers of a natural disaster may stay for as long as is necessary until the dangers of the natural disaster have receded. The purpose of these facilities is to offer temporary shelter for residents who are unable to return home due to the natural disaster. All public buildings like schools, colleges, etc. or elevated areas would be used as shelter in case of any disaster in town. The shelters are designated by the town government and awareness about them should be created among the general public.

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.

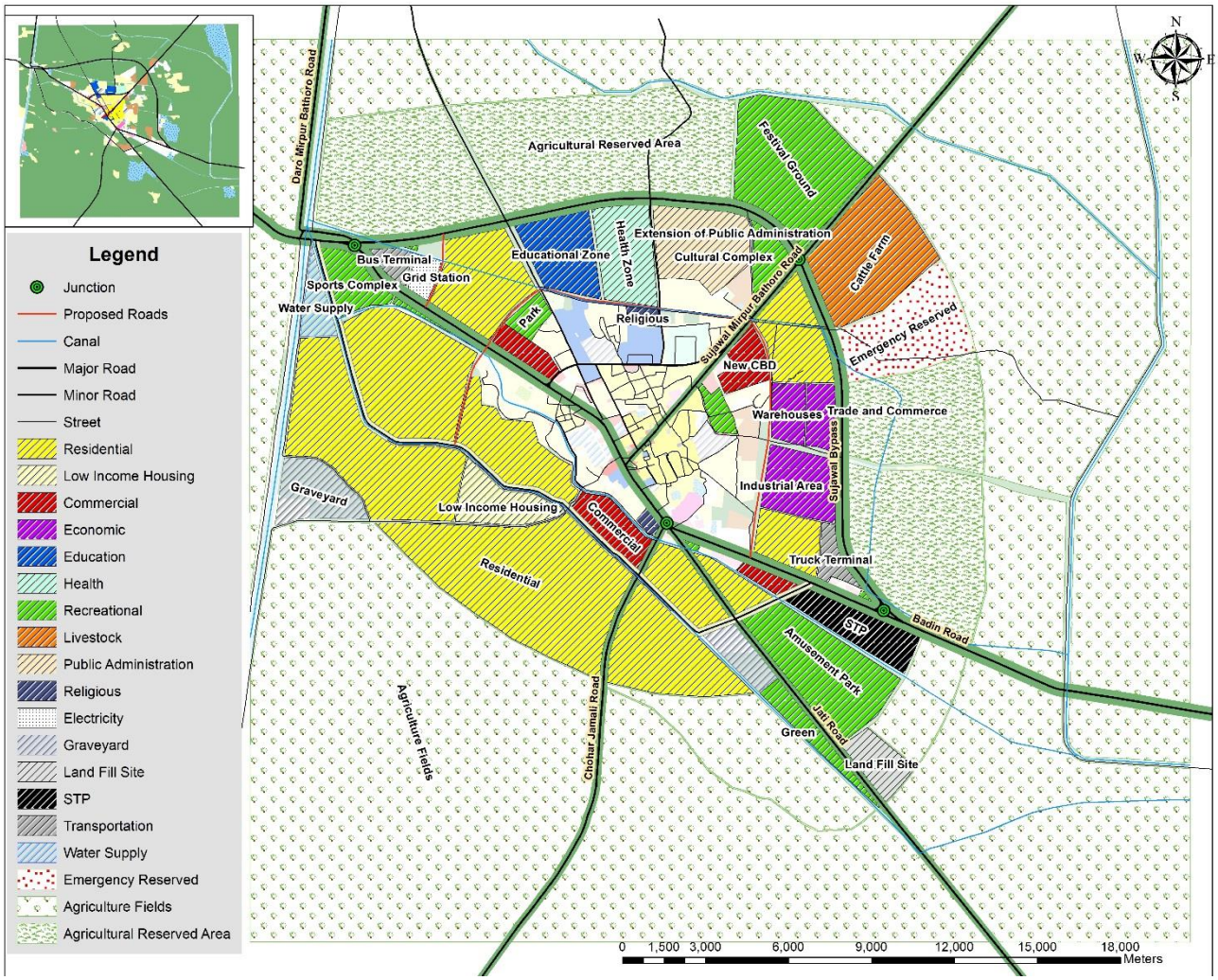
The "Project Management and Implementation Unit" shall supervise and coordinate respective urban developers involved in development activities, conduct monitory audits, prepare evaluation and impact reports. Planning and development department Government of Sindh shall lead "PMIU" to implement Master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

F. STRATEGIES FOR FUTURE DEVELOPMENT

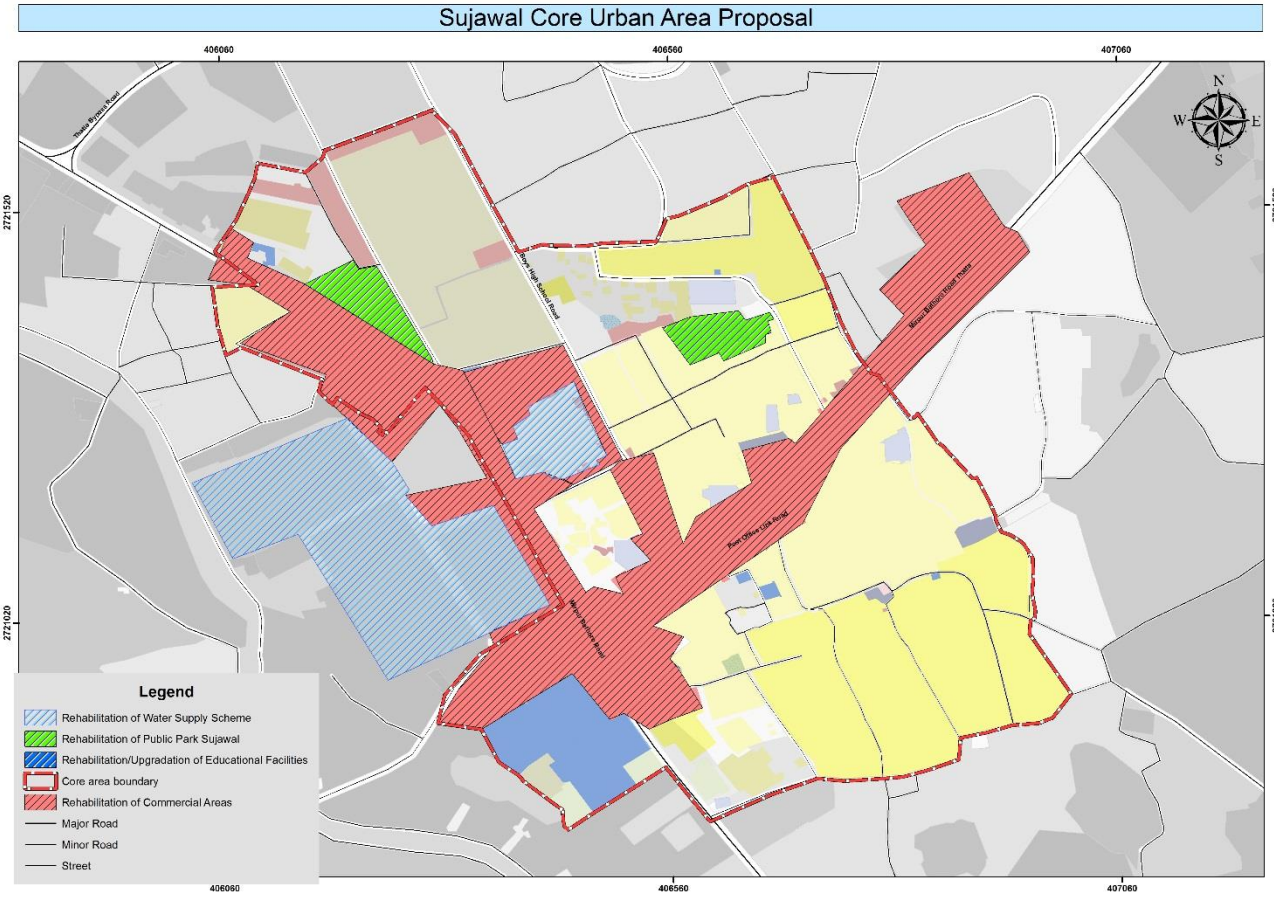
The strategies focus on revitalization of the affordable housing, provision of basic facilities, efficient transportation and communication, energy efficient technology, active service sector, implementation of pro-active governance, develop human resources, facilitate social infrastructure, reinforce 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

Proposed Master Plan for Sujawal Town



H. IMMEDIATE ACTION PLAN FOR CORE URBAN AREA SUJAWAL



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.

STRATEGIC DEVELOPMENT PLAN REPORT – SUJAWAL

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 SUJAWAL AND ITS ENVIRONMENTS

2.1 Sujawal District at Glance

Sujawal District is a new district of the Sindh province of Pakistan. It is located at 24°36'23" of North and 68°4'19" of East and is bordered in the northwest by the Indus River which separates it from district Thatta. According to the 1998 census, the population of District Sujawal (former Taluka of Thatta) was 513,702. The district has an area of 7335 km². District Sujawal is situated on the southern side of Sindh. It shares its borders with Thatta in the north-west. River Indus flows along this border. On the east is District Badin, on the North is District Tando M Khan and the Arabian Sea in the south.

Figure 2:1: Tehsil Map of Sujawal

Agriculture, District Sujawal is irrigated, mainly, by Indus River and canals. However, other modes of land irrigation like tube wells are also used. Irrigation is done mostly through canals and tube wells. Though agricultural land is very limited, yet the available cultivable land is very productive in this region. There are two main crop seasons; "Kharif" and "Rabi" in Sujawal District. The Kharif season starts from April-May and ends in October-November while the Rabi starts from November-December and ends in April-May. In district Sujawal, a good breed of buffalo and cow are found in the district. Sheep, goat, camel, horse, ass, and mule are also the main livestock of the district.

According to Population and Housing census of 2017, the population of district Sujawal is recorded as 781,967 souls with 10.9% urban population and 88.9% rural population, with 52% Male and 47.98% Female, with an average growth rate of 2.23%. The average Household size of Sujawal is 5.1 with 153,018 Housing units.

2.1.1 Geographical Location

District Sujawal lies in 24°36'23" of North and 68°4'19" of East and is bordered in the side of the northwest by the Indus River which separates it from the District Thatta.[1]

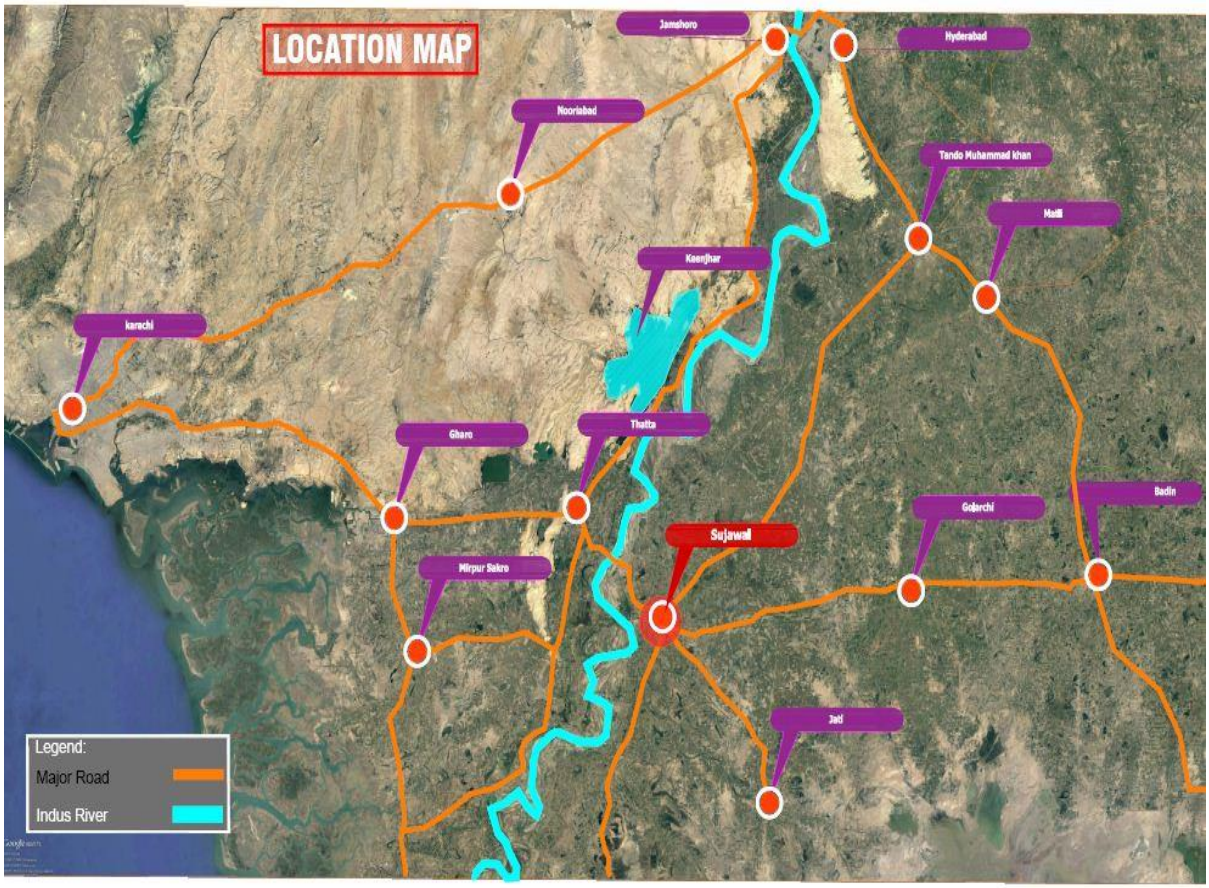


Figure 2:2: Geographical Location of Sujawal

2.1.2 Topography, Geology and Soils

In 2013, Sujawal was made a district after carving it out of district Thatta. Before 2013, Sujawal was a Taluka of District Thatta. The topography of project area is diversified, at the north western area of the district is a hilly tract, known as Kohistan connecting with the mountainous area of Dadu and Kalat districts, known as the Kirthar Range. The south-western area of the district is sand, "Kallar" (salt incrustation) and sea affected, while the south-eastern portion adjoining the Rann of Kutch on the border of India is also a desert-like sandy area with scattered human habitations. The southern area known as Kharo tract is the coastal zone of the Arabian Sea.[2]

In terms of use, the lands in the district can be divided into five major categories; lands not available or fit for agriculture, those under arable agriculture, forests, rough grazing lands and areas under human

[1] https://www.sindhidunya.com/sujawal-the-newly-formed-district/
[2] 1961 District Census Report Thatta

settlements. The soils are silt, clayey wet and saline. The natural vegetation found in the district can be divided into two categories-mangroves in the coastal or delta zone, and tropical thorns in the rest of the district.[3]

2.1.3 Demography

In accordance with the 1998 census of Pakistan, the population of the recently created districts Sujawal was 513,702 of which 8.93% lived in urban atmospheres. Sindhi is the most commonly spoken language of the district. In 1998, Sujawal was the Taluka of District Thatta and it is newly made district in 2013. According to the census 2017, district Sujawal is rural by its characteristics and 89% of the population resides in the rural area as compared to the 11% that resides in the urban areas with the population density of 89.89/km^2.

Table 2-1 Demographic Projections: District Sujawal

Project Area	Population		AGR		Average Household Size		Households	
	Census 1998	Census 2017	Census 1998	Census 2017	Census 1998	Census 2017	Census 1998	Census 2017
Sujawal District	513,702	781,967	2.08%	2.23%	4.8	5.1	106,510	153,018

Source: Population Census 1998 and 2017

2.1.4 Climate

This district has a very normal and moderate climate, hot in summer and cold in winter. During the peak of the summer season, the temperature might rise to 106° Fahrenheit during the day time, but in winter months, the minimum temperature might fall below 19° Fahrenheit. The average or net rainfall in the district is 48 millimetres.[4]

2.1.5 Ethnicity, Culture and Politics

District Sujawal also has its deep-rooted cultural values. The dress of men and women is simple and varies according to season. Men wear mostly cotton shalwar and kameez in summer and silk or woolen clothes in winter. Females wear loose shalwar kameez. For purdah, women wear burkas and some wear chaddar. Mostly on festivals, women wear Saari and gharries of Punjabi style. Women generally wore gold and silver ointments.

District Sujawal represents the traditional Sindhi culture. Sindhi is the major language of the district, although Urdu is also spoken and understood. Besides, Seraiki and Balochi are also spoken in the city area. Islam is the major religion of this district representing 96.2% of the population. The caste system is very strong in this region. Majority of the population of Sujawal district belongs to indigenous Sindhi clans.

[3] District Disaster Management Plan (July 2017 - June 2027)
[4] https://www.sindhidunya.com/sujawal-the-newly-formed-district/

2.1.6 Administrative Set-up

The recently created district is being made to smooth the administrative affairs of the place. Sujawal District is subcategorized into 5 tehsils Jaati, Mirpur Bathoro, Shah Bandar, Kharo Chan, and Sujawal.

Table 2-2: Administrative Set-up of District Sujawal

S. No.	Name of Talukas'	No. of Municipal Committees'	No. of Town Committees'
01	Sujawal	00	01
02	Mirpur bathoro	00	02
03	Jati	00	01
04	Shah Bandur	00	01
05	Kharo Chan	00	00
Total		**00**	**04**

2.1.7 Major Linkages

Sujawal city is situated, 130 kilometers east of Karachi, on the national highway (N5). This highway passes through district Thatta to Sujawal for a length of 112 kilometers. The district headquarter of Sujawal is connected with other Talukas through well-built roads. Although these roads are single, but are of good quality.

2.2 Sujawal Town

2.2.1 History

District Sujawal is one of the oldest regions of Indus civilization. The majority of the population of the Sujawal district belongs to indigenous Sindhi clans. Jokhio, Palijo, Sheerazi, Soomro, Samoon, Syed, Memon, Khuwaja, and Mirbahar are the main tribes of the project area.[5] This region was an important administrative office for many rulers in the ancient Indus civilization. Due to the shifting nature of the Indus River.[6] Sujawal got its name from its illustrious resident "Sujawal Khaskheli" who was known to be a loyal servant of the 19th century Sindh ruler Mir Fateh Ali Khan Talpur. Mostly people are engaged in fishing, agriculture, a few are government employees and labourers.[7]

Most of the people are related to Agriculture but due to scarcity of water, they could not get a better yield. Underground water is also blackish in most of the areas. The main crops are Sugarcane, Rice, Wheat,

[5] ibid
[6] http://www.districtthatta.gos.pk/About.htm (accessed on 11/2/2013)
[7] SF_Sujawal-District-Culvert-Case-Study-2nd-version

Tomato and Banana.[8] In accordance to the statement, the right side of Indus River will contain ancient Thatta district and the left side will come under the jurisdiction of recently made Sujawal.[9]

2.2.2 Geography

It is situated at 24°36'23" of North and 68°4'19" of East and is bordered in the side of northwest by the Indus River which separates it from the District Thatta.

2.2.3 Demography

According to the 1998 census, the population of Sujawal town was 23,286. The population of Sujawal town had an estimated growth rate of 2.63% per annum. According to the census 2017, the population of Sujawal town is 35,325 with a growth rate of 2.22%. The average Household size of Sujawal TC in 1998 was 6.4 which has decreased to 5.0 in 2017.

Table 2-3: Present-Past Population Growth Trends

Project Area	Population		AGR		Average Household Size	
	Census 1998	Census 2017	Census 1998	Census 2017	Census 1998	Census 2017
Sujawal TC	23,286	35,325	2.63%	2.22%	6.4	5.0
Sujawal Taluka	127,299	198,587	2.14%	2.37%	5.3	5.0
Sujawal District	513,702	781,967	2.08%	2.23%	4.8	5.1

- **Future Projections**

  In the 1998 census, the population of Sujawal TC was 23,286 and in the 2017 census, the population of Sujawal TC jumped to 35,325 which is not a phenomenal increase. Based on the annual growth rate of 2017 census population of the town committee of Sujawal is projected as under:

Table 2-4: Future Projections for Sujawal TC

Year	Population (Sujawal TC)	
	District	(Town Committee)
1998	513,702	23,286
2017	781,967	35,325
2022	873,133	39,424
2027	974,927	43,999
2032	1,088,589	49,104
2037	1,215,502	54,802

Source: Census 2017 and Consultant's Estimates

[8] TMA - Thatta - LSU Assessment Report
[9] https://www.sindhidunya.com/sujawal-the-newly-formed-district/

2.3 Urban Morphology

Town shaped like an oval pattern of irregular shape. The city extended in two directions i.e. north-east and north-west along National Highway N-5 (Thatta-Sujawal road). Town's spatial growth during last 7 years was hardly 5% of built-up area increased at outskirts of town area mainly Sujawal- Mirpur Bathoro road. The city grew mainly in north-east and north-west directions. The administrative complex and offices i.e. DC office, Session Court, police station, SSP office etc. are situated along Thatta-Sujawal Road which passes through the centre of city.

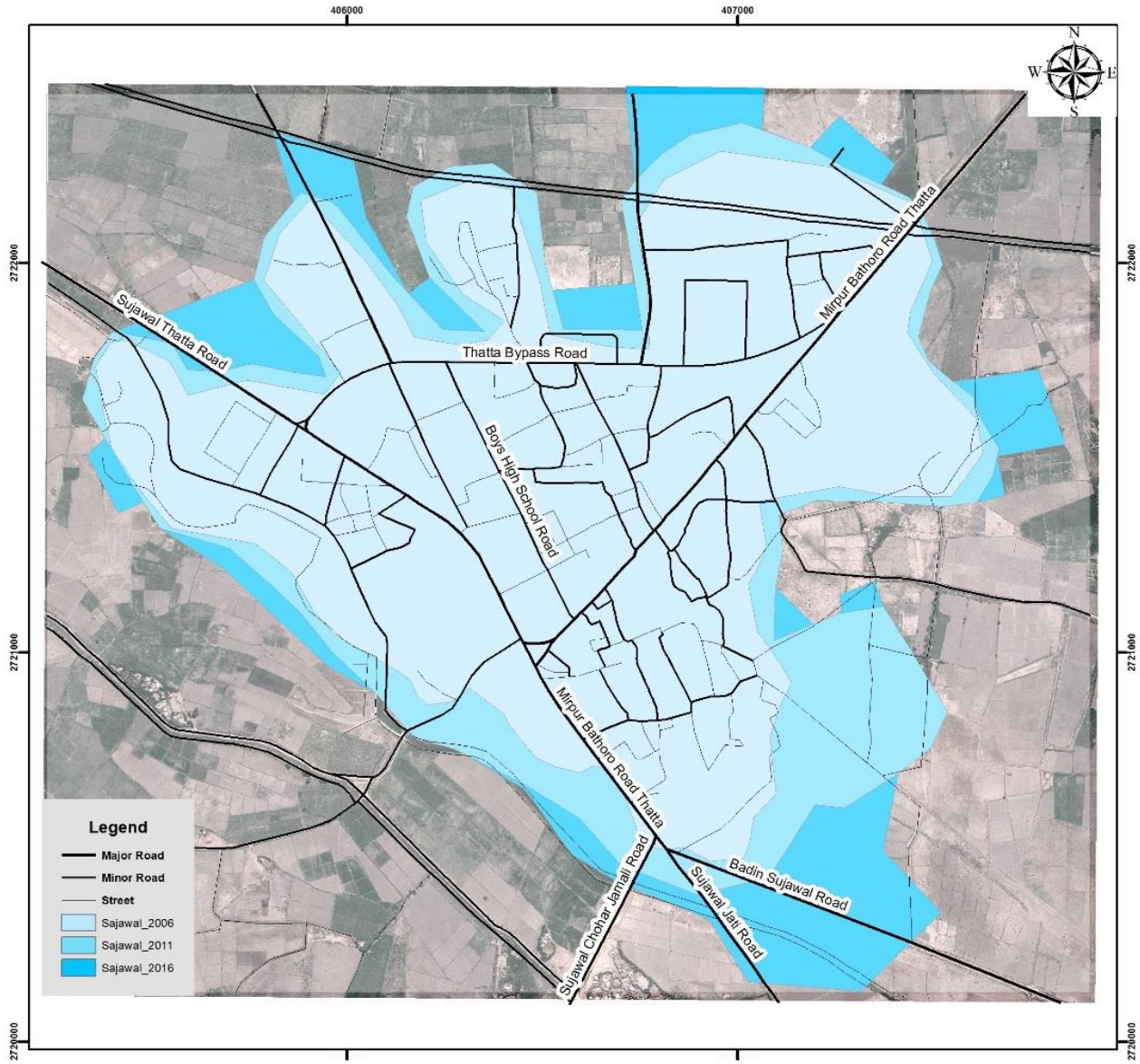


Figure 2:3: Historical Map of Sujawal Town

2.4 Land Use and Spatial Analysis

The built-up area of Sujawal Town comprises on around 564.5 acres of land as compare to consultant's urban boundary is 1524.82 acres. The land use analysis indicates that almost 20.6% of total urban boundary area is in use of residential purpose only. 47.9% of the area is covered by agriculture fields. Table below depicts the overall Landuse classification and percentages of different Landuses

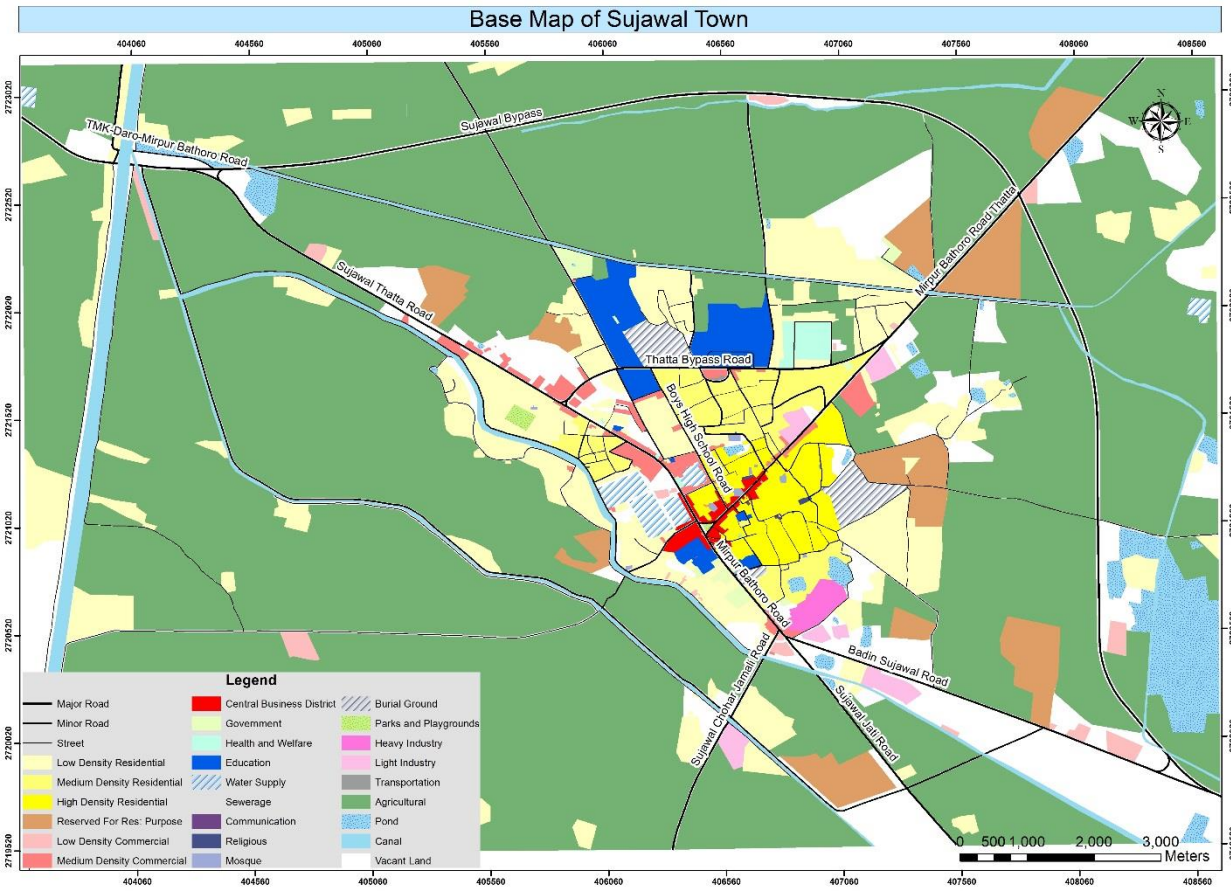


Figure 2:4: Land use Map of Sujawal Town

Table 2-5: Land use Classification and Percentages

Sujawal Town (Urban Boundary)				21296.0
CATEGORIES	**LANDUSE CLASSIFICATION**			**AREA (ACRES)**
URBAN	Residential	Residential	Low Density Residential	359.1
			Medium Density Residential	67.2
			High Density Residential	61.1
			Mix Development	
			Proposed Housing Schemes	135.0
			Sub Total	622.5
	Commercial	Commercial	Low Density Commercial	32.8
			Medium Density Commercial	27.7
			High Density Commercial/ CBD	9.0
			Sub Total	116.0
	Parks and Playground	Parks and Playground	Parks and Playgrounds	2.5
			Sub Total	2.5
	Amenities	Institutional	Education	50.4
			Public Administration	9.9
			Health And Welfare	9.6
			Religious	2.3
		Utilities And Municipal Service Facilities	Electricity	0.0
			Sewerage	0.0
			Water Supply	18.1
		Burial Ground	Burial Ground	24.2
			Sub Total	114.5
	Industrial	Manufacturing	Small-Scale Manufacturing/ Light Industry	17.6
			Large-Scale Manufacturing/ Heavy Industry	8.5
			Sub Total	26.2
	Transportation	Transportation	Transportation	0.3
			Sub Total	0.3
			Sub Total	881.9
NON-URBAN	Agriculture And Forestry		Agricultural	3010.0
			Sub Total	3010.0
	Water Bodies		Canal	114.3
			Water Bodies	97.8
			Sub Total	212.1
	Vacant Area			354.9
	Total			354.9
TOTAL				**4458.9**

Source: Spatial Analysis done by Consultants

2.5 Existing Zonal Plan:

Zone 1:

Zone 1 contains Misri Shah Graveyard. It also comprises of mix development of residential and commercial area consisting of various housing colonies. This zone also contain Police station.

Zone 2:

This zone old commercial area as well core urban area of Sujawal Town. It comprises mix development with education, health and administration facilities. Thus this could be also referred as the CBD of the town.

Zone 3:

This zone has water reservoirs and water canal. It's also consist of mix development mainly commercial activities along the Badin Sujawal Road.

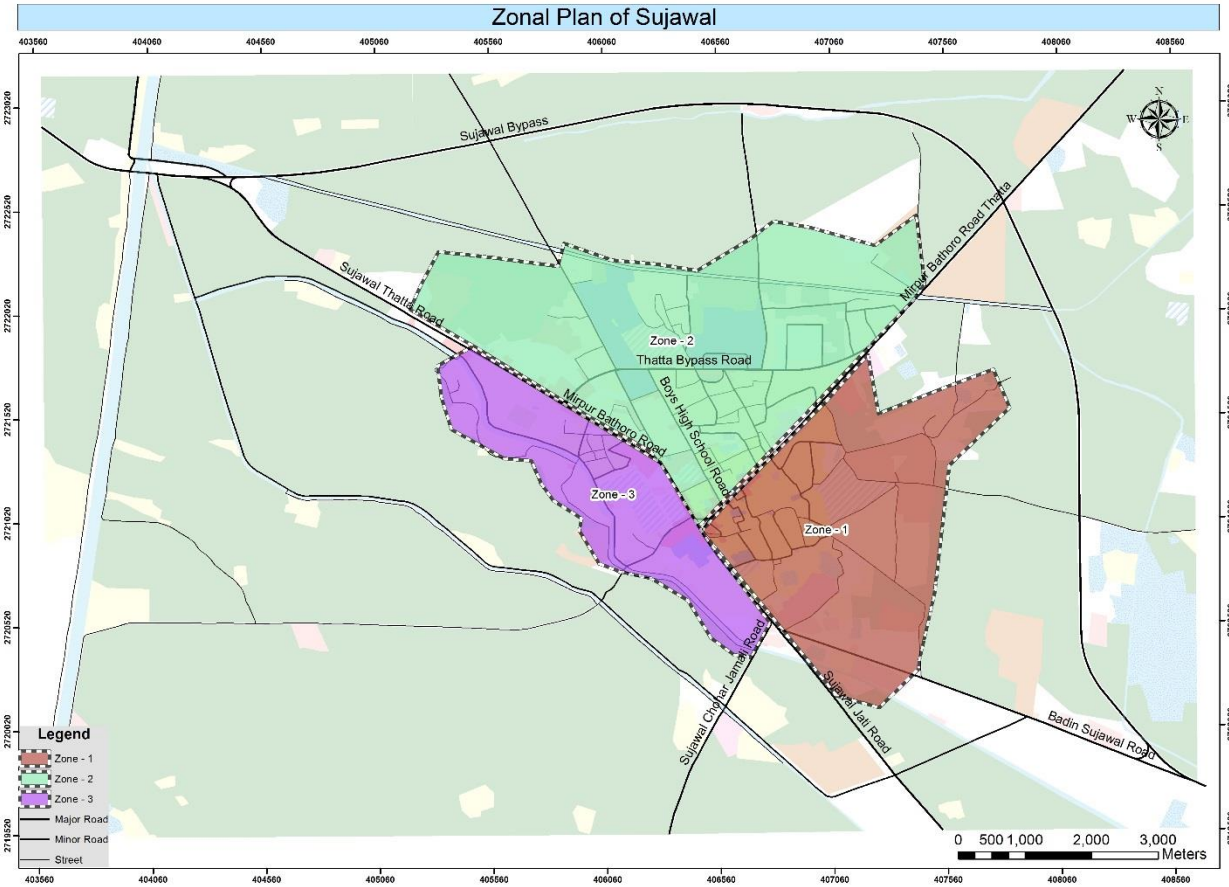


Figure 2:5: Sujawal Zonal Map

Residential

Govt. Girls Primary School Civil Hospital

Commercial

Barren Land

Graveyard

Press Club Sujawal

Figure 2:6 : Pictures of various types of Land uses

3. STRATEGIC DEVELOPMENT PLAN REPORT

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 Sujawal 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 **Sujawal'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 Sujawal'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.

SUJAWAL 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 SUJAWAL TOWN

4. PROPOSED MASTER PLAN OF SUJAWAL

4.1 Spatial Pattern

Sujawal got its name from its illustrious resident "Sujawal Khaskheli" who was known to be a loyal servant of the 19th century Sindh Ruler, Mir Fateh Ali Khan Talpur. In 2013, Sujawal was made a district after carving it out from District Thatta. Likewise Sujawal District, Sujawal Town is also a newly created District Headquarter Town.

District Sujawal is one of the oldest regions of Indus civilization. The majority of the population of the Sujawal District belongs to indigenous Sindhi clans. Sujawal is bordered in the northwest by the Indus River which separates it from District Thatta. It is situated on the southern side of Sindh. On the east is District Badin, on the north is District Tando Muhammad Khan and the Arabian Sea is in the south.

Sujawal is irrigated mainly by Indus River, mostly through canals and tube wells. Though agricultural land is very limited, yet the available cultivable land is very productive in this region. The main crops are sugarcane, rice, wheat, tomato and banana. In Sujawal, good breed of buffalos and cows are found. Sheep, goat, camel, horse, ass, and mule are also the main livestock of the district.

The topography of the district is diversified. The northern part of the district is a hilly tract, known as Kohistan connected with a Kirthar Range of mountains. The south-western area of the district is sand, Kallar (salt incrustation and sea affected), while the south-eastern portion adjoining the Rann of Kutch on the border of India is also a desert-like sandy area with scattered human habitations. The southern area known as the Kharo tract is the coastal zone of the Arabian Sea.

Sujawal Town is situated at a distance of 130 kilometers from Karachi, 30 kilometers from Thatta and 80 kilometers from Tando Muhammad Khan and Badin. It is also connected with other talukas of Sujawal District through road network. Sujawal Town has an irregular shape, though it looks like a hat in an inclined position. The town is extended in three perpendicular directions i.e. northwest towards Thatta, northeast towards Mirpur Bathoro, and southeast towards Badin.

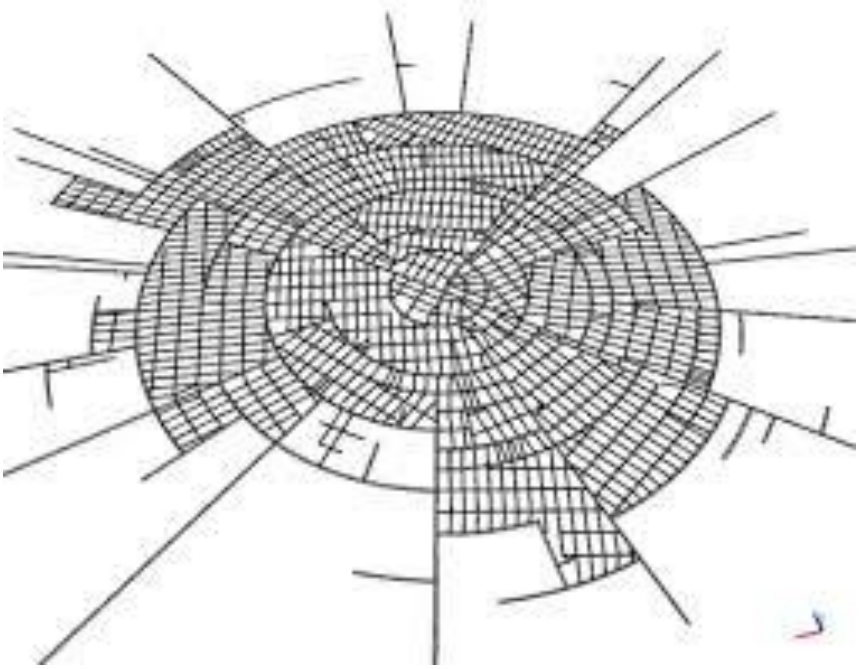
4.2 Basic Urban Form

The existing town is a small size lively and thriving urban center 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 Jati, Shah Bandar and Kharo Chan.

It is no surprise then that the population demands the uniqueness and prominence of the existing town to be maintained or enhanced in the future plan. During the stakeholder's conference, the town elders

insisted that any future urban development detached from the existing town making the existing town a redundant, will not be acceptable to them.

The existing core town would naturally be the physical nucleus of the future town, and the future development will radiate from it in all directions in form of different sectors.



At present there are three major perpendicular roads of Thatta in northwest, Mirpur Bathoro in northeast and Badin in southeast, all of these roads are converging to the core area of Sujawal Town. In addition, Jati and Chohar Jamali Roads are going towards south, while Daro Road going towards north.

In category of bypasses, Thatta Bypass exists inside the town, which is now serving as one of the important road of the town. Other than this, there is an existing Sujawal Bypass in the northeastern side of the town. It is taking off from Thatta Road, crossing Mirpur Bathoro Road at its peak and finally landing at Badin Road. This bypass can be termed as Main Sujawal Bypass, as it is providing three major connections with Thatta, Mirpur Bathoro and Badin Towns. Moreover, a road in southwestern direction, nearly parallel to Thatta and Badin Roads, is forming an important link, can be named as Sujawal Link Road.

Since this town is not large enough neither in terms of its spatial spread, nor in its projected future population, thus there is no new major outer connectivity has been created. Instead of bypasses and ring roads, a parallel New Road is proposed in between Main Sujawal Bypass and Thatta Bypass. In this way, interconnection of the perpendicular and parallel roads within the Main Sujawal Bypass and Sujawal Link Road, will keeps the development compact.

4.3 Proposed Master Plan

The Proposed Master Plan for Sujawal 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 Sujawal Master Plan is 5,200 acres approx. for a population of 55,000 by 2037. In this way, Sujawal Town in next twenty years is expected to have population density of 11 persons per acre and overall eight housing units per acre with an average household size of 5.0.

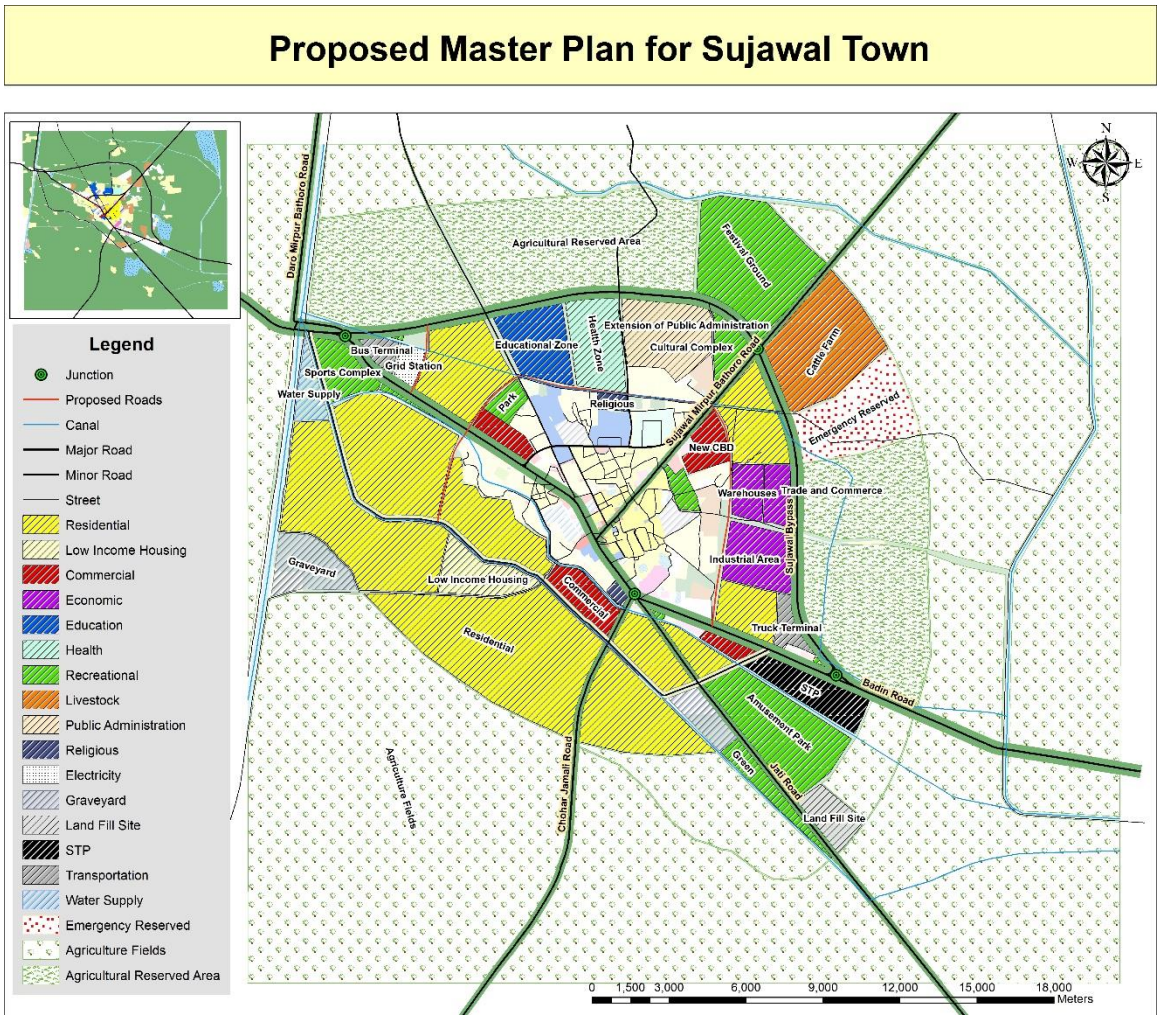


Figure 4:1: Proposed Master Plan for Sujawal Town

The hallmark of the plan is that it is **compact without being congested**. As the future expansion of the Sujawal Town is expected to be medium size, thus the complete Proposed Sujawal 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 plan is hemispherical in form with three major arteries arranged in perpendicular fashion, caped with a D-shaped main bypass and based with a link road. These major arteries are Thatta, Mirpur Bathoro and Badin Roads. The Main Sujawal Bypass is making a D-shaped

curve, which is based with Sujawal Link Road. A New Road is proposed in between and parallel to Thatta Bypass and Main Sujawal Bypass.

Two main commercial centers are placed along perpendicular and central artery of Mirpur Bathoro, while two sub commercial centers are along parallel roads of Thatta and Badin. The other prime activities are placed around the existing town, mostly within the Main Sujawal Bypass and Sujawal Link Road. Thus the intersection of perpendicular and parallel roads with Main Sujawal Bypass and Sujawal Link Road 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

- In order to cater small though scattered town, two main commercial centers are proposed along Mirpur Bathoro Road and Sujawal Link Road. On the other hand two sub commercials are suggested at Thatta and Badin Roads.
- Due to connectivity corridor, all economic activities like Industrial, Warehouses, Trade and Commerce, are placed along Main Sujawal Bypass.
- As the economic activities are proposed along Main Sujawal Bypass, thus Truck Terminal is also placed there, which is also accessible from Badin Road. While, a Public Transport Terminal is designated along Thatta Road and it is also approachable from Main Sujawal Bypass.
- Two sites for graveyards have been reserved along Jati Road and at extreme west side of the town before Canal.
- The Cattle Park is proposed in the northeast direction, along Mirpur Bathoro Road and also accessible from Main Sujawal Bypass, to limit the town development further. It will also benefit the population of nearby villages and other settlements.
- Considering the location of existing health and educational facilities, the large areas for new Health and Educational Zones, are placed in between Main Sujawal Bypass and New Road.
- Two Large Parks with commercial areas, Cultural Complex near New Public Administration Area and Sports Complex towards Thatta are proposed for recreational activities. In addition there are two major recreational zones are proposed; Festival Grounds along Mirpur Bathoro Road and Amusement Park along Jati Road.
- In regards to DC Office, accessible from Mirpur Bathoro Road, site is designated for New Public Administration Area, to serve and manage this beautiful city of Sujawal.
- Along Main Sujawal Bypass, the areas have been reserved for agriculture, as these areas are benefitted with the existing irrigation network. This will be helpful in restricting housing development and preserving the agricultural farms from the onslaught of the housing projects by private sectors.

4.3.2 Main Sujawal Bypass and Sujawal Link Road

Considering the existing Sujawal Bypass in northeast and a link road in southwest direction; as important transport corridors, suggested to be named as Main Sujawal Bypass and Sujawal Link Road, respectively. With the combination of Main Sujawal Bypass and Sujawal Link Road, D-shaped transport corridors are developed, despite of typical ring road. However, both of these are connecting each other through Thatta and Badin Roads. The further detail is as follow:

i. Main Sujawal Bypass: The existing Sujawal Bypass is recently completed, providing three connections from Thatta (northwest), Mirpur Bathoro (northeast) and Badin (southwest). Thus it is recommended to develop as Main Sujawal Bypass.
ii. Sujawal Link Road: There is also a need to provide access to the southern part of the town as well. This link road is a parallel connection to Thatta-Badin Road. And it is starting from Thatta Road and ending at Badin Road. Thus it is recommended to be upgraded as Sujawal Link Road.

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 bypass and link road. As the areas on both sides of the bypass and link road will attract many developers. The land two hundred feet on both sides of the bypass and link road should be notified for development control where only planting of local trees should be allowed.

4.3.3 Perpendicular and Parallel Roads – Regional Connectivity

All proposed roads are existing major roads, providing transport connectivity with other urban and rural regional areas. Most of these roads are converging to core urban area, or in other words these roads are originating from the existing town. In this way, the existing town will remain focal point of all development along the roads. However, these roads are also serving as vital regional connections.

As a result, there are three proposed roads with increased ROW, which will serve as future regional connections. These roads are arranged in a perpendicular manner and includes;

i. Mirpur Bathoro Road (perpendicular connection)
ii. Thatta Road (parallel connection)
iii. Badin Road (parallel connection)

However it is very important to control upfront development along the major roads. Likewise existing bypass and link, 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[10]. 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 Sujawal as DHQ Town, secondary zoning i.e. Level-2, is also categorized accordingly, again in consideration to the NRM Standards[11]. The proposed land use zoning is shown in the table:

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	1,620	31.2%
2	Commercial	2-3%	Commercial	136	2.6%
3	Industrial	2-10%	Economic	320	6.2%
			Livestock		
			Industrial		
4	Institutional	3-5%	Health and Welfare	359	6.9%
			Educational		
			Religious		
			Public Administration		
5	Community Open Spaces	4-6%	Recreational	503	9.7%
6	Graveyards	2-3%	Graveyards	104	2.0%
7	Arterial Circulation & Terminals	15-20%	Transportation	546	10.5%
			Utilities and Services		
8	Protected Reserved	15-25%	Urban Forestation	1,609	31.0%
			Agriculture		
			Water Bodies		
			Vacant / Reserved		
	Total Area of Proposed Master Plan of Sujawal Town			5,197	100%

The total area requirement for full fledge city of Sujawal will be around 5,200 acres. As shown in the table of proposed land use classification, the percentages of residential and commercial areas are slightly lesser, in comparison to the NRM standards. Since the institutional area is of higher value, as it will also contain residences for employees / staff and some related commercial activities are also associated with institutional areas. In this way, institutional area is sharing the commercial and residential load as well. Despite this factor, all the other land uses are distributed as per the standard.

[10] 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

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

S.No	PROPOSED LAND USE CLASSIFICATION FOR SUJAWAL TOWN						
	Level - 1 Functional Zoning	Level - 2 Functional Zoning	Areas (acres approx.)		Land Uses (%)	Areas (acres approx.)	Land Uses (%)
1	Residential	Existing Residential	314	1,620	31.2%	1,620	31.2%
		Proposed Residential	1,306				
2	Commercial	Existing Commercial	24	136	2.6%	136	2.6%
		Commercial - Mirpur Bathoro	32				
		Commercial - Jati	40				
		Sub-Commercial - Thatta	22				
		Sub-Commercial - Badin	18				
3	Economic	Trade and Commerce	32	60	1.2%	320	6.2%
		Warehouses	28				
4	Livestock	Cattle Farms	170	170	3.3%		
5	Industrial	Existing Industries	20	90	1.7%		
		New Industrial Area	70				
6	Health and Welfare	Existing Health and Welfare	8	87	1.7%	359	6.9%
		Health and Welfare Area	79				
7	Educational	Existing Educational	58	133	2.6%		
		Educational Area	75				
8	Religious	Existing Religious	2	28	0.5%		
		Religious 1	12				
		Religious 2	14				
9	Public Administration	Existing Public Administration	8	111	2.1%		
		New Public Administration Area	103				

10	Recreational	Existing Parks and Playground	2	503	9.7%	503	9.7%
		Cultural Complex	32				
		Sports Complex	42				
		Festival Grounds	203				
		Amusement Park	154				
		Green	32				
		Large Park - Mirpur Btahoro	18				
		Large Park - Thatta	20				
11	Graveyards	Existing Graveyards	20	104	2.0%	104	2.0%
		Graveyard 1	24				
		Graveyard 2	60				
12	Transportation	Existing Transportation	96	397	7.6%	546	10.5%
		Public Transport Terminal	18				
		Truck Transport Terminal	25				
		Road Network	258				
13	Utilities and Services	Existing Utilities and Services	13	149	2.9%		
		Water Supply	25				
		Sewerage	58				
		Land Fill	38				
		Electricity	15				
14	Urban Forestation	Urban Forestation	155	155	3.0%	1,609	31.0%
15	Agriculture	Agricultural Reserved	1,099	1,099	21.1%		
16	Water Bodies	Canals and Ponds	221	221	4.3%		
17	Vacant	Emergency Reserved	134	134	2.6%		
		Total Area for Future Development of Sujawal	5,197	5,197	100%	5,197	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 1,600 acres of residential land use is proposed, which will create eight housing units per acre on average. Thus in overall town more than 13,000 housing units are expected to be in town by 2037.

There are existing vacant land parcels in overall town, specially in northwest and northeast 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 50 acres along Sujawal Link Road is proposed 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 [12]		
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.

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

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

Houses - Applicable SBCA Bylaws[13]

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 Sujawal Town, the trend of vertical development is almost not existing. However, 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[14]

[13] Houses/Bungalows, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.2, page no 141.

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

Types	Densities[15] 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

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:

- **Main Commercial Areas**
  Instead of a large CBD, there are two main commercial areas proposed, one is along Mirpur Bathoro Road and other along Sujawal Link Road. The main land uses of these commercial areas 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.

  Sujawal and it's environ have number of sites of historical significance including mainly Darghas and Temples. In addition, there is a potential to develop coastal areas of Shah Bandar and Kharo Chan as tourist spots.

  On the other hand, Sujawal is also a transport hub due to regional level economic activities with three major links i.e. Thatta, Mirpur Bathoro and Badin Towns. The travelling for business purpose is also generating demand for tourism related facilities. Considering the potential of tourism, the main commercial areas will also accommodate convention center, expo center, hotels, shopping malls, exhibition ground, etc.

[15] Residential Density Standards, as per Sindh Building & Town Planning Regulations, Chapter 20.3, page no 123.

- **Sub Commercial Centers**

  In continuation to the main commercial areas, it is recommended to place sub commercial centers to share the burden of commercial activities. Thus two sub commercial center are proposed along Thatta and Badin Roads 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[16][17]	**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 east of the town along New Road, trade and commerce area is positioned. It is placed in a way that it is also accessible from Main Sujawal Bypass. 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 along Main Sujawal Bypass and also accessible from New Road, next to trade and commerce. 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.

[16] Commercial, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.3, page no 143.

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

This area will also 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.

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[18]	**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 Sujawal is not only an agricultural town, local inhabitants also rely on livestock for another source of income. In this regard, to promote livestock production, Cattle Park is placed in northeast direction along Mirpur Bathoro Road and also accessible from Main Sujawal 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**[19]
  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.

[18] Industrial Areas, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.6, page no 145.
[19] 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:

Table 4-2 : New Industrial Estate [20]

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.		

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

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

- **New Industrial Area**

  At present mostly small scale industrial units along Badin and Mirpur Bathoro Roads are existing within Sujawal Town. In this regard, in east of the town, an area for New Industries has been proposed in between New Road and Main Sujawal Bypass. It is suggested to explore this New Industrial Area according to the economic need of the town. It is not recommended 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. It is suggested to promote agro based industries, local production and its associated market. The small scale industries will include flour mills, rice husking mills, ice factories, packaging of fruits and vegetables, feeder crops, handicrafts, souvenirs etc.

  Although in Sujawal District, there are large coal deposits and potential of large scale industries also present, not only agriculture related industries. However, this area is more appropriate to develop small to medium scale industries, and to avoid development of heavy industries inside the town in order to keep the city environment clean. Likewise, Laar Sugar Mill, Deewan Sugar Mill and recent addition of car manufacturing plant of Deewan Group near Budho Talpur; it is highly recommended to place large scale heavy industries outside the Sujawal Town.

  The following guidelines are for industrial zone development:

Permitted Uses	**Allied Permissible Uses**
- Small Scale Industries - Processing Units - Manufacturing Activities - Warehouses or Godowns - Workshops	- Showrooms - Mixed-used buildings - Residences for workers - Fueling stations
Applicable SBCA Bylaws[21]	**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

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

4.4.6 Health and Welfare Zone

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

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

- **Health and Welfare Area**

  Since Civil Hospital in Sujawal is already occupied and there is a need to establish full fledge public health facility for the residents of town and district as well. Thus, DHQ Hospital is proposed here as it is accessible from New Road and also from Main Sujawal Bypass. In this area DHQ Hospital with Medical and Nursing Colleges, staff residence, hostels, community and allied facilities will be developed to serve the district population. This area could also include; Rehabilitation Centers, Special children, Edhi Homes (orphanage / old age / women) etc.

  This health area is marked in north direction in regards to connectivity, in order to make it accessible for other towns as well and to attract private investment in health and welfare sector. This will serve the clinical as well as regular hospitalization needs like Maternity, Emergency, Dental, OPDs, Laboratories and Diagnosis, Pharmacies, Blood Banks, Physiotherapy Centers etc.

  It is widely possible that this area will also 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.

  The following guidelines are for health and welfare zone development:

Permitted Uses	Allied Permissible Uses
- Large Hospitals - Specialized treatment centers - Medical College - Dental College - Pharmaceutical College - Nursing College - Laboratories and Diagnostic Centers - Blood Banks - Health Research Institutes	- Staff Residences (medical and paramedic) - Separate Hostels for Boys and Girls - Auditoriums, seminar halls, workshop spaces - Community facilities (parks, playgrounds, schools, clinic, neighborhood commercial) - Support facilities (gym, health club, bus stops, taxi stand, banks, fueling stations)

Applicable SBCA Bylaws[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

4.4.7 Educational Zone

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

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

- **Educational Area**

  In Sujawal, north of the town along New Road and Main Sujawal Bypass, next to Health Area, an Educational Area is proposed and suggested mainly 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.

  It is also proposed to provide government degree colleges for boys and girls, separately in this area. 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 area to provide all kind of facilities for research and development in different fields.

  As the society is moving towards global dynamics, diversified fields of education will be prerequisite. These 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.

  The vocational center is also proposed for this area. It will cater need of under privileged youth for better skills and technical knowledge. This will provide space for skill development

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

centers, technical education for the local and surrounding population to accommodate in the current job market. It may 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 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[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

4.4.8 Religious Zone

In the proposed master plan two religious sites are allocated in the Sujawal Town. One is in the center of the town along Badin Road and second is located at New Road parallel to Main Sujawal Bypass. 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[24][25]	**Prohibited Uses**
- Plot Sizes: 1.0 acre or above	- Private residential housing schemes

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

- FP: 50% - FAR: 1:1.5 - Floors: G+2 (max)	- Large commercial activities

4.4.9 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**

  Considering the location of DC Office and future requirements, the New Public Administration Area is proposed accessible from Mirpur Bathoro Road towards northeast of the town.

  As Sujawal 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.

  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.

  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[26]	**Prohibited Uses**
- Plot Sizes: 1.0 acre or above - FP: 50% - FAR: 1:1.5 - Floors: G+2 (max)	- Private residential housing schemes - Large commercial activities

26 Ibid

4.4.10 Recreational Zone

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

- **Large Parks – Makli and Sujawal**
  There are two Large Parks proposed, one is with the main commercial at Mirpur Bathoro Road, while another is with sub commercial along New Road. 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 swings, sitting, walking, jogging with allied facilities of washrooms, tuck shops, parking etc.

- **Sports and Cultural Complexes**
  Next to New Public Administration Area, along Mirpur Bathoro Road at inner side of main Sujawal Bypass, Cultural Complex is proposed in northeast of the town. And the Sport Complex is proposed along Thatta Road, in northwest side of the town. These will include cricket, football, hockey and other ground, cultural center and gymnasium. These type of sports facilities will be as per standards to promote domestic sports.

- **Festival Grounds**
  Along Mirpur Bathoro Road and at outer side of Main Sujawal Bypass a huge area is located for the purpose of Festival Grounds. 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 in southeast direction along Jati Road, at outer side of Sujawal Link Road. 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. Moreover, Sujawal 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 Sujawal region as well.

The following guidelines are for recreational zone development:

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

4.4.11 Graveyards Zone

At present there are number of graveyards in the town, which have sufficient space available for immediate need. However, for long term there are two graveyards proposed, one in extreme west direction and other in southeast of the town along Jati Road. 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

4.4.12 Transportation Zone

In Sujawal Town, the transportation is mainly based on road network of major roads, link road and bypass 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, Sujawal is connected to both Karachi and Hyderabad Airport at a distance of 110 and 130 kilometers respectively via National Highway N5 and Thatta-Sujawal Road. An airstrip is located at Jungshahi Town in Thatta District, at a distance of 50 kilometers towards northwest via Thatta-Sujawal and Jungshahi Road. However, it is suggested that

residents of Sujawal Town should utilize Karachi and Hyderabad Airports, until Jungshahi Airstrip will be upgraded as full fledge airport. Thus a new airport for Sujawal Town is not feasible due to nearby airport facilities and with projected population.

- **Railway Connectivity**
  There is no railway station in Sujawal, however nearest railway station is Jungshahi Railway at a distance of 50 kilometers in Thatta District. Thus, it is suggested that residents of Sujawal Town should utilize this railway facilities.

- **Proposed Road Network**
  The proposed road network is originate from the existing perpendicular roads i.e. Thatta, Mirpur Bathoro and Badin Roads. And the major regional connectivity is developed through Main Sujawal Bypass. However, the widening and beatification of Mirpur Bathoro Road is forming the perpendicular and central connection in northeast direction, while Thatta and Badin Roads are creating parallel connections from southeast to northwest. And a Sujawal Link Road is proposed in southwestern direction between Thatta and Badin Roads.

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.	Main Sujawal Bypass (Sujawal Bypass)	200	200
ii.	Sujawal Link Road	150	100
iii.	Thatta Road	150	100
iv.	Mirpur Bathoro Road	150	100
v.	Badin Road	150	100
vi.	Jati Road	100	50
vii.	Chohar Jamali	100	50
viii.	Daro Road	100	50
ix.			
x.	New Road	100	50
ROW – property to property distance **Forestation on both side of ROW**			

Primary Roads: The proposed Main Sujawal Bypass running on the periphery of the town is considered as Primary Road. Its different segments are serving as bypasses without entering in the town. It 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 perpendicular roads connecting the town with other towns and the link road connecting southwestern side of the town. It will have a right of way of 150 feet (min) with three lanes, service road, median, footpaths, and parking and cycle/pedestrian tracks. These roads includes; Thatta, Mirpur Bathoro, Badin and Sujawal Link Roads.

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; Jati, Chohar Jamali and Daro Roads. It also includes proposed New Road parallel and in between Main Sujawal Bypass and Thatta Bypass.

- **Public Transport Terminal**

  The Public Transport Terminal is placed along Thatta Road in northwest side of the town, also accessible from Main Sujawal Bypass. 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 location of proposed economic activities, truck terminal is placed towards southeast along Badin Road also accessible from Main Sujawal Bypass. Since 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.

  Since Sujawal 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[27]	**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

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

4.4.13 Utilities and Services Zone

The utilities and services provision 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 supply sources is Indus River, from where water takes off through several canal systems from left side of Kotri Barrage such as Phuleli, Pinjari and Paro. In continuation towards northwest, an additional area along Thatta Road is proposed for water supply works. This additional area has been reserved to extend the water reservoirs as per the town's water demand and related water supply infrastructure. This increase will also cater to water supply filtration plant and other advance purification mechanism.

- **Sewage Treatment Plant**
  The area is designated for STP and its related uses, in southeast direction accessible from Badin Road and Sujawal Link Road. The site is 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.

- **Landfill Site**
  A landfill site is proposed at outskirts of town area, in southeast side considering wind direction. This landfill site is directly accessible from Jati Road. As the whole town will grow according to the master plan it will serve the population for next 20 years or even beyond.

- **Grid Station**
  Grid station in Sujawal is existing outside the town area along Mirpur Bathoro Road. For immediate need it is possible to extend the facility in the same premises. The extended facility will benefit the residents as per the need of the present consumption of the town. However the Grid Station is proposed for upcoming future load and requirement along Thatta Road, also accessible from Main Sujawal Bypass.

The following guidelines are for utilities and services zone development:

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

4.4.14 **Urban Forestation Zone**

Urban forestation along bypass, link road 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 Main Sujawal Bypass 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 urban forestation of 50 to 100 feet on both side of the Major Roads and Sujawal Link Road are also proposed depending upon their ROW, to avoid direct / upfront development along roads. All major roads crossings will have initially green roundabouts with enough space for grade separated junctions in the future.

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

The following guidelines are for urban forestation zone development:

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

4.4.15 **Agricultural Zone**

In order to limit the town development agricultural reserved areas are proposed mostly along Main Sujawal Bypass. 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, rice, sugarcane, cotton, jowar, maize, bajra, barley, gram, rapeseed, mustard, sesame and oil seeds.

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.

4.4.16 Water Bodies

The main water source is Indus River, from where water takes off through several canal systems from left side of Kotri Barrage such as Phuleli, Pinjari and Paro; which feeds to the Sujawal Town. Thus the beautification of these canals 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.

4.4.17 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 Sujawal Town but being on the peripheral area, would not disturb the town activities in general and it is directly accessible from Main Sujawal Bypass.

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.

SECTOR WISE PROPOSED STRATEGIES

5. HOUSING

5.1 Existing Situation

Based on 1993-98 estimates 134,648 housing units are required annually in urban Sindh. Only about 25% of the needs are met in the formal housing sector.

General housing condition of the surveyed houses was satisfactory. Sample survey of the town reveals that approx. 20% of the houses were constructed in between 6 to 10 years. 76% of the houses were below 120 sq. yards with an average of 6 members in each household.

With this average number of family members, 52% of the houses have only two rooms, As far as the utility services in the houses are concerned, basic services need improvement as the sample survey reveals 65% of the houses have drained (flush system) in their houses while 35% of the houses have un-drained toilets which requires manual cleaning.

Only 76% of the houses have piped supply (House Connection) while 11% of the houses use ground water by manual hand pumps. Conditions of drains are also alarming, 79% of the drains are open and only 4% of the households have covered drains. This section further elaborates the general housing condition of Sujawal town.

Table 5-1: Housing Statistics

ADMINISTRATION UNIT	Past Census 1998				Current Census 2017				Projected 2037	
	Population	AGR	No. of HH	HH Size	Population	AGR	No. of HH	HH Size	Population	No. of HH
Sujawal TC	23,286	2.22%	3,638	6.4	31,676	1.63%	6,317	5.1	43,769	8,574
Sujawal Taluka	127,299	2.37%	24,019	5.3	198,587	2.37%	39,127	5.1	317,252	62,206
Sujawal District	513,702	2.24%	211,354	5.8	781,967	2.24%	153,018	5.1	1,217,882	238,800

5.2 Issues

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.

5.3 SWOT analysis

HOUSING			
Strength	**Weakness**	**Opportunity**	**Threats**
1. 65% of the urban area population has pacca houses as per sample survey. 2. The trend of new housing schemes construction by private development is increasing. 3. Most of the formal population is served by electric and gas supply.	1. High prices of houses. 2. The informal housing sector lacks provision of utility services like gas supply, clean water and drainage facilities.	1. Demand for new planned housing schemes. 2. Demand for low income housing. 3. Demand for public housing projects. 4. More housing for local people of town. 5. Opportunity for local micro financing for housing. 6. 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. Increase to urban sprawl. 5. Inflation 6. Shortage of open spaces in urban areas. 7. Formation of urban slums. 8. Relocation of higher income groups to other towns.

5.4 Need Assessment

According to the results of the 2017 census population, Sujawal TC area had a household size of 5.0 person and total housing stock of 6,977 households, Most of them were listed as Pacca houses including Pacca (Brick construction) and RCC houses.

Table 5-2: Housing Backlog: Sujawal TC

S. No.	Housing	Population	Household Size	No. of HH
1.	**Present 2017**	35,325	5.0	6,977
2.	**Future 2037**	54,802	5.0	10,960
3.	**Additional Required (2017-2037)**		5.0	3,983
Source: Consultants Estimate 2018 & 2017 Census Report of Sujawal				

Based on projected Population for the year 2037 the increased population is 54,802 with an estimated additional housing requirement of 3,983 households.

5.5 Policy Guidelines

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

5.6 Policy Measures for Land

- 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.

5.7 Policy Measures for Housing Finance

- 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.

5.8 Policy Measures for Katchi Abadis, Squatter Settlements & Slums

- 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.

5.9 Policy Measures for Low Income Housing

- 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.
- 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.
- 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.
- Shifting / removal of illegal settlements from hazardous zones in addition to Up gradation / regularization of notified Katchi Abadis in Sujawal Town
- Construction of housing for low income group

5.10 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.

5.11 Priority Projects

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

➢ **Project Justification**

Significant households in Sujawal 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 Sujawal town, the status of ownership of houses is like 87% family owned and rent free. Whereas 13% of total households are on rent. The category of rental indicates housing gap.

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.

The site of SMBBT in Sujawal is located near Deputy Commissionaire office at Mirpur Bathoro Road. The site has been fully developed with 175 plots ready for allotments to poorest of society.

Description	Results
Present Population census 2017	**35,325**
out of total, 13% Population of Sujawal Town Living in rental houses with no house ownership	4592.25
Households required @ 5.0	918.45
Availability of SMBBT Fully developed Housing site with 175 plots	743.45

Approx. 745 Number of housing units up to 120 sq. yds will be proposed. Tentative five million cost per acres as development cost is estimated with all allied facilities and infrastructure. 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, Sujawal Town Committee, and HESCO etc.

- **Estimated Cost: 1,000 Million Approx**. (Short Term)

Project Name	Short Term	Proposed Area in Acres	Preliminary Cost in Million/- PKR)	Justification
Land Development for low income housing scheme	Short Term	50 acres	1000.00	744 housing unit's size up to 120 SY. For this we have assumed 20.0 million per acre cost covers land development & land acquisition for 50.0 Acres.

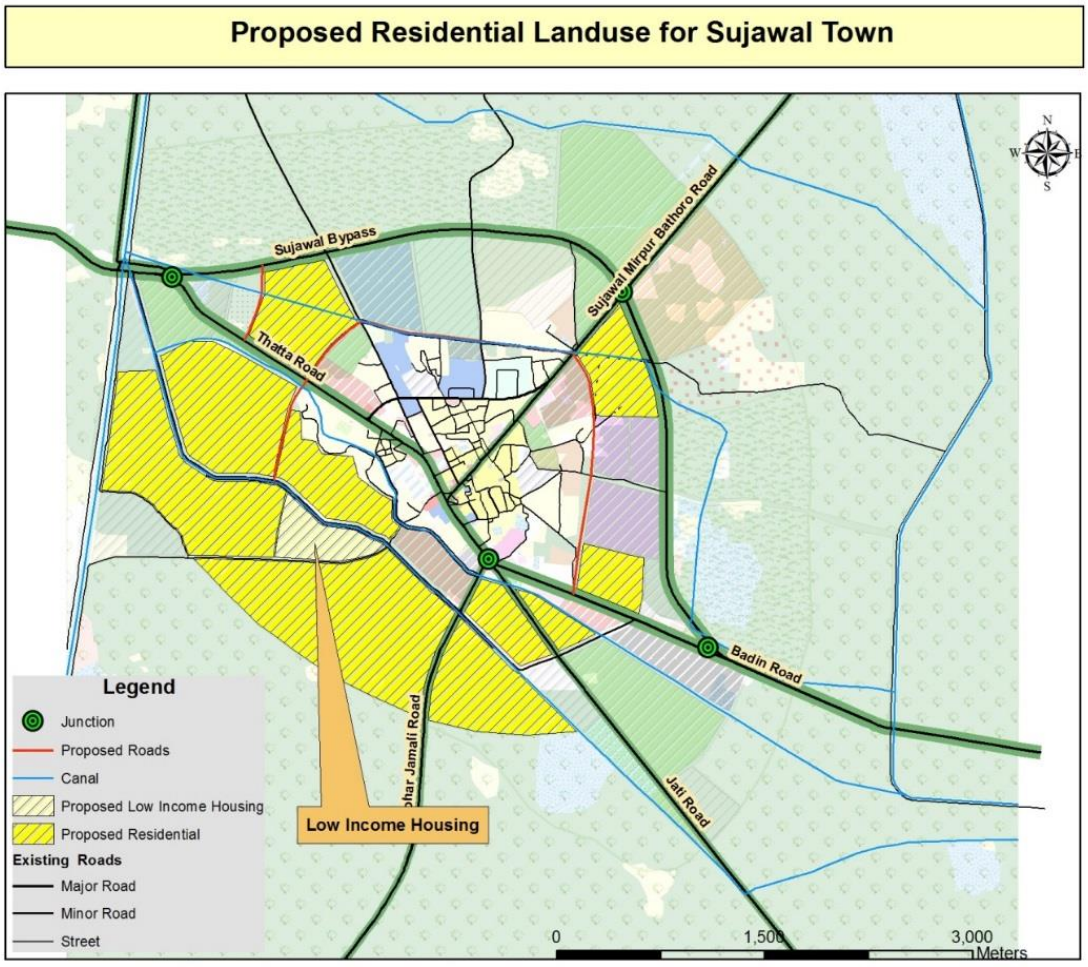


Figure 5:1: Proposal for Site Development for Low income Housing Scheme for Sujawal Town

6. SOCIAL INFRASTRUCTURE

6.1 Education

6.1.1 Existing Situation

In district Sujawal, there are 1,390 viable schools out of which 1,127 are functional, 130 schools are temporary dysfunctional, 46 schools are viable dysfunctional, and 87 are dysfunctional permanently. Furthermore, the total schools of the district sub-classified as 363 schools are for boys, 123 schools for girls and the remaining 904 schools are co-education out of the total viable schools of the district. The enrolment in viable schools of the district is 72,033 (male 48,435 and female 23,598), the number of teaching Staff is 2,618 out of which 2,217 are male and 401 are female teachers.

Figure 6:1: Govt. Primary School Sujawal

Furthermore, there are 1,336 primary schools in the district, out of which 1,078 are functional, 130 are temporary dysfunctional, 41 are viable dysfunctional, and 87 are permanently dysfunctional. Out of total primary schools in the district, 344 schools are for males, 107 for females, and other remaining 885 are co-education with an enrolment of 57,832 (male 37,512 and female 20,320) having Teaching Staff of about 1,960 out of which 1,739 are male and 221 are female teachers.

Additionally, the number of middle schools in the district is 29, out of these 24 are functional. Out of total middle schools in the district, 10 are for boys, 12 are for girls, and other remaining 7 schools are co-education. The enrolment in these schools is 947. Out of total enrolment, the number of boy's enrolment is 523 and girl's enrolment is 424, the number of teaching staff is 112 out of which 75 are male teachers and other 37 are female teachers.

Moreover, there is only one elementary school which is for only boys and enrolment in this school is 71 with teaching staff of 5. Also, the number of Secondary Schools in Sujawal is 18, out of which 6 are boys, 2 are girls, and the other 10 are co-education schools. The enrolment in secondary schools is 8,244 (male 6,557 and female 1,687), with the teaching staff of 350 (270 male and 80 female) teachers.

Additionally, there are 6 High Secondary Schools in the district, 2 for boys, 2 for girls and 2 for co-education, with 4,939 (male 3,772 and female 1,167) enrolment having Teaching Staff of 191, out of which the 128 teachers are male and 63 are female teachers.

Besides, the government is working on public assisted schools through Public-Private Partnership with the **Sindh Education Foundation (SEF**). Fifteen schools are operational under SEF in District Sujawal. The number of enrolment in these schools is 2,939 with 67 classrooms and the number of teachers is 57.[28]

i. 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 76%. There is difference in the literacy ratios by sex. The 43% of males are literate against only 33% females, out of which 8% females have education only up to primary level. But overall 17% educated population passed primary, 12% middle, 13% matriculation, and 12% intermediate, 10% graduates and 1% post graduates.

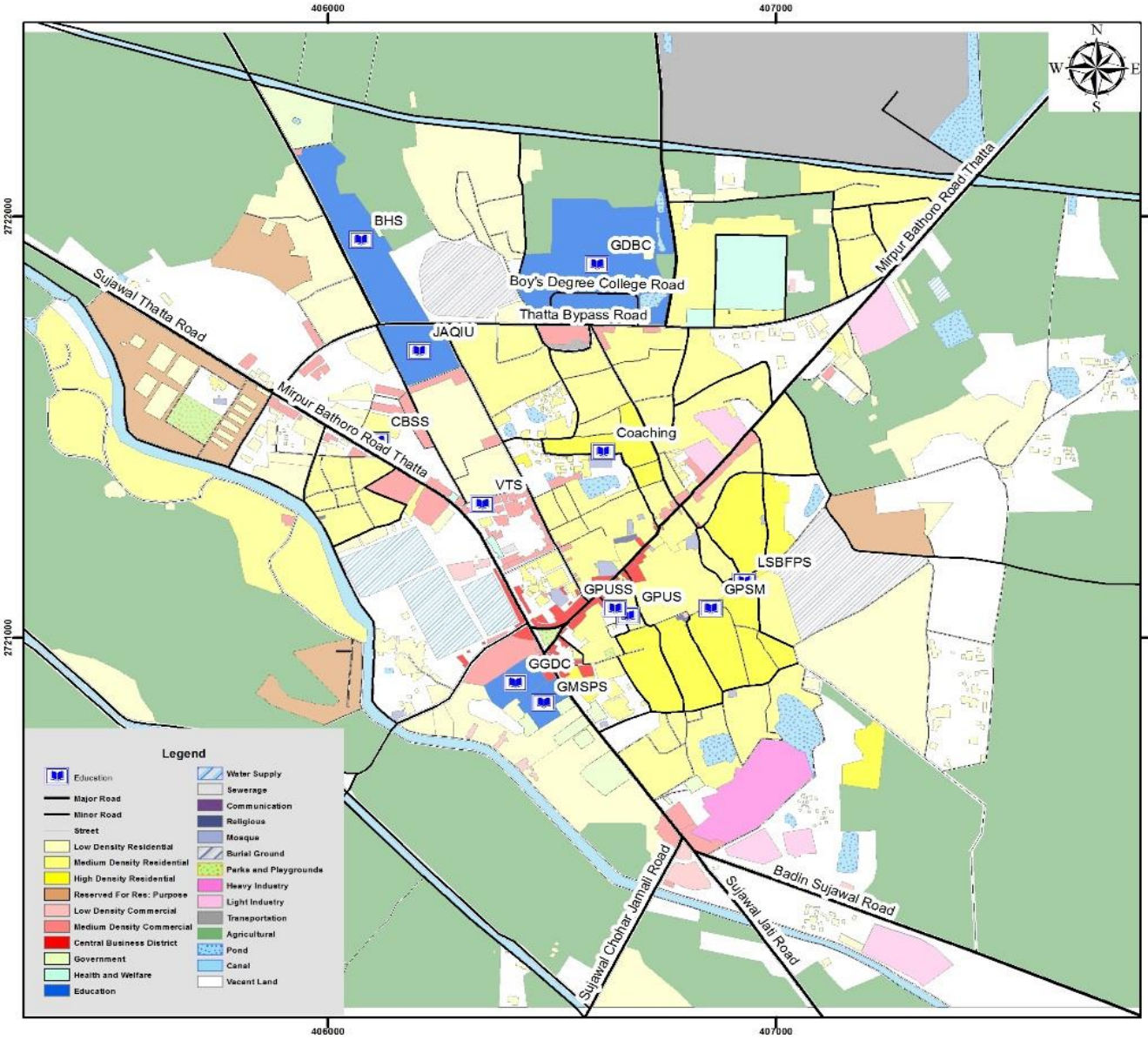


Figure 6:2: Educational Institutions in Sujawal Town

[28] *Sindh Education Profile 2016-2017.*

Present Education Institutions and Enrolment Record

The present number of Non-Professional College in District Sujawal are 2 (male: 1, female: 1). 1 female Intermediate College with total enrolment of 199 and teaching staff of 9 teachers, and 1 male Degree Colleges with the total enrolment of 2,123 (male: 1995, female: 18) and having teaching staff of 16.[29]

I. District Sujawal

According to the report (Sindh education Profile 2016-2017) and Secondary data received from RSU-Sindh Management Information System (SEMIS). Government of Sindh gives an overall situation of Education attainment from primary to high secondary enrolments in Sujawal district.

Figure 6:3: Govt. Girls Primary School Sujawal

Present number of Boys and Girls students in Schools at Sujawal is 72,033 in 1,390 different level of schools and the available number of classrooms in schools is 2,587.

Table 6-1: Existing Situation in District Sujawal

S .No.	Education Type	School
01	Enrolment	72,033
02	Class Room	2,049
03	Student Capacity Per Room	28
04	No of Teachers	2,618
05	Teacher Student Ratio	28

Source: Sindh Education Profile 2016-2017

The occupancy is 1:28 students per classroom in schools, which is common according to the National Reference Manual (NRM) standard of 30 students per classroom, according to the current figures given by the RSU Education & Literacy Department support unit. Most of the school buildings in district Sujawal district are old and needs to be repaired.

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

II. Taluka Sujawal

Present number of Boys and Girls students in Schools at Sujawal is 25,351 and total 375 schools of different level. Available number of classrooms are 620.

As per present figures provided by Reform support unit RSU education & literacy department and district education department, the occupancy is 41 students per classroom in primary to higher secondary schools which is higher as per National Reference Manual (NRM) standard of 30 students per class room

Table 6-2: Existing Situation in Taluka Sujawal

S. No.	Education Type	School
01	Enrolment	25,351
02	Class Room	620
03	Student Capacity Per Room	41
04	No of Teachers	898
05	Teacher Student Ratio	28

Source: RSU (Reform Support Unit RSU Education & Literacy Department. Government Of Sindh 2017)

III. Non-Professional College

The present number of Non-Professional College in district Sujawal are 2 (male: 1, female: 1). 1 female Intermediate College with total enrolment of 199 and teaching staff of 9 teachers, and 1 male Degree Colleges with the total enrolment of 2,123 (male: 1995, female: 18) and having teaching staff of 16.[30]

Table 6-3Present Non-Professional Colleges in District Sujawal

Institutions	No. of Institutions			Enrolment			Teaching Staff		
	TOTAL	Male	Female	TOTAL	Male	Female	TOTAL	Male	Female
Non-Professional College	2	1	1	2322	1995	327	25	16	9
Intermediate	1	-	1	199	-	199	9	-	9
Degree	1	1	-	2123	1995	128	16	16	-
Post Graduate	-	-	-	-	-	-	-	-	-

Source: College Education Statistics-2014-15

6.1.2 Issues

Identification of major issues of education sector in Sujawal are as follows:

- Shortage of class rooms as per current enrolment
- Low enrolment level with gender disparity

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

- 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.

6.1.3 SWOT Analysis

Education & Literacy			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Urban literacy rate is higher than rural. 2. High demand rate for private schooling education system. **3.** 76 % of urban population is literate.	1. The trend of losing public institutes and universities. 2. Less highly educated personnel's. 3. Mostly building structures of primary, middle and secondary schools in Sujawal are old and need to be repaired.	1. More people will move to urban areas for education. 2. More educational institutes are required. 3. More PPP for education sector is required. 4. Good labour force available 5. Basic Infrastructure for education Teachers training programs	1. Relocation of educated class to other major towns of province.

6.1.4 Need Assessment

I. Present Need Assessment (2017)

District Sujawal (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 available number of class rooms shows that there is a present shortage of class rooms.

Table 6-4: Present Need in Education Sector of Sujawal District

S. No.	Description	Results
1	Total Enrolments	72,033
2	Total Number of available Class Rooms	2,049
3	Student Per Class Room @ NRM Standard (Primary to Secondary)	30
4	Present Occupancy Load of Students per Class Room	29
5	Class Rooms Required for present need	2,401
6	Shortage of Class rooms	352

Source: *Sindh Education Profile 2016-2017 and Consultant's Estimates 2017*

- Present need can be fulfilled by providing new class rooms in existing school buildings or providing new school buildings with provision of play grounds and other facilities.
- Therefore, for the short term plan, Sujawal district have shortage of 352 classrooms.

Taluka Sujawal (Includes Primary, Middle, Elementary education institutions)

- Short term plan, for Taluka provision of 103 classrooms at different levels is required with the repairing of existing buildings with all basic facilities and training of teaching staff is required.

Table 6-5: Present Need in Education Sector of Sujawal Taluka		
S. No.	**Description**	**Results**
1.	Total Enrolments	18,679
2.	Total Number of available Class Rooms	520
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	623
6.	Shortage of Class rooms	103
Source: *RSU (Reform Support Unit RSU Education & Literacy Department. Government Of Sindh 2017) and Consultant's Estimates 2017*		

Taluka Sujawal (Secondary to High Secondary education institutions)

- As per NRM (National Reference Manual) and NEP (National Education Policy) standards, students per class room 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 shortage of 67 classrooms.

Table 6-6: Present need of Classrooms in Taluka Sujawal		
S. No.	**Description**	**Results**
In Schools of Sujawal Taluka (Secondary and High Secondary)		
1	Total Present Enrolments	6,672
2	Classrooms available at present	100
3	Students per classrooms at present	67
4	Classrooms required for present need @ 40 students per class room	167
5	Present shortage pf classrooms	67
Source: *RSU (Reform Support Unit RSU Education & Literacy Department. Government Of Sindh 2017), District Education Department, and Consultant's Estimates 2017*		

II. Future Assessment (2037)

a. <u>District Sujawal</u>

i. <u>Primary to Higher Secondary</u>

Table 6-7: Future Requirement of Classrooms in Sujawal District		
S. No.	**Description**	**Results**
Primary to Higher secondary		
1	Expected total enrolment by 2037 @ 100% enrolment	**111,256**
2	Total classrooms requirement till 2037	3,709
3	Present Supply (2017)	2,587
4	Additional classrooms requirement till 2037	1,112

The long term plan target is to achieve 100% enrolment with 1:1 male female ratio by 2037; therefore 1,112 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 of 835,252 (10 and above).

b. Taluka Sujawal

Primary to Secondary

The long term plan target is to achieve 100% enrolment with 1:1 male female ratio by 2037; therefore 650 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 of 213,330 (10 and above).

Table 6-8: Future Assessment (2037) at Taluka Level

S. No.	Description	Results
Taluka Sujawal		
1	Expected total enrolment by 2037 @ 100% enrolment	37,802
2	Total classrooms requirement in 2037	1,260
3	Present classrooms requirement in 2017	610
4	Additional classrooms requirement in 2037	650

6.1.5 Policy Guidelines[31]

- 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 girl's literacy and women education, informal system of homeschool may be encouraged.

6.1.6 Strategic Development Plan

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

[31] 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 Sujawal, 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.

ii. Short Term Plan

- Rehabilitations of Schools and Colleges with allied infrastructure
- TC 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 Sujawal

6.1.7 Priority Projects

i. Repair & Rehabilitation of schools 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 Sujawal is not at the preferred level. Importance must be placed on girls schools because it was badly disregarded. At present, 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. The List of the schools and colleges in this project are given bellow:

S. No.	Name of School	Area
1	Boys High School	9.50
2	Govt. Primary School Madarsa	0.02
3	Government Boys Degree College	16.16
4	Government Boys Degree College	3.28
	Total	**28.97**

- **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. 757.06 million approx.**

Project Name	Area Acres	Estimated Cost In Millions	Short Term	Justification
Education				
Rehabilitation of existing school buildings along with allied facilities with basic utilities. Considering 40% Built-up area	28.97	757.06	Short Term	11.58 acres =504709.12 sft, at the rate of 1800/- PKR per sft construction cost with all infrastructure cost.

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 Sujawal, the peoples are significantly deficit in technical skills.

- **Project Benefits**

  By implementation of this project, people will enhance their academic skills and it also strengthen 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	Short Term	Preliminary Cost in Million	Justification
Capacity Building Training Programs to Enhance Capacities.	Short Term	15.00	Teachers Capacity building programs can also strengthen their teaching skills for better results.

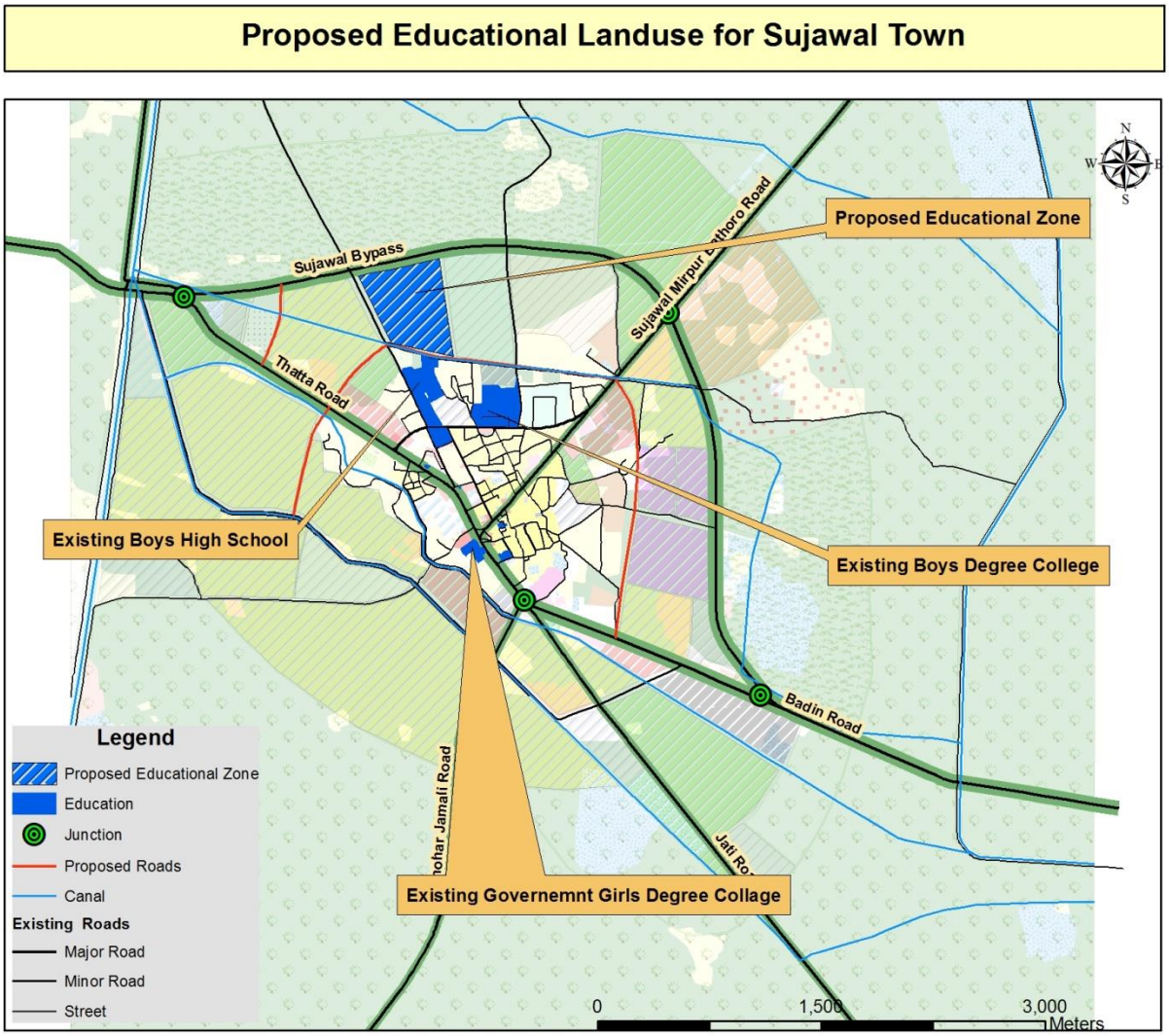


Figure 6:4: Proposal for Extension of Educational Facilities for Sujawal Town

6.1.8 Immediate Action Plan for Core Urban Area

Rehabilitation and Up gradation of Educational 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.

Immediate plan for Sujawal Includes Government Primary Urdu School, Govt. Primary Urdu Sindh School, Govt. Girls Degree Collage, Government Main Sindhi Primary School, Vocational Training School

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.

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	Government Primary Urdu School	0.08	0.08	0.10	0.13	0.13	0.08	0.02	0.04	0.02
2	Govt. Primary Urdu Sindh School	0.04	0.04	0.05	0.06	0.06	0.04	0.01	0.02	0.01
3	Government Girls Degree Collage	2.25	2.25	2.59	3.38	3.38	2.25	0.56	1.13	0.56
4	Government Main Sindhi Primary School	1.76	1.76	2.02	2.64	2.64	1.76	0.44	0.88	0.44
5	Vocational Training School	0.10	0.10	0.12	0.16	0.16	0.10	0.03	0.05	0.03
Total		**4.24**	**4.24**	**4.88**	**6.37**	**6.37**	**4.24**	**1.06**	**2.12**	**1.06**
Total PKR Rs. Million			**30.35**							

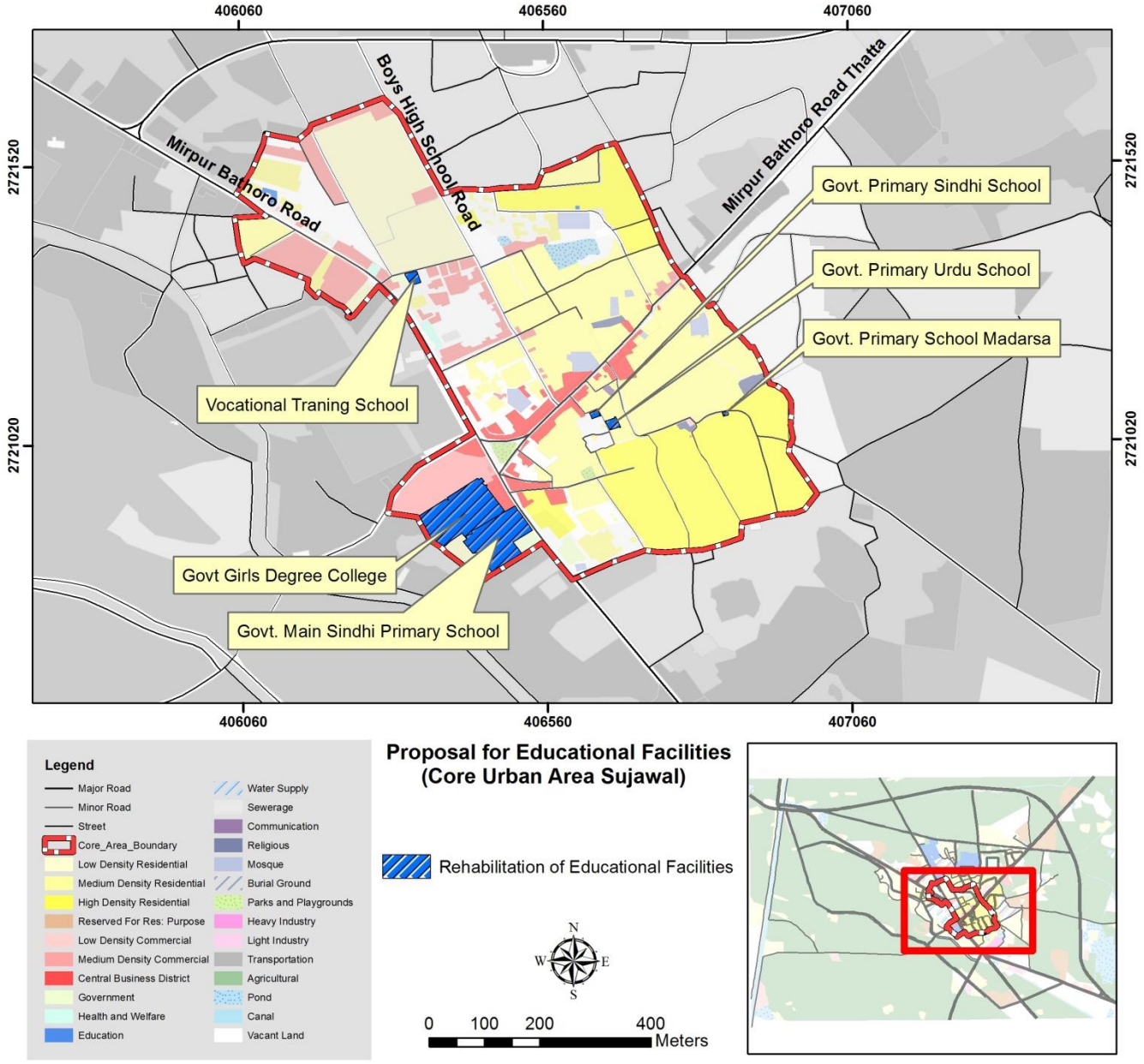


Figure 6:5: Proposal of Rehabilitation for Educational Facilities for Core Urban Area Sujawal

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 Sujawal district. There is one civil hospital having 80 beds, 2 Taluka hospitals with 60 beds and 4 private hospitals with 48 beds serving the whole population district. The other health facilities spread over the entire district are 2 RHC (Rural Health Center) having 30 beds, 6 TB Clinics, 29 BHUs (Basic Health Unit) having bed strength of 58. Also, 76 dispensaries are having 10 number of beds and 2 M.C.H.Cs (Mother Child Health Center).

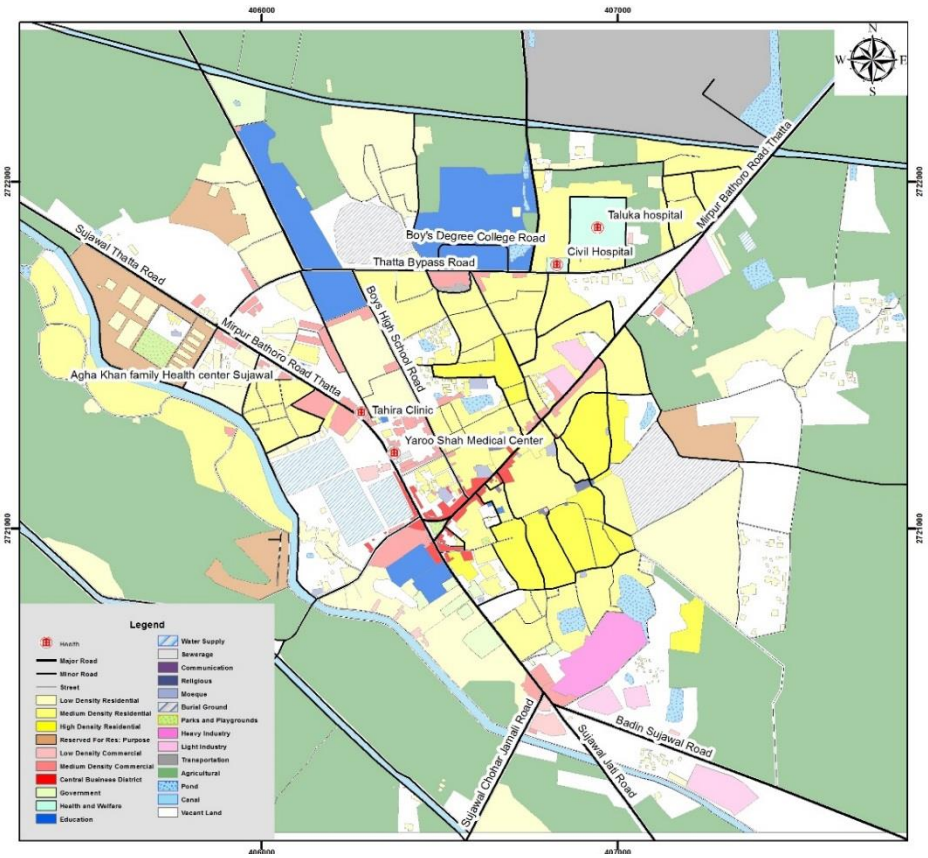


Figure 6:6: Health Map of Sujawal TC

I. Health Sector at District Level

In district Sujawal, there is one civil hospital having 80 beds, there are two (2) Taluka HQ Hospitals at District having 60 beds, 29 BHUs having 58 beds and 2 RHCs having 30 beds, 76 Dispensaries having 10 beds. There are 4 private hospitals with 48 numbers of beds serving at the Sujawal district.

In District Sujawal there is only Unani Shifa khana which serving the whole district population.

Table 6-9: Government and Private Health facilities with bed Capacity

S.No	Type	No.	Beds
1	Civil	1	80
2	Taluka	2	60
3	BHUs	29	58
4	RHCs	2	30
5	Private	4	48
6	dispensaries	76	10
Total		**114**	**286**

Source: Health Profile of Sindh, 2017

The total number of dispensaries at District Sujawal is 76 out of which 20 are Government, 35 are L. Bodies and 21 are private. There are 2 Private M.C.H.C (Mother and Child Health Center). There are 6 Government T.B clinics in District Sujawal.

II. Health Sector at DHQ Sujawal

a. Medical & Para Medical Staff

It is clearly shown in the table that 31% of sanctioned posts of doctors are filled and 59% is vacant. At present, Sujawal has 152 sanctioned doctors out of which 58 are the actual appointments and remaining are vacant (including both male and female doctors). 21 nurses, 140 dispensers other paramedic and non-paramedic staff are performing their jobs i.e. ward boys, sweepers, gardeners, electricians and lab attendant. This number of medical staff is exclusive for private practicing doctors and paramedics.

Table 6-10: Medical & Para Medical Staff

Posts	Sanctioned	Filled	Vacant
Doctors	152	58	94
Staff Nurse	21	21	0
Dispensers and Paramedics & Non-Paramedic Staff	140	140	0

Source: District Health Officer, Sujawal 2017

b. Laboratories

Currently THQ/DHQ is facing lot of problems due to unavailability of Laboratorial facilities. Shortage of electricity, surgical instruments, and lack of machinery are the major issues.

c. 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 under supply and delayed supply or lack of procurement powers at the district level. The DHQ/THQ Hospital and other health facilities are facing lot of problems regarding shortage of medicines supply. Most of patients have to purchase medicines from the local market. Presence of sub-standard medicines in local markets adds troubles for the patients.

d. Private Health Facilities

Few private health facilities are working in Sujawal like; Agha khan family Health centre Sujawal, and Yaroo Shah Medical Centre.

e. Preventive Health Care

Provincial Health Department Government of Sindh and Sujawal District Administration is quite active in preventive health measures and from time to time has run various campaigns such as:

- Polio Eradication (Anti-polio campaign)
- Malaria Control Program
- Epidemiological Data Collection
- TB Control Program DOTs
- Leishmianiasis

- Leprosy Control Program
- Aids Awareness Program

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 SOWT Analysis

Health			
Strength	**Weakness**	**Opportunity**	**Threats**
Availability of civil hospital in DHQ Town	Less number of beds Shortage of doctor and para medical staff	More investment is required through PPP in health sector. More job opportunities for doctors.	Less emergency response to health incidents. Death rate may increase. Epidemics diseases.

6.2.4 Need Assessment

The NRM (National reference Manual) recommends 2 beds per thousand as the medium-term target. On this basis, approximately 1,564 beds will be required to provide gradually. Even though available beds are 286, further 1,278 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 6-11: Present Need Assessment of Health Facilities

Present Health Need At Sujawal District						
Present Population	Available Beds	Present need	Required Beds	Available Doctors	Present Need	Required Doctors
781,967	286	1,564	1,278	225	782	557

According to the WHO (world Health Organization), the ratio of doctor to population is 1:1000. In present, 557 doctors are required to serve the present population of the district Sujawal.

Future Need Assessment (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 given in the National Reference Manual on Planning and Infrastructure Standards (NRM). Present supply of beds is fulfilling the future demand till 2037. To achieve this target of hospital bed ratio, there is no need of bed will be required to fulfill future bed requirement. Future Supply, Need, Gap, and Population per Bed Ratio is given in table.

Table 6-12: Future Supply and Need at District level

Future Health Need Assessment At Sujawal District till 2037						
Future Population	**Available Beds**	**Future Need**	**Required Beds**	**Available Doctors**	**Future Need**	**Required Doctors**
1,215,502	286	2,431	2,145	225	1,216	991

According to the WHO (world Health Organization), the ratio of doctor to population is 1:1000. For serving the future population till 2037, 991 doctors are required to serve the future population of the district Sujawal.

6.2.5 Policy Guidelines32

- 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.

6.2.6 Strategic Development Plan

i. Long Term Plan

- 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

[32] Sindh Vision 2030

- Research and development programme for doctors and paramedics staff
- Provision of diagnostic facilities, ambulance, pharmacy in all hospitals
- Tertiary Level Specialized Hospitals to cater District
- Enhancement of Mobile Health Unit for far-flung areas of the District
- Accommodation facilities for Doctors and Paramedic Staff

ii. **Short Term Plan**

- Improve access to healthcare facilities as due to long journeys to hospitals many patient die on the way.
- Ensure availability of adequate and skilled workforce to fulfill population health needs,
- Improving functionality of equipment and availability of quality medicines.
- 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 should need to be rehabilitation of these institutes to provide sufficient and high quality health to the people of Sujawal.

6.2.7 PRIORITY Projects

i. Repair and Rehabilitation of Civil Hospital Sujawal and Construction of more Wards

- **Project Justification**

  Health is the fundamental need of the people. Currently, DHQ / THQ hospital of Sujawal is facing lot of problems due to unavailability of laboratorial facilities, shortage of electricity, surgical instruments, lack of emegency services and lack of equipments are the major issues.

- **Project Benefits**

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

- **Implementing Authority - Government of Sindh - Health Department**
- **Estimated Cost: 437.98 Million PKR Approx. (Short Term)**

S. No.	Project Name	Area (acres)	Estimated Cost In Millions	Short Term	Justification
Health					
1	Repair and Rehabilitation of Civil Hospital Sujawal Construction of more Wards within premises of Civil Hospital (Considering 60% Built-up)	9.31	437.98	**Short Term**	5.586 acres = 243326.16 sft, at the rate of 1800/- PKR per sft construction cost with all infrastructure cost.

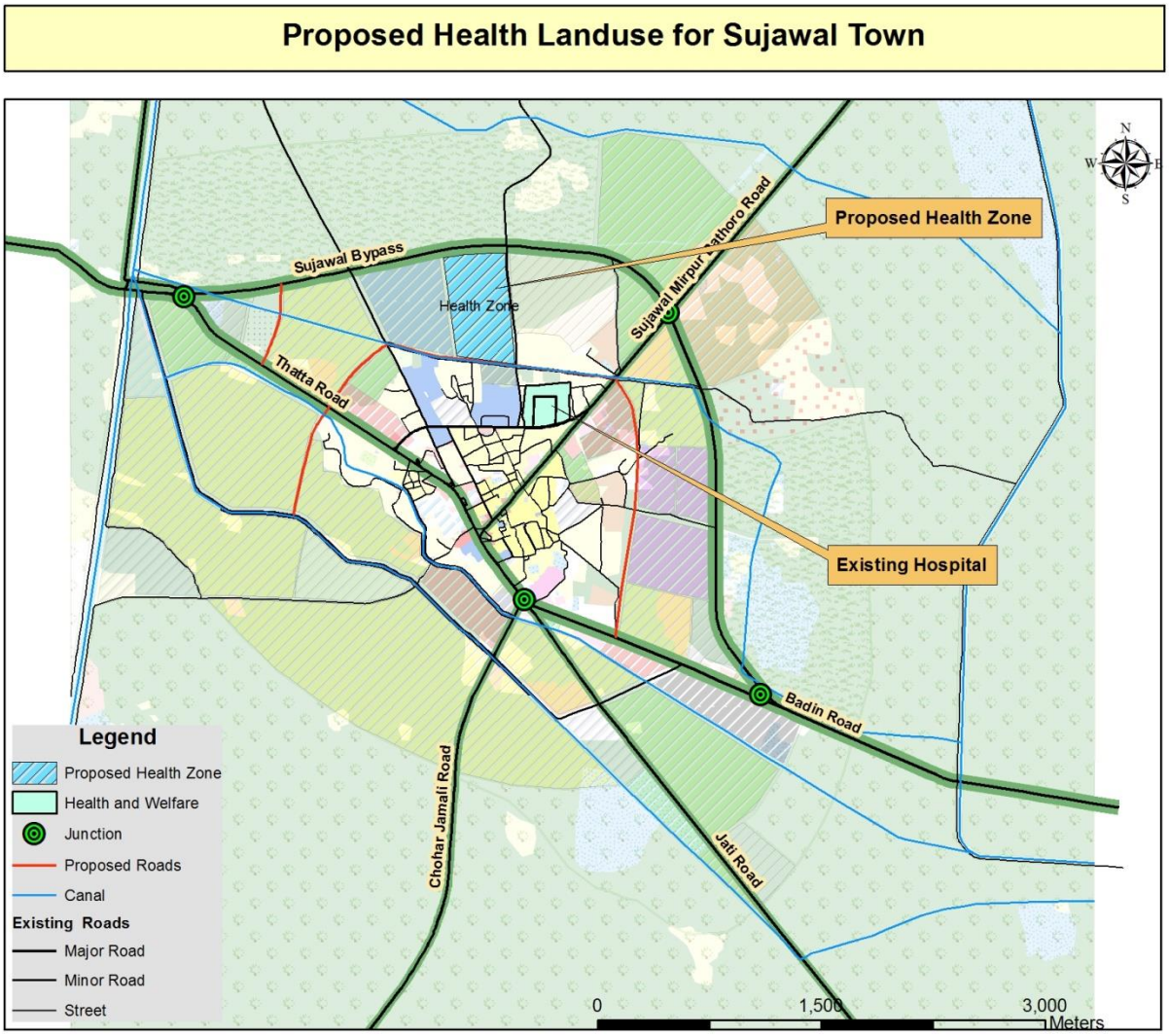


Figure 6:7: Proposal for Extension of Health Facilities for Sujawal Town

6.3 Recreational

6.3.1 EXISTING Situation

Amusement is both goal and subjective in nature. The target amusement which have 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 own contemplations, emotions and prisoner alongside learned capacities with respect to 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 entertainment of the whole person's ability for activity, where some on a position of high expertise and as per great taste with respect to the standard of refined society. Diversion is mental recognitions which can't be summed up. As such the meaning of diversion varies from man to man, as indicated by its mental and potential emotions.

6.3.2 RECREATIONAL Spaces in Sujawal

According to Cultural Department of Sujawal, There are 3 cricket grounds and 1 park in Sujawal town. There is also a library in Sujawal. As the population of the town is growing, administration needs to construct more grounds and park for recreational purpose of residents of Sujawal.

6.3.3 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
- There is no playground available for sports in core urban area, youngsters are forced to play on Burial grounds and vacant land etc.

6.3.4 SWOT Analysis

Strengths	Weakness	Opportunity	Threats
Sports & Recreation			
1. Local environment of town supports green urbanism. 2. Youth is active in sports related activities.	1. Shortage of sweet water facility to maintain green spaces, green belts and trees plantation. 2. Shortage of sports infrastructure.	1. Good health of local communities. 2. Air pollution reduction. 1. Healthy environment.	1. Give birth to passive recreation. Obesity.

Strengths	Weakness	Opportunity	Threats
Culture			
1. The indigenous cultural activities of various social groups and minorities comprises many events that attract people from its surrounding localities.	1. Poor Management for organizing cultural events 2. Lack of infrastructure to accommodate visitors into such events. Lack of opportunities to commercialize / merchandize cultural goods	1. If organized appropriately could generate handsome amount of revenues with other spin-off effects. 2. Revenue generation through cultural events. 3. Commercialization	1. Security Threats 2. Demise of cultural values and norms.

6.3.5 Policy Guidelines[33]

- 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;
- Sujawal needs infrastructure and programmes for sports activities, sport, 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

6.3.6 Strategic Development Plan

- **Canal Beautification:**

There are three canals Gotaro Distry, Mehmooda Wah and Qazi Minor in the vicinity of Sujawal.

For the beautification of canal (Qazi Minor, Mehmooda wah,Gotaro Distry), footpaths and walk ways should be constructed and benches should be fixed on the banks of canals to turn them into recreation spots for the locals and to this effect design should be prepared in collaboration with the irrigation department.

Similarly, food courts will be set up in various places along the canal bank (Mehmooda Wah), 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.

[33] NOPRA 2005

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, Protect and conserve the cultural heritage, promote language, art and culture of District and dissemination of information through media.
- Feasibility Study for Establishment of Museum and Research Center at Archeological Site.
- Youth development programme for sports and recreation
- For long term there are two graveyards proposed, one in extreme west direction and other in southeast of the town along Jati Road. (as shown in Master plan proposal)
- 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 Town Committee due to danger may be purchased by TC 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' In Sujawal Tc
- Construct More Parks and Rehabilitate the Available Parks to Facilitate the People of Sujawal Town.
- Construction of auditoriums for art councils
- Establishment of synthetic grounds, playing turf (for hockey, football) and indoor gym facility.

6.3.7 Priority Projects

i. Construction of Multipurpose Sports Grounds / Stadium

➢ **Project Justification**

The availability of parks in any city is essential for the safe and healthy environment. Sujawal town is significantly deficit in Recreational facilities, there is only one park names as Public Park. Repair and rehabilitation of park is already proposed in IAP Report. On the prirority basis, it proposed to construct multipurpose Sports ground at sujawal town. Therefore it is proposed to Construct Multipurpose Sports ground at sujawal town recreational zone proposed in development master plan of Sujawal.

- **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

- **Estimated Cost: 214.24 Million PKR Approx.**

Project Name	Long/ Short Term	Proposed Area (acre) & Lengths (m)	Preliminary Cost in Million	Justification
Construction of Multipurpose Sports Grounds / Stadium	Long Term	6 acre	214.24	**A.** Spectator area 20,000 sft. Repair & Rehab; @ the rate of 2,000/ sft. - Total 40.00 Million for the Construction of Spectator area. **B.** Playground Area 4.0 Acres (174,240 sft, @ the rate of playground @ rate of 1000/ sft. ○ Total 174.24 Million A+B = 214.24 Millions

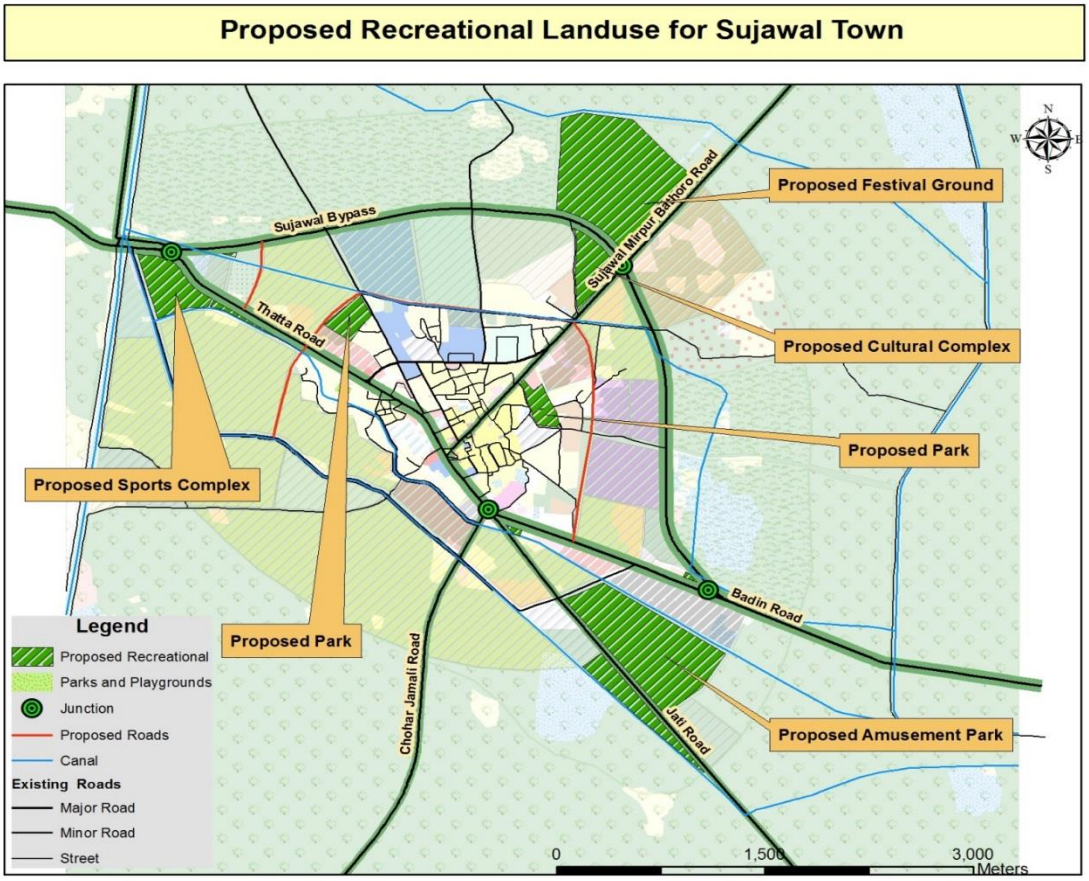


Figure 6:8: Proposal for Future Recreational Land use in Sujawal Town

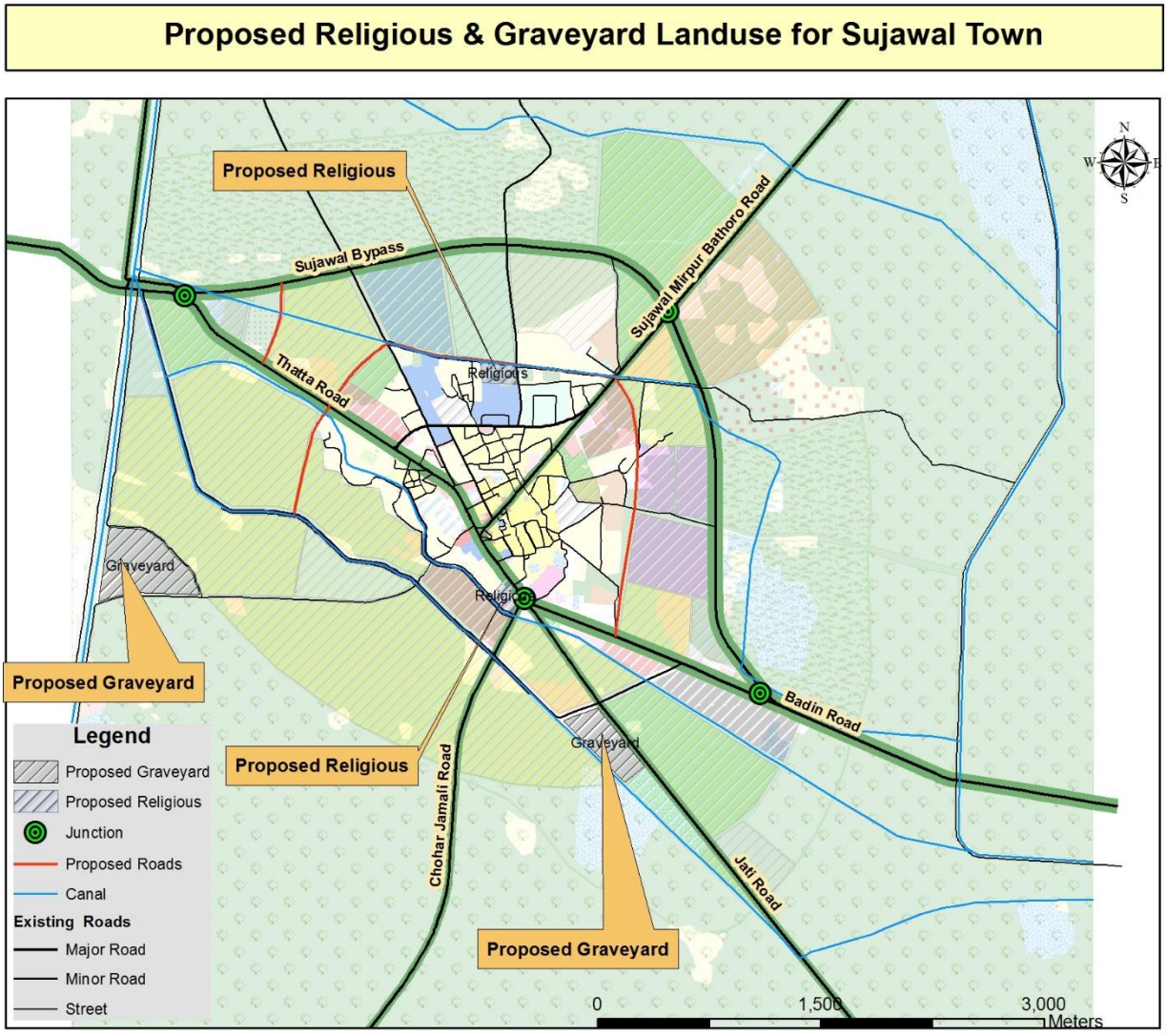


Figure 6:9 Proposal for Future Graveyard Landuses for Sujawal Town

6.3.8 Immediate Action Plan for Core Urban Area

- Provision of Open Spaces, Parks and 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**

    The available parks are

insufficient for the people of Sujawal. Currently, core urban area of Sujawal is suffering due to acute shortage of compulsory open spaces. There is only one public park present in core urban area along main Mirpur Bathoro Road. To achieve the short term plan on immediate basis the Repair and rehabilitation of Public Park is required.

- **Sports Facilities**
  There is no any space is designated for spots activities.

S. No	Name of Recreational Facilities	Area / Locality / Address	Area (acre)	Rehabilitation Required - Area wise or job wise cost (PKR)			
				Street / Road / Parking	Utility infrastructure	Public Facilities	Security
1	**Rehabilitation of Public Park Sujawal**	**0.23**	0.23	0.28	0.29	0.35	0.09
Total PKR Rs. Million				**0.28**	**0.29**	**0.35**	**0.09**
Total PKR Rs. Million				**1.00**			

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.

- **Conservation of Historical Places and Cultural Heritage**
  There are ample heritage mosque in Town which should be preserved as heritage and also would be used as religious tourism.

- **Immediate Action Plan for Core Urban Area**
  Rehabilitation of Public Park located along Mirpur Bathoro Road.

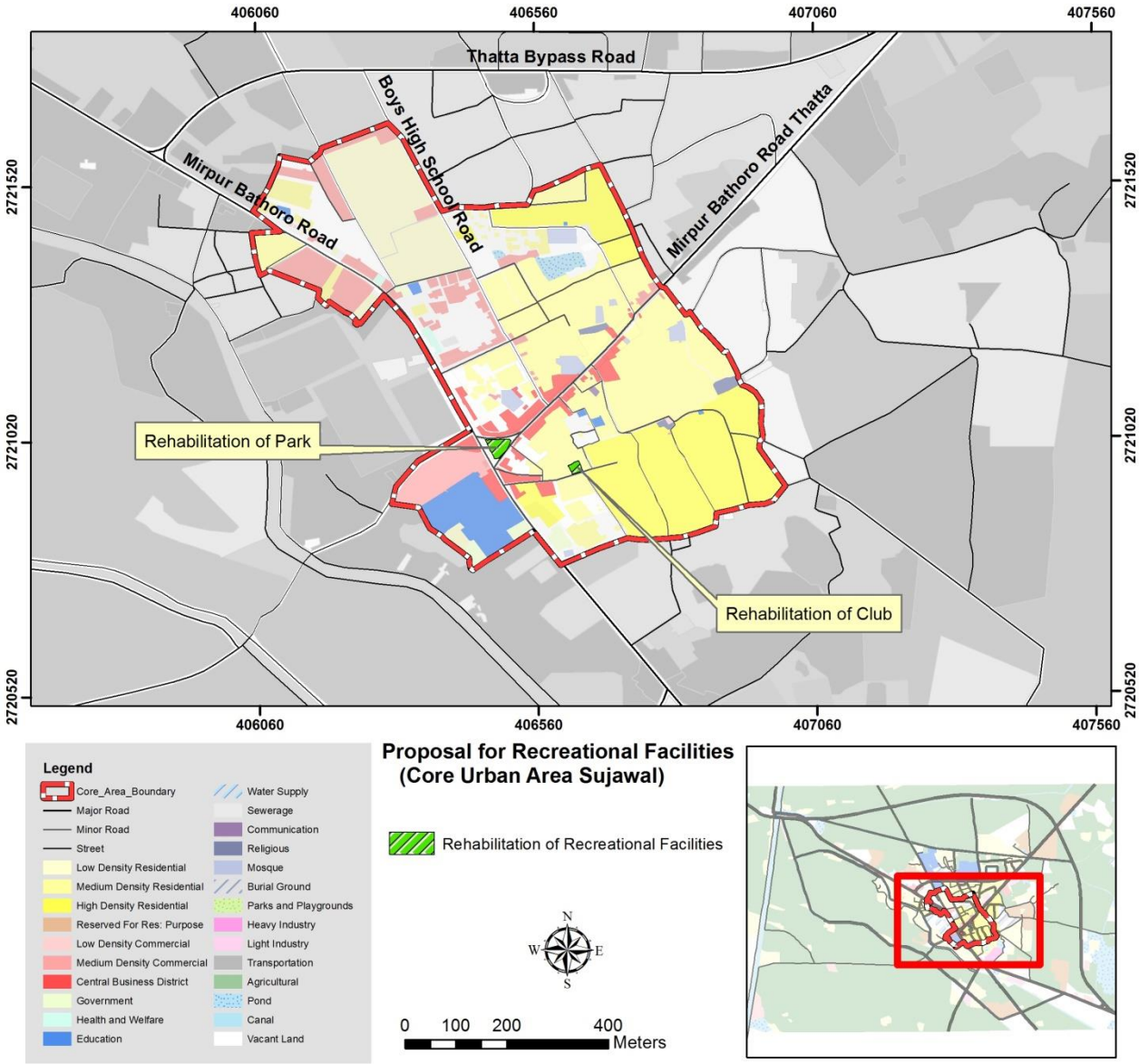


Figure 6:10: Provision of Recreational Facilities for Core Urban Area Sujawal

7. ECONOMIC DEVELOPMENT PLAN

Sujawal district is established in October 2013 bifurcating from district Thatta. According to the notification the right side of Indus River will comprise old Thatta district and the left side will come under the jurisdiction of newly created District Sujawal.

Taluka Sujawal is district headquarter located at about 20 km west of Thatta on the road Badin to Karachi. Sujawal is an agricultural city, but few industries also located in its surrounding, like Sugar Mill and Car/motor assembling and production plants. Two taluka namely Shahbunder and Kharochan are located in coastal area 89% and 100% respectively lived in rural area therefore inhabitant of these Taluka relying on fishing business. The inhabitants of remaining 03 Taluka namely Sujawal, Jati and Mirpur Bhathoro are relying mostly on agriculture, livestock and very few in minor industries.

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.[34]
- Increase farmer's income.[35]
- 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.

[34] ADP 20017-18 Industries
[35] ADP 2017-2018 Agriculture

7.1 Agriculture

7.1.1 Existing Situation

The agriculture sector in the district is challenged with many issues. Half of the district's land is not available for cultivation and this proportion is increasing steadily over the years. The declining availability of water in Indus has serious repercussions for the Indus Delta and agriculture in the district. A large section of the population that was previously engaged in agriculture has turned to fishing nowadays. Due to sea intrusion, the growers are sprouting betel leaf crops to make ends meet as needs less water and yields more profit. The degradation of Indus delta and grazing lands has also resulted in the decline of livestock population. There are two main crop seasons; "Kharif" and "Rabi" in Sujawal District. The Kharif season starts from April-May and ends in October-November while the Rabi starts from November-December and ends in April-May.

The Wheat, Cotton, Rice, Sugar-Cane are the major crops of the district while Barely, Bajra, Jowar, Maize, Gram, Rapeseed, Mustard, Sesamum, Oil Seeds fall in the category of minor crops. Wheat is a staple food crop of the people of Sujawal district and it occupies the majority of cultivated land. The Onion, Bajra, Masoor, Maize, Sesame, Gram, Jawar, Rape & Mustard, and Matter are the minor crops that significantly contribute the share to the total cropped area of the district Sujawal.

After the establishment of a separate district Sujawal in 2013, the geographical area and population of District have been changed**. As in Development Statistics of Sindh 2018, there is no separate data for Sujawal and new data is calculated on the basis of Tehsils and new geographical area of the district**. Detailed are in Table 7-1: Bifurcation of Area and Population as under:

Table 7-1: Bifurcation of Area and Population

District	Area Hectare		Population 2017	
Thatta	857,000	49.38%	979,817	55.62%
Sujawal	878,500	50.62%	781,967	44.38%
Total	1,735,500	100%	1,761,784	100%
Consultant assumptions				

I. Land Utilization

After the disintegration of the data, the total geographical area of district Sujawal is 878,257 hectares out of this during 2016-17, the cultivated area was up to 171,096 hectares, current fallow was 92,635, and the net area sown was 78461 but during 2015-16, the values were minor different, cultivated area of the district was 170,083 hectares, current fallow 92,635, and the net area sown

Table 7-2: Comparison of Land Utilization (Before Disintegration

Sr. No.	Type of Cultivated area	Land Utilization (Hectares) 2015-16	Land Utilization (Hectares) 2016-17
		Geographical area	Geographical area
1	Cultivated area	336,000	338,000
2	Current Fallow	183,000	183,000
3	Net area sown	153,000	155,000
4	Cultivated Waste	198,000	198,000
5	Not available for cultivated	853,000	852,000
6	**Total geographical area**	**1,735,000**	**1,735,000**

Source: Development Statistics of Sindh 2018

was 77,449. Furthermore, the comparison of land utilization before and after disintegration is given in the tables.

Table 7-3: Comparison of Land Utilization (After Disintegration)			
Sr. No.	**Type of Cultivated area**	**Land Utilization (Hectares) 2015-16**	**Land Utilization (Hectares) 2016-17**
		Geographical area	**Geographical area**
1	Cultivated area	170,083	171,096
2	Current Fallow	92,635	92,635
3	Net area sown	77,449	78461
4	Cultivated Waste	97,190	100,228
5	Not available for cultivated	431,787	431,282
6	**Total geographical area**	**87,8257**	**878,257**
Source: Development Statistics of Sindh 2018			

II. Crop Production

After the disintegration of the data, the production of Rice in the district during 2016-17 was 118,440 M. Tons, Wheat production was 27,428 M. Tons, Sugarcane 183,204 Bales, Maize production was 561 M. Tons, and cotton 11,950 Bales. Although, during 2015-2016, the production of Rice was 116,213, wheat 28,711, Sugarcane 190,384 bales, Cotton 13,988 bales, and the production of Maize was 537 bales. The date comparison shows the minor difference in the production of the various crops of district Sujawal. Yields of all crops is low comparing to provincial/national level. To address the property issue/raising of income level wasteland available be granted to landless people for utilization. Raising livestock looking to water shortage and proper crop and irrigation water management. The crops, production field, and land utilization is given tables as under:

Table 7-4: Crop Production (After Disintegration)					
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	38,154	116,213	39,878	118,440
2	Wheat	9,192	28,711	9,250	27,428
3	Sugar Cane	3,237	190,384	3,196	183,204
4	Cotton (bales)	3,382	13,988	2,981	11,950
5	Maize	527	537	505	561
Source: Development Statistics of Sindh 2018					

III. Irrigation Network

The hilly areas of the district are cultivated on monsoon water and wells, while the canals and channels irrigate the other lands. The areas within the protective banks of the Indus used to have fertile patches of land which depended upon the flood and lift water system from barrage channels at various places for irrigation purposes. However, the pattern of irrigation has been transformed in the district due to a lack of water availability. District Sujawal is irrigated, mainly, by the Indus River and canals such as Pinyari feeder and Daro branch. Among the rural mouzas, 86 (41%) mouzas are irrigated from the river and 52 (25%) are irrigated through canals. In the year 2014-15, 82% of the total sown area was irrigated and from this irrigated area 100% area was irrigated through canals and tube wells. From 2014-15 to 2015-16, there is a 21% decrease in the total irrigated area with a 22% decrease in canal irrigated area.[36] Due to the flood irrigation system, acute water shortage and inadequate system of drainage, the cultivable land has degraded to a varying degree causing a threat to food security and incomes and, employment of the farming community, particularly of small landowners and haris.[37]

In the year 2015-16, 69,664 hectares were irrigated out of 77,342 hectares, whereas in 2016-2017, 69,666 hectares were irrigated out of 78,258 hectares which shows that only 1% area becomes un-irrigated by means of non-supply/short supply of irrigated water which could be one of cause due to low economic conditions of people of Sujawal. The table below gives information regarding irrigation in the district[38].

Table 7-5 Irrigation by Year Wise (After Disintegration)

District	2015-16			2016-17		
	Total (Hectares)	Irrigated (Hectares)	Un-Irrigated (Hectares)	Total (Hectares)	Irrigated (Hectares)	Un-Irrigated (Hectares)
Sujawal District	77,342	69,664	7,678	78,258	69,666	8,592

Source: Development Statistics of Sindh 2018

7.1.2 Problems/ issues

- The sugarcane prices are unstable in Issues and the industrialists never miss an opportunity to deny farmers their due share. During the crop season, the net take home decreases drastically when the crop is bumper and the industry is not scared of the supply.
- High price of Inputs (Fertilizers Material, Pesticides and Quality seed)
- Farm to market road.
- Water logging and salinity.
- Lack of Tube well installation facilities and Shortage of irrigation water.
- Irrigation and Drainage problem
- Shortage of food godowns and warehouses.
- Insufficiency of covered storage.
- Land grabbing by sea water.

36 District Disaster Management Plan (July 2017 - June 2027)
37 PESA- District Thatta 2014
38 Sindh Development Statistics 2018

7.1.3 SWOT Analysis

Agriculture			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Agriculture based economy. 2. Strong network of distribution of agro based products.	1. High price of Fertilizers 2. Low price of crop production 3. Lack of property certified and improved seed 4. Lack of agriculture credit facilities 5. Absence of Agriculture research centres 6. Less quantity of water for agriculture	1. Job opportunity for rural population. 2. Healthy population 3. Strong transport system 4. Outside investors show interest in agriculture sector. 5. Agriculture can be a strong source of revenue generation.	1. Shortage of educated and skilled professionals. 2. Less efficient local markets. 3. Shortage of agro based products. 4. Shortage of farm human resources for crop production. 5. Lack of awareness among farmers related to yield increasing methods. 6. Land grabbing by sea water.

7.1.4 Strategic Development Plan

District Sujawal is irrigated by river Indus and canals and although the agricultural land in the district is limited, yet the available cultivable land is very productive in this region. Wheat, Cotton and Sugarcane are the major crops of this district.

Utilization of Cultivable waste land of 1600 hectares may increase the crop production. As analyzed about 43% of arable land used for cultivation of Cotton followed by wheat by 39%, might be the reason that the soil and climate of the region suits to these crops, therefore grower and Government may focus to reclaim more waste land to convert the same into arable land and **priority may be given to Cotton and Wheat crops in the district**.

Moreover, Government and grower need to focus to explore ways and means to improve utilization of waste land for other crops also for which the consultant recommends that existing Research Centers may be strengthened and new Research Centers are to be established in the region by employing modern technologies and methods. Research needed:

- To improve and evolve new crop varieties with high yields & good quality.
- To solve the day to day problems of the farming community /growers.
- Evolution of new high yielding and insect, pest, disease resistant varieties of major and minor crops
- To improve production technologies for crops / plants to get higher yields.
- Disseminate improved production technologies to the growers

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

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 godowns for storage of agricultural products.
- Construction of covered godown.

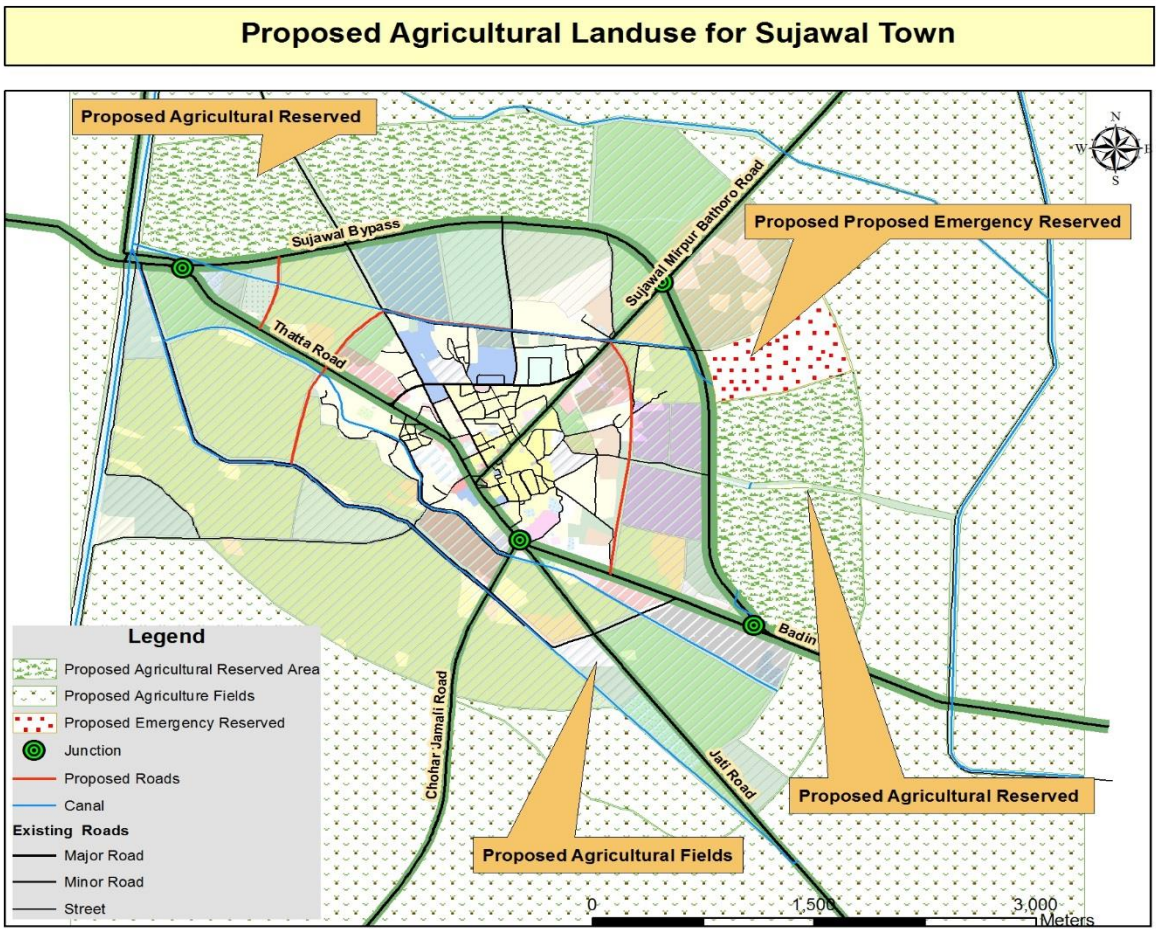


Figure 7:1: Proposed Agricultural Fields for Town

7.2 Livestock

7.2.1 Existing Situation

The livestock sector maintains a unique position within the agriculture sector of Pakistan. It contributes 51% to the value addition in the agriculture sector of Pakistan. It also contributes 9% to the GDP of Pakistan. Besides, this sector provides foreign earnings, dairy products' needs, food security and daily cash income to the people of Pakistan. It helps to reduce income inequalities, especially in case of emergencies (floods, crop failure). Hence this sector is considered as the most secure source of livelihood for small farmers and landless poor. The share of Sindh province in the livestock population of Pakistan is 20%.

A large section of the Districts' population that was previously engaged in agriculture has turned to fishing nowadays. Due to sea intrusion, the growers are sprouting betel leaf crops to make ends meet as needs less water and yields more profit. A good breed of buffalo and cow are found in the district. Sheep, goat, camel, horse, ass, and mule are also the main livestock of the district. Most of the farmers have traditionally kept cattle, buffaloes, sheep, camel, and goat. The degradation of Indus delta and grazing lands has also resulted in the decline of the livestock population. The livestock in the district suffers in particular from the shortage of high-quality feed and fodder crops as a result of the overall shortage of water.

Number of Livestock

District Sujawal is a richly populated area having an animal's population of large and small animals. This district is well known with different types of breeds of cattle, Goats, and sheep's.

Since no data regarding livestock pertains to Sujawal district are available, therefore Consultant has no option except to adopt the same analogy as adopted in land utilization by splitting available data of district Sujawal to give a logical sense for evaluation of livestock sector of the district Sujawal. The animal population of the district is highest number of cattle having 208,048 heads followed by the buffalos 185,775 heads and sheep is 177,676.

Table 7-6: Number of Livestock (After Disintegration)

Sr.	Livestock by Category	Population of District	Population of DHQ Town
1	Cattle	208,048	1000
2	Buffalos	185,775	2500
3	Sheep	82,004	200
4	Goats	177,676	200
5	Camels	5,568	-
6	Asses	9,618	-
7	Poultry	492,533	-

Source: Development Statistics of Sindh 2018/ Departmental Data Collection, Livestock Department Sujawal

Veterinary Service

The services for veterinary in district Sujawal are deficient, as district Sujawal is a richly populated area having an animal's population of large and small animals. For this population of animals, the services are not sufficient and not serving the all population of animals. There is only 1 veterinary Hospital poor condition and good service facilities. There are 02 sanctioned veterinary doctors, sanctioned posts of paramedics Staff are 03 and technicians are 03.

Table 7-7 Veterinary Service

Sr.	Items	Numbers
1	Veterinary Hospital/Centres	01
2	Doctors	02
3	Paramedics Staff	03
4	Technicians	03

Source: veterinary Department Sujawal

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 Need Assessment

- There is dire need of Cattle Park with facilities to cater these issues.

7.2.4 Strategic Development Plan

- Improving the production performance of livestock in District through manipulation of different minerals and feed supplements.
- Enhancement of Livestock Production and Productivity through strategic deworming and vaccination.
- Establishment of model livestock farms linked with improved supply chain and value addition.
- Establishing new cattle & dairy farms that lead to increase in number of cattle and quantity of milk.
- Enhancing Veterinary Services.
- ADP project already initiated by Sindh Government to overcome the rural Sindh Livestock.

7.3 Fisheries

7.3.1 Existing Situation

There are 13,896 fishermen are experiencing their luck, out of which 8,368 are working full time and 5,528 are part-time. The registered boats in district Sujawal are 2,101. The annual fish production of the district Sujawal is approximately 18,448 M. Tons.[39]

Table 7-8 Annual Fish Production

Fisheries-Water bodies, Fish farms & Production (M.Tons)		
1	Number of Boats	2,101
2	Number of Fishermen	13,896
3	Annual Fish Production	18,448
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

[39] Development Statistics of Sindh 2018

7.3.3 SWOT Analysis

Livestock & Fisheries			
1. Local skills and vet services available 2. Favorable environment is available for livestock growth (Pasture) and poultry farming in surroundings of city. 3. Marine (coastal) fisheries accounts for about 79% of the country's total fish catch. 4. Out of overall coastal fisheries the contribution of Sindh coast/ Indus Delta is higher than Baluchistan, despite Sindh coast being smaller (350 km).	1. Large scale breading has not developed 2. Lack of facilities to industrialize livestock based products. 3. Lack of extension services in private sector. 4. Landlessness and small holding prevents the farmer to raise livestock. 5. Limited knowledge and facilities to farmers and fishermen as well. 6. Climate change and environment degradation.	1. Cooperative dairy farming and in-land fisheries has sufficient scope 2. Large pasture land and labour force available for livestock growth 3. Livestock based products can enhance economic activities if produced through appropriate industries. 4. Issuance of district angling licenses 5. Local publicity and awareness 6. Enforcement of fisheries enactment in their respective domain 7. Fish seed stock replenishment in natural water bodies in their respective domain	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

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 livestock and dairy farms to meet the increasing requirement of meat and milk. Similarly new fish farms and poultry farms in the districts need to be established to generate production and income of the people engaged in this business.
- For 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.

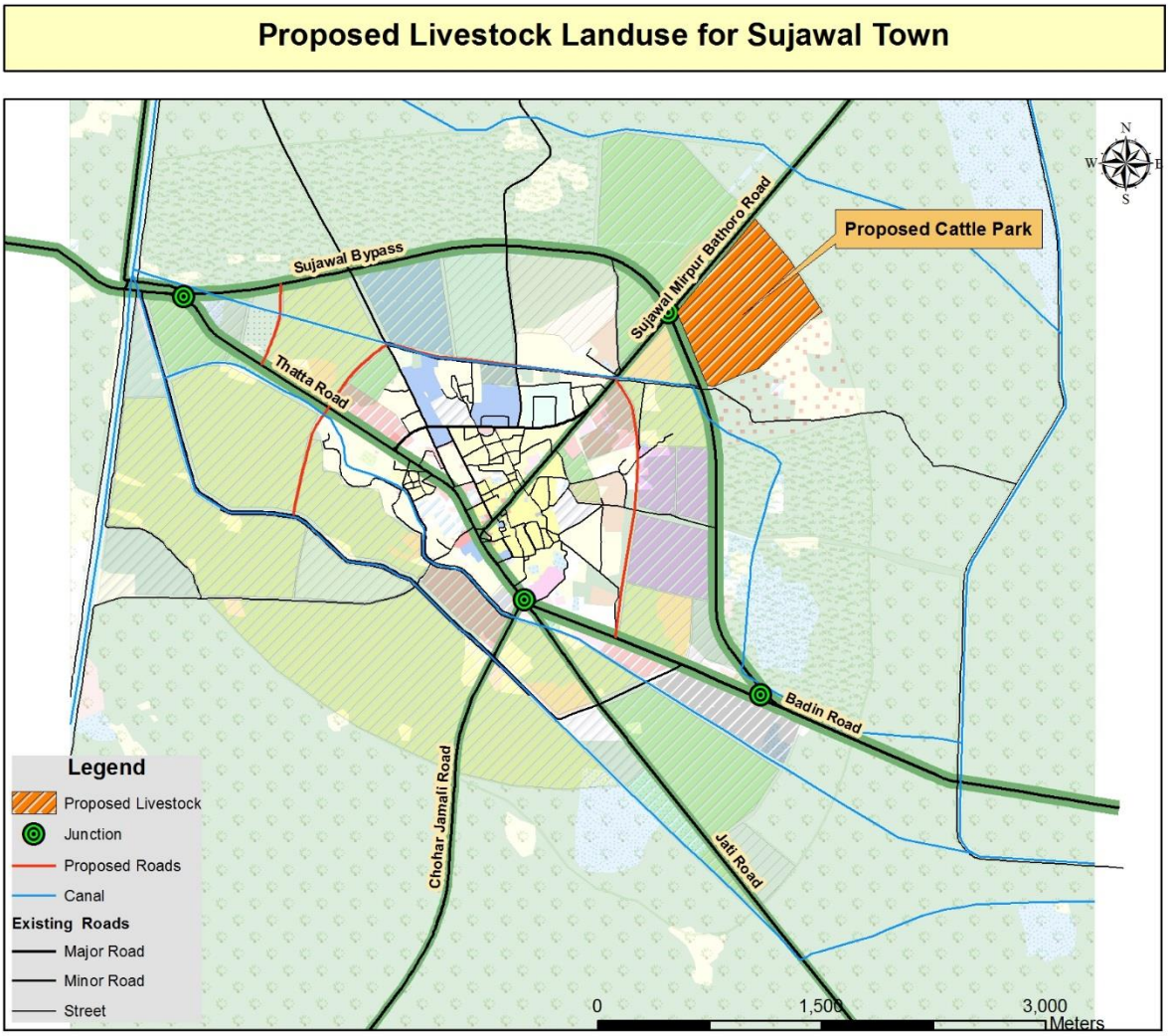


Figure 7:2: Proposed Cattle Farm

7.4 Industries

7.4.1 Existing Situation

Most of the industries in Thatta and Sujawal Districts are pertaining to the Textile, Sugar and agriculture Field. Famous among these include sugar mills listed below), textile mills, flour mill, ice factory, Rice Husking Mills etc. Recent addition to the industrial units is the Car manufacturing plant near Budho Talpur, belonging to the Dewan Group adjacent to the Dewan Sugar Mills now in Sujawal.

Table 7-9: Sugars Mills with Production

S.No	Industry Sugar Mills	Sugarcane Crushed	Sugar Production
		M. Tons	
1	**Dewan Sugar Mills ***	246,872	23.365
2	**LARR Taluka Sajawal ***	240,042	27,605
3	**Shahmurad Sugar Mills***	496,109	52,578
(Capacity varies every season on availability of sugar and working days)			

Rice Milling Industry

Rice milling is the oldest and the largest agro processing industry in Sindh province. Various studies revealed that total quantities losses are due to various post-harvest operations, lack of technology awareness, and use of obsolete machineries and equipment.

- **NEW JHULEY LAAL RICE MILL, (**Date Commissioned 19 September 2014)
  (MAIN BADIN ROAD, SUJAWAL TALUKA, DISTRICT SUJAWAL)
  This is a brand new husking unit with a capacity of 5 tons / hour consisting of local as well as Chinese machinery. Machinery and equipment is installed and the mill is operational since September 2014
- **SANGAM RICE MILL (Date Commissioned 1 December 2014)**
  (MAIN BADIN ROAD, TALUKA SUJAWAL, DISTRICT SUJAWAL)
  Initially, the rice mill's capacity was 2.5 tons / hour. The machinery and equipment was old and obsolete. With the support of SEDF, GOS, the owners have successfully replaced old machinery and equipment with brand new husking unit (capacity at 5 tons / hour).

I. Industrial Estate

There is no specified industrial zone in Sujawal. It is suggested to establish one planned industrial area where industrialists could have all the facilities such as land, road, railway, water supply, electricity, gas, telephone, godowns, sanitation, drainage, labour colonies and other necessary public amenities.

II. Technical and Vocational Training

With the advent of new technological age, simple skills will not serve the purpose. Industry requires new workers trained on the different types of latest equipment and machines which demand exceptional skills. The aim of vocational training is to produce higher level technicians,

and they require a specific training. The higher level technician is a highly skilled worker; in other words, such a person gets an intermediate level education between engineer and specialized worker, and this kind of training can be given only by a vocational institution.

Since no separate data about Technical and Vocational Training in respect of District Sujawal is available, therefore requirement of institutes in district Sujawal has been appraised considering population of district Sujawal and the facts and figures pertains to Thatta District. Table 7-10: Technical Institutions (Sujawal District) below shows requirement of institute in district Sujawal.

Table 7-10: Technical Institutions (Sujawal District)

Technical Institutions (Sujawal District)					
Population	**2017**	**2022**	**2027**	**2032**	**2037**
	781,967				
Population (Projected)		873,560	975,881	1,090,187	1,217,882
Existing Situation		**Future Requirement**:			
Vocational Institutions	Data NA	5	6	7	7
Polytechnic Institutions	Data NA	2	2	2	3
Commercial Institutions	Data NA	3	3	4	4

7.4.2 SWOT Analysis

Industries			
Strengths	**Weakness**	**Opportunities**	**Threats**
1. Sujawal is primarily an agro-based town and the industrial base in this district is dependent on the agriculture. 2. Major industries in Sujawal TC are rice mills and flour mill. 3. Existence of Deewan group of industries.	1. Sugar Industries crisis 2. High rate of diesel. 3. Less job opportunities for other sectors. 4. Less job employment in agriculture sector.	1. New trade techniques & Job Opportunities. 2. Agriculture is a strong economic sector it must be utilized to generate revenue and plant new agro based industries. 3. Ajrak production should be promoted to generate handsome revenue from it.	1. Isolated economy. 2. Uneducated social group. 3. More emphasis of crop producers on sugar cane production. 4. Air pollution 5. Water contamination to river Indus resources.

- **Need Assessment**
  - Vocational training to Women force should be encouraged for establishing cottage industry in the district.
  - Establishment of Small industrial zone

7.4.3 Strategic Development Plan

i. Long Term Plan

- Sufficient market infrastructure to ensure optimal value addition
- Development of Industrial Estates / Apparel Park / Special Economic Zone in District
- 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

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 with following limitations:

- Addition in industrial units suggested may vary as it is dependent upon the production capacity of each unit. As noted earlier, establishment of a Small Industrial Estate is already in process which should be completed with required facilities
- The area of industrial estate may need extension with necessary facilities for encouraging the investors to establish new units
- Training should be provided to local workers in relvany industies and women working force to establish cottage industry.
- Incentives to private investors for establishment of new industrial units and enhance the production capacity of present industry. 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 unemplyment rate and poverty allleviation

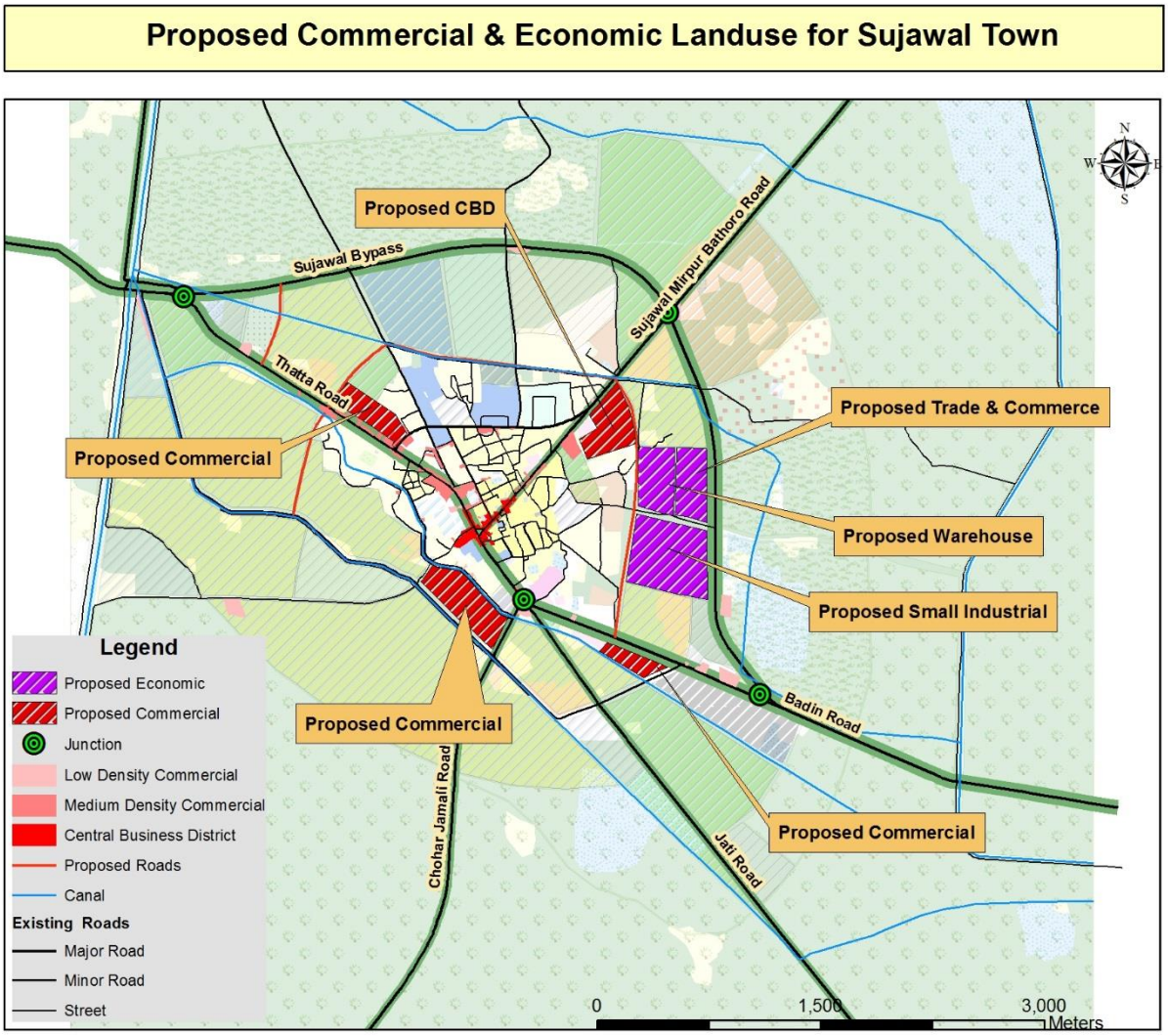


Figure 7:3: Proposed Small Industrial Zone

7.5 Trade and Commerce

There is the presence of strong local retail market along Mirpur Bathoro road. Sujawal bazar consists of major commercial activities, wholesale market with lots of food shops, commercial banks and government offices, public & private schools and health services etc.

7.5.1 SWOT analysis

Trade & Commerce			
Strengths	**Weakness**	**Opportunities**	**Threats**
1. Availability of financial institutes. 2. Regional trading hub. 3. Large number of local skilled artisans available.	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. Home grown handicrafts can be promoted 4. Large number of business interest groups. 5. Agro products can generate handsome revenue.	1. Security measures required. 2. Inflation. 3. Lack of investment by investors.

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 Strategy Development Plan

- Provision of Slaughter House
- Provision of parking for existing commercial areas
- Up gradation of old bazaar area
- Establishment of Fruit and vegetable market
- Specialized Wholesales market
- Construction of Building for service industry
- Provision of Cold spaces and warehouses

7.5.4 Priority Project

i. Establishment of Fruit and Vegetable Market at Sujawal

➢ **Project Justification**

At present there is no designated fruit & vegetable market present in Sujawal Town. Ordinary retail shops for vegetables and fruits are located on the main roads, which causes traffic congestion & garbage issues in the town.

Establishment of planned Fruit and Vegetable Market at Sujawal with allied facilities shall attract entrepreneur to expand their investment and will also improve the urban environment. In trade

Size: In development Master, land is reserved for Trade & Commerce Zone. In that zone 5 acres land comprising general shopping area and offices is reserved for fruit and vegetable market on priority basis. Whereas remaining area of trade & commerce is reserved for Whole sale Market, Slaughter House & Ware Houses for future need. Market involves the amalgamation of heavy food processing truck loading and unloading area with fruits and vegetable stalls along with shops for whole sale and trade processing along with the public services for the ease of market users at the facility provision of single facility use with all services. Need to plan and develop on basis of services will include on provision of project implementation and on users requirement.

- **Project Benefits**

  It will give ease to the local population to earn their living through it and will also improve the taxation, employment and the traffic congestion which is the major issue of Sujawal Town due to availability of market in the main core city area.

- **Implementing Authority - Sujawal Town Committee and Private Investors.**

- **Estimated Cost: 230.68 Million approx. (Short Term).**

Project Name	Sector	Short Term	Proposed Area (acre) & Lengths (m)	Preliminary Cost (million/- PKR)	Justification
Establishment of Fruit and Vegetable Market at Sujawal (Considering 30% Built-up Area)	Economic Development (Trade & Commerce)	Short Term	5 acre	130.68	30% of proposed land is 1.5 = 65,340 sft , at the rate of 2,000/- PKR per sft construction cost with all infrastructure cost
Land Acquisition for Establishment of Fruit and Vegetable Market at Sujawal	Economic Development (Trade & Commerce)	Short Term	5 acre	100.00	Per acre cost @ 2,000,000 (2 Million) per Acre

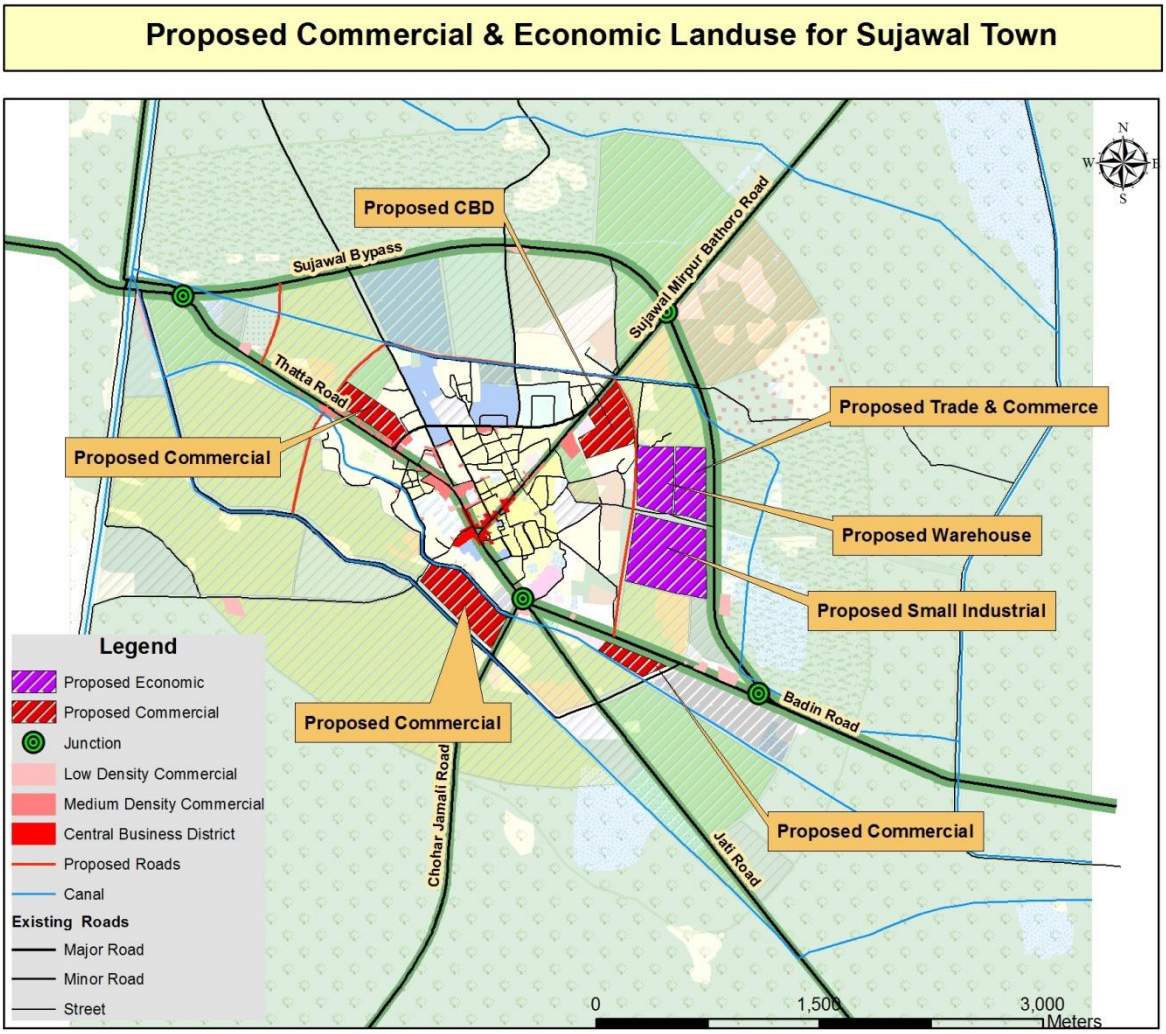


Figure 7:4: Proposed Economic Landuse for Sujawal Town

7.5.5 Immediate Action Plan for Core Urban Area

The core town area is the oldest and the most congested part of the Sujawal town, 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.

Figure 7:5 Model of Strip Mall

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

  The proposed projects for core urban area of Sujawal consists on; Removal of encroachments from town center and bazaars, created by the shopkeepers and hawkers; Rehabilitation of Main Commercial (CBD) Area, Rehabilitation & Beautification of main Bazar area located along Sujawal Mirpur Bathoro Road and Thatta Sujawal road. CBD includes traders, wholesale markets, and traditional embroidery shops, Furniture shops, Auto Shops, restaurants, schools, clinics and general stores etc. Shahi bazar is located in old commercial area of DHQ town & in poor condition.

  - Rehabilitation & Beautification of Sujawal Bazar area
  - Provision of pedestrian facility in the Bazaar area.
  - Banned heavy vehicles during peak hours.
  - Removal of encroachments (road side bus & wagon stands etc.)

Rehabilitation Of Commercial Areas –Job-Wise Cost (PKR)						
S. No.	**Area / Locality / Address**	**40.60 Acres**	**Cost in PKR million.**			
			Street / Road / Parking	**Utility infrastructure**	**Public Facilities**	**Security**
1	Rehabilitation of Residential Cum Commercial		10.15	1.22	15.23	10.15
2	Rehabilitation of Commercial Areas					
Total PKR Rs. Million			**36.74**			

- **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

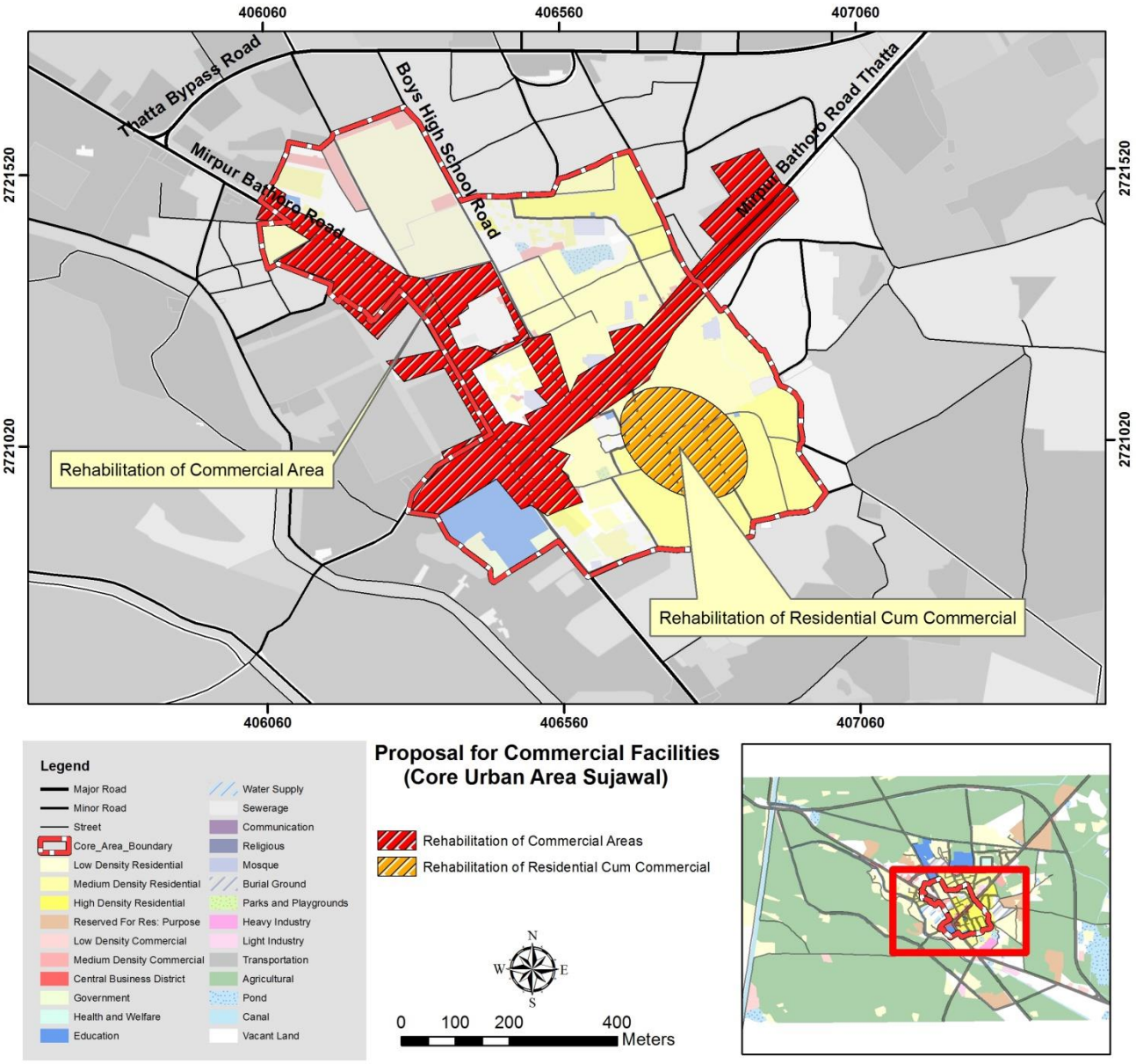


Figure 7:6 Proposal for rehabilitation of Commercial & Res; Cum Commercial areas of Core Area

7.6 Economic Development Plan of 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).

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.

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

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.

Honorable Chief Minister, Sindh approved 05 districts namely Badin, Thatta, Tharparkar, Sujawal& Larkana for establishment of Rural Growth Centers (RGCs) as a pilot district.

Honorable Chief Minister, Sindh approved 05 districts namely Badin, Thatta, Tharparkar, Sujawal& Larkana for establishment of Rural Growth Centers (RGCs) as a pilot district and approved Chuhar Jamali, District Sujawal, as a pilot RGC. The planned interventions relating to up-gradation/ rehabilitation in the proposed growth center will be unfolded with a view to revitalize growth; jobs and livability of Chuhar Jamali and its surrounding areas.

i. 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.

ii. 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 hardships.

8. BASIC UTILITIES

8.1 Water Supply

8.3.1 Existing Situation

The lower Indus Platform Basin is bounded to the north by the Central Indus Basin, to the northwest by Sulaiman Fold Belt Basin and the Kirthar Fold Belt Basin in the south west. The Sujawal TC has almost flat land and no hill torrent flows are arisen that may be drained from the hills or Nais. Thus Indus River is the main source of potable water that simultaneously off takes through several canal systems from left side of Kotri barrage such as Phuleli, Pinjari and Paro which feeds to the Sujawal Town. The supplied water by these canals is to be stored into the manmade wetland or reservoirs and be utilized accordingly. Moreover, the available ground water is not suitable for drinking, domestic and agricultural purposes. However, in some areas potable water is only available where land is parallel to Indus River. The ground water table in the vicinity varies from 20 ft. to 60 ft. The shortage of irrigation water supplies has reduced the water carrying capacity of KB (Kalri Baghar) Feeder requires remodelling of the canal (an off-taking canal from right bank of Indus River at Kotri Barrage).

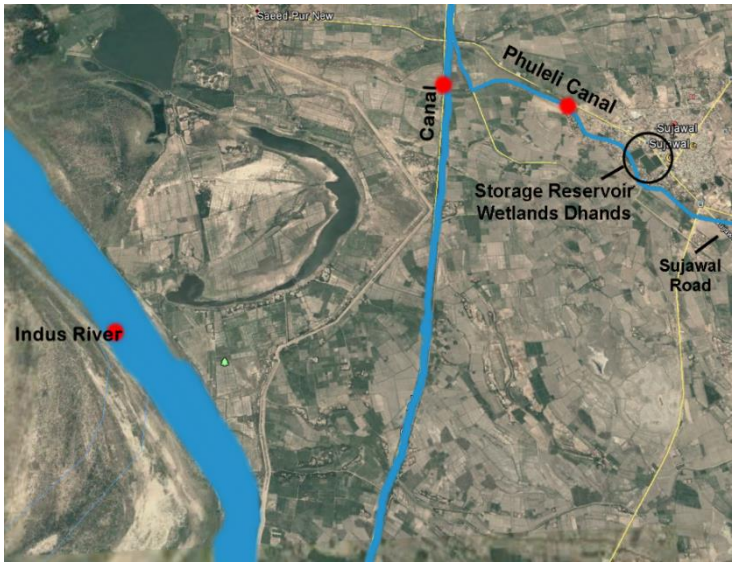


Figure 8:1: Source of Water Supply in Sujawal

i. Water Intake Works

The source of water supply to Sujawal TC is Indus River, the main source of potable water that simultaneously off takes through several canal systems from the left side of Kotri barrage such as Pinyari Feeder, Daro Feeder, and Mahamooda wah which feeds to the Sujawal. The transmission system of water in Sujawal TC is through pumping, there are 2 pumping stations and 3 storage reservoirs for supply water to Sujawal TC. The pipes of the water supply have C1, PE, and RCC of various sizes from 16, 12”, 6”, 4”, and 3”, 2”, and 0.5” diameter.

ii. Existing Water Works

The existing system of water works in Sujawal TC was found totally stuck up and no operation & maintenance methods are being applied; especially in the absence of regular sampling & testing lab, the quality of water remains doubtful. The sample testing revealed that the water supplied to the residents remains polluted. The Town 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.

iii. Distribution Network:

There are 2 pumping stations on main Sujawal Road and 3 storage reservoirs or Wetlands from where water is pumped into distribution networks. The distribution Network consists of pipe sizes of 16", 8", 4", 2" and ½" diameter. The material of pipes mostly used are C1, AC and PE pipes. The system is staggered and small pipes are laid on roads and crossing sewerage drains. The distribution network covers 18 km2 with 2500 to 3000 connections.40 There is no zoning system of distribution and no water meters are installed. Distribution network improvement (DNI) is essentially required for equitable distribution. Water supply network map was not available with PHED.

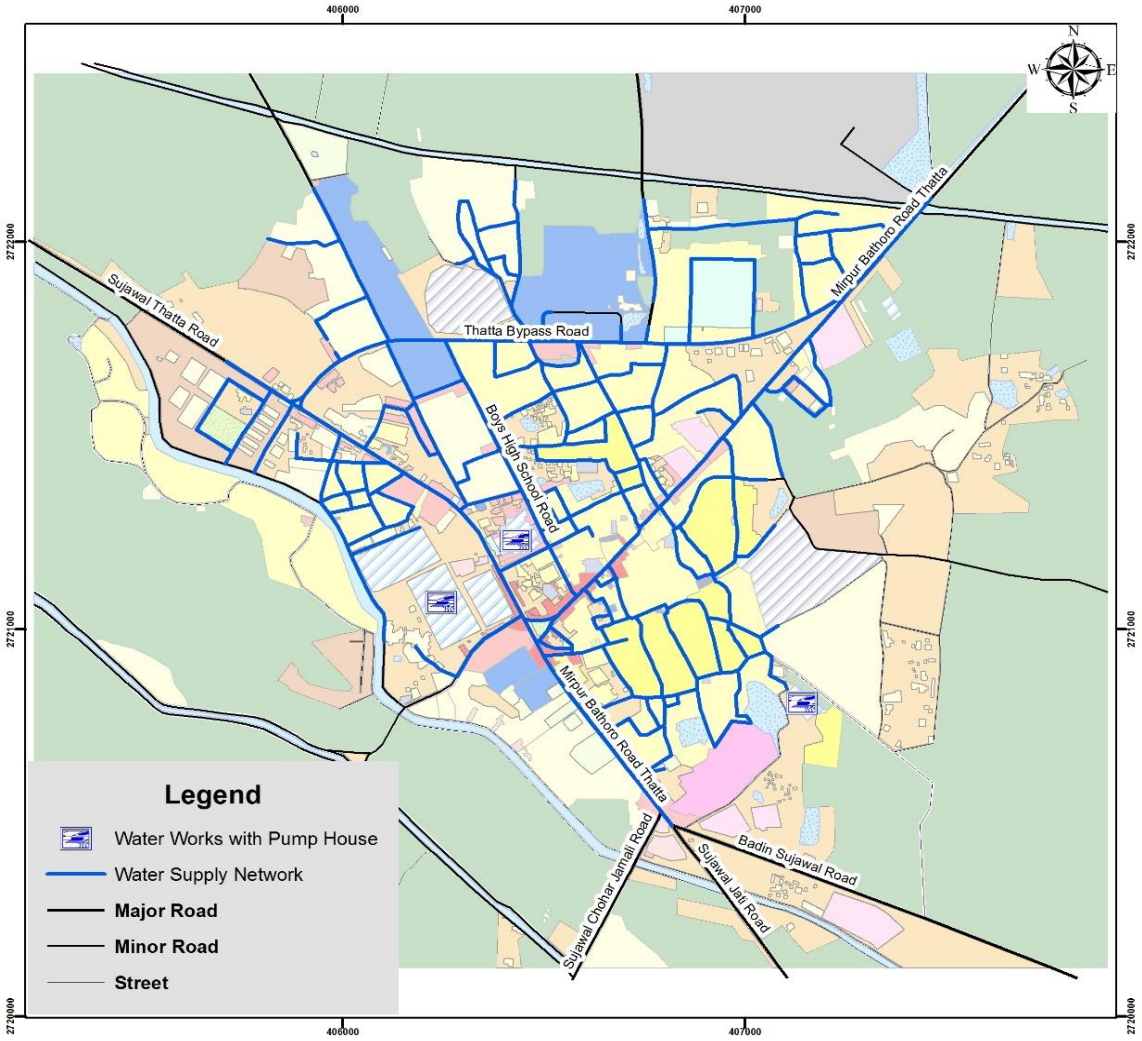


Figure 8:2: Existing Water Works of Sujawal Town

[40] PHED Sujawal

iv. Water Treatment Works

Different industries throw tonnes of solid & liquid waste directly into the Canal. For domestic consumption, the source of water supply to civic agencies is irrigation channels but limited to provisions of Raw Water. The extracting agency e.g. Sujawal is liable for treatment of this water to make it fit for human consumption compliant to WHO – drinking water standards. There are no water treatment quality is available in Sujawal & municipality is storing and supplying by storage in wetland reservoirs. There is only one RO Plant in the vicinity installed for community use. The Judicial Commission's report reveals that the samples taken from RO Plant of District Sujawal establishes unequivocally that water being produced from the RO Plant doesn't meet the quality standards. Unless a metering system to gauge the quantity of water supplied & the quality of water produced is measured in a testing laboratory, the purpose of RO plant to provide drinkable water wouldn't be achieved nor there any justification to spend huge amounts on its running cost. **There is No treatment of raw water.** The water is drawn from long distance of canal water services and stored in storage reservoirs or wet lands and they are susceptible to pollution from effluent discharges upstream. Water supplies are also contaminated from sewerage and wastewater leakages through old pipes and poor joints, negative pressure caused by intermittent delivery timings and pumping from empty pipes. Water come from Indus River then it comes to Water reservoirs / Wetlands, pipe distribution system is scattered without zoning system. The system is very old which is in need of re-habitation.

8.3.2 Issues

The following key challenges in drinking water supply:

- High proportion of non-revenue water without proper metering system
- ½“, 1” & 2” pipes used which is not a municipal system of water Network
- Ageing infrastructure (water pipes on road level)
- Water mains are leaking at many places due to direct pumping.
- The use of hand-pumps is not very popular because water from hand-pumps has more minerals and highly saline. Poor water quality from polluted and contaminated sources
- Inadequate water treatment facilities.Only one RO plant is present that too is not functional.
- Distribution Network is faculty which needs overall rehabilitation by DNI for equitable distribution.
- No provision of testing Lab for regular Water Sampling.
- RO plant is without metering and no quality control method adopted.
- The existing supply is severely stretched and inadequate.
- Water is not safe to drink and is contaminated by sewerage.
- The supply is intermittent but water is supplied every day

8.3.3 SWOT Analysis

Water Supply & Distribution			
Strengths	**Weakness**	**Opportunity**	**Strength**
1. Intake sources available 2. Almost 76% population of the town is having the facility of piped supply and remaining population have hand pumps inside their houses. 3. The bulk of municipal water supplied Sujawal is drawn from the irrigation canal, passing close to the town.	1. Absence of treatment plant. 2. Poor administrative setup for water supply management and distribution. 3. High proportion of non-revenue water	1. Adequate water resources available for water supply system development. 2. Extension of existing irrigation system will boost agricultural productivity. 3. PPP in service delivery.	1. Contaminated water impacts Negative externalities on human and plant health 2. Depletion of water quality due to " "drains down"

8.3.4 Need Assessment

As per collected secondary data, the present need of Water in Sujawal TC is 1.06 mgd and the supply is 0.53 mgd, so there is gap of 0.53 MGD.

The present supply of the water is 0.53 mgd for Sujawal TC. As per PHED standards, the estimated water demand of Sujawal TC for the period up to 2037 is shown below.

Table 8-1: Population, Current Water Supply & Demand Projected up to Year 2037

Town	Description	2017	2022	2027	2032	2037
Sujawal	Population	**35,325**	**39,424**	**43,999**	**49,104**	**54,802**
	Per Capita daily demand @30 gped)	**1.06**	**1.18**	**1.32**	**1.47**	**1.64**

Source: Consultant Estimation

As per secondary data, the current demand of the town is about 1.06 mgd while the existing supply is 0.53 mgd. It is expected that the Sujawal TC will have a population of about 54,802 persons by 2037 and the daily demand for water for the town will increase up to 1.64 for a whole-day supply.

8.3.5 Sindh Drinking Water Policy 2017:

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).
- 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.
- The minimum acceptable option for the provision of domestic water is that, water will be provided inside the house, through piped system, to meet the minimum requirement of 50 liters = 11.0 gpcd per person per day. In rural settlements water may be provided through communal points to meet the minimum requirement of 25 liters per person per day (5.6 gpcd).
- Where domestic water supply is not of acceptable quality, a provision of at least 4 liters per person per day of drinking water should be provided, such that no household is more than 0.5 km from the point of supply.

8.3.6 Strategic Development Plan

i. Long Term Plan

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

ii. Short Term Plan

- Rehabilitation existing water supply network of Whole Town

- 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.
- Construction of water treatment plant for Town

8.3.7 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 Sujawal. Indus River is the main source of potable water that simultaneously off takes through several canal systems from left side of Kotri barrage such as Phuleli, Pinjari and Paro which feeds to the Sujawal Town. The wastewater is discharged into the canal through the pumping station which has been constructed by HDA/WASA without considering that canal water is being used for drinking purposes by the local people downstream of this canal.

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
- Intake structure to Reservoir including air, butterfly and washout valves.

➢ **Project Benefits**

People of Sujawal are facing shortage of water supply. 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. After implementation of this project, the source of water intake will be safe.

➢ **Implementing Authority:** Sujawal TC, Government of Sindh and PHE Department.

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

ii. Provision of New water supply network for 24% of Sujawal TC (Approx. 109.60 Acres)

- **Project Justification**

Almost all the network of Water Supply in Sujawal is in poor condition and most of it is damaged (especially in the old town area). More than 24% of urban areas have no proper Water Supply Network (Excluding Core Town Area). This project will help to supply 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:** As already discussed above that 24% of Sujawal TC have not a proper supply of clean Water. So after implementing this project, the Potable water will easily supply to the rest of town.

- **Implementing Authority :** Government of Sindh- PHE Department Sujawal TC

- **Estimated Cost: 328.82 Million PKR Approx. (Short Term)**

Total Urban Area excluding Agriculture, Vacant and Water Bodies Area	**564.5** Acres
Urban Area excluding Core Town Area 107.80 Acres	**456.7** Acres
24 % un-served Area	109.608 Acres
Installation of New water supply scheme is proposed to cater 24% population / Area of Sujawal town @ Rate of 3.0 Million Per Acre	328.82 Acres

iii. Repair & Rehabilitation of Water Supply Network 76% Sujawal TC (Approx. 347.092 Acres)

- **Project Identification & Justification**

Almost All the network of Water Supply in Sujawal TC is in poor condition and most of it requires repair & rehabilitation. According to the socio economic survey results, 76% of total population has piped water connection. People purchase their potable water through tankers due to the shortage or delays in water supply. This project will help to improve the capacity of supply water schemes already exist in town.

Repair and rehabilitation of existing water supply network cover below main components such as;

- Excavation
- Pipe cost
- Gate valve/ Washout valve/ Air release valve
- Joints repairs
- Balancing slopes at all network

Total Urban Area excluding Agriculture, Vacant and Water Bodies Area	**564.5** Acres
Urban Area excluding Core Town Area 107.80 Acres	**456.7** Acres
76 % Served Area	347.092 Acres
Proposal for Repair & Rehabilitation of Existing Water supply scheme shall help to supply safe potable water to served 76% population of Sujawal TC. One Million per Acre = 347.092 Millions	347.092 Acres

- Checking of pipe life with rupture checker
- Valves for area wise pressure maintenance

➢ **Project Benefits**

After implementing of this project, the Potable water will be supplied to rest of area of Sujawal TC Implementing Authority - Government of Sindh- PHE Department Sujawal TC

➢ Estimated Cost: 347.092 Million PKR Approx. (Short Term)

PROPOSED PRIORITY PROJECTS						
S. No	**Project Name**	**Estimated Cost In Millions**	**ADP**	**Non ADP**	**Status**	
					Short Term	**Long Term**
Water Supply						
1	Improvement In Water Intake Work	100.00	-	Non ADP	Short Term	-
2	Provision of New water supply network for remaining 24% (109.608 Acres) except core urban area.	328.824	-	Non ADP	(Phase Wise)	-
3	Repair & Rehabilitation of existing Water Supply Network 76% (347.092 acres) except core urban area.	347.092	-	Non ADP	(Phase Wise)	-

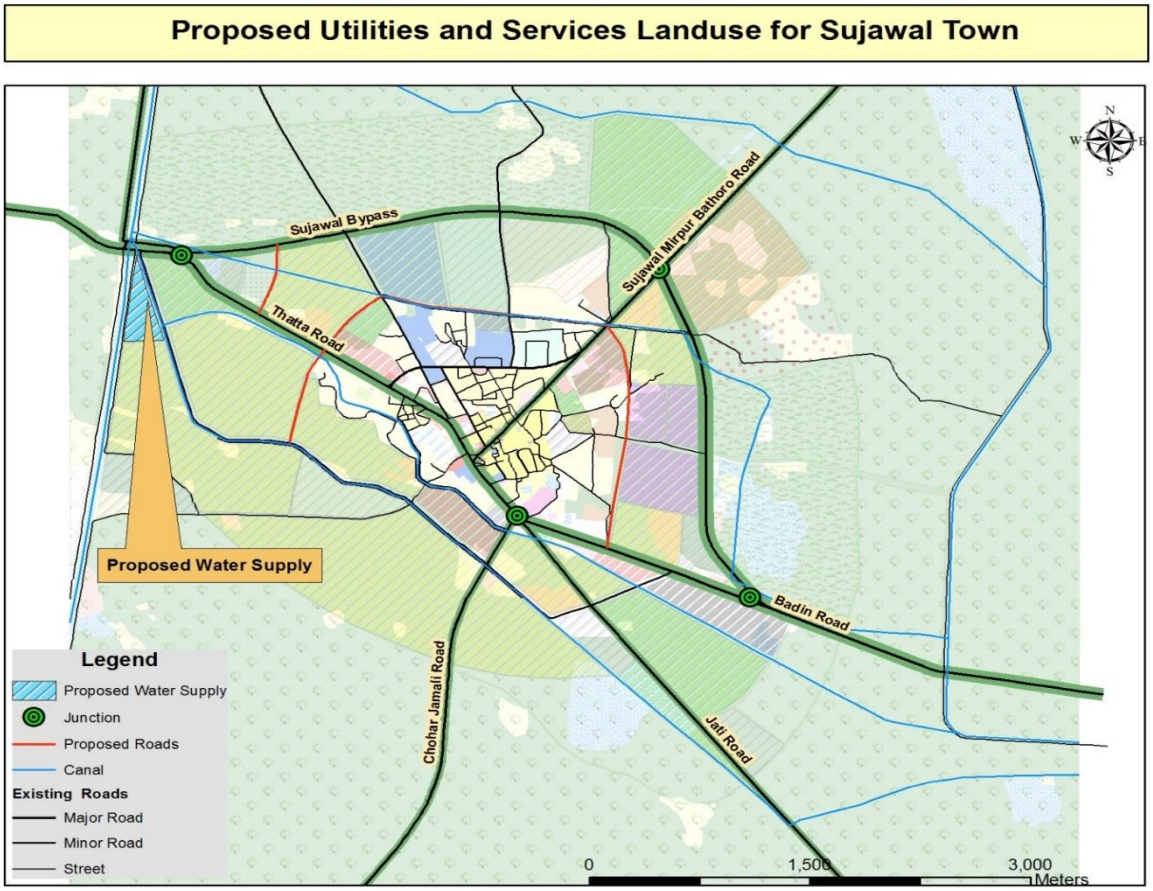


Figure 8:3: Future Land use for Water Works for Sujawal Town

8.3.8 Immediate Action Plan for Core Urban Area

Existing water supply scheme of core town area has passed ages and became outdated, core area of Sujawal 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 Thatta (107.80 Acre)				
S#	**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).	107.80	1.0 million Per acre	107.80
			Total Cost (PKR). Million	**107.80**
Note: *Water supply system renovation includes supply pipe networks, pumping machinery and equipment's for more efficient and effective supply of water.*				

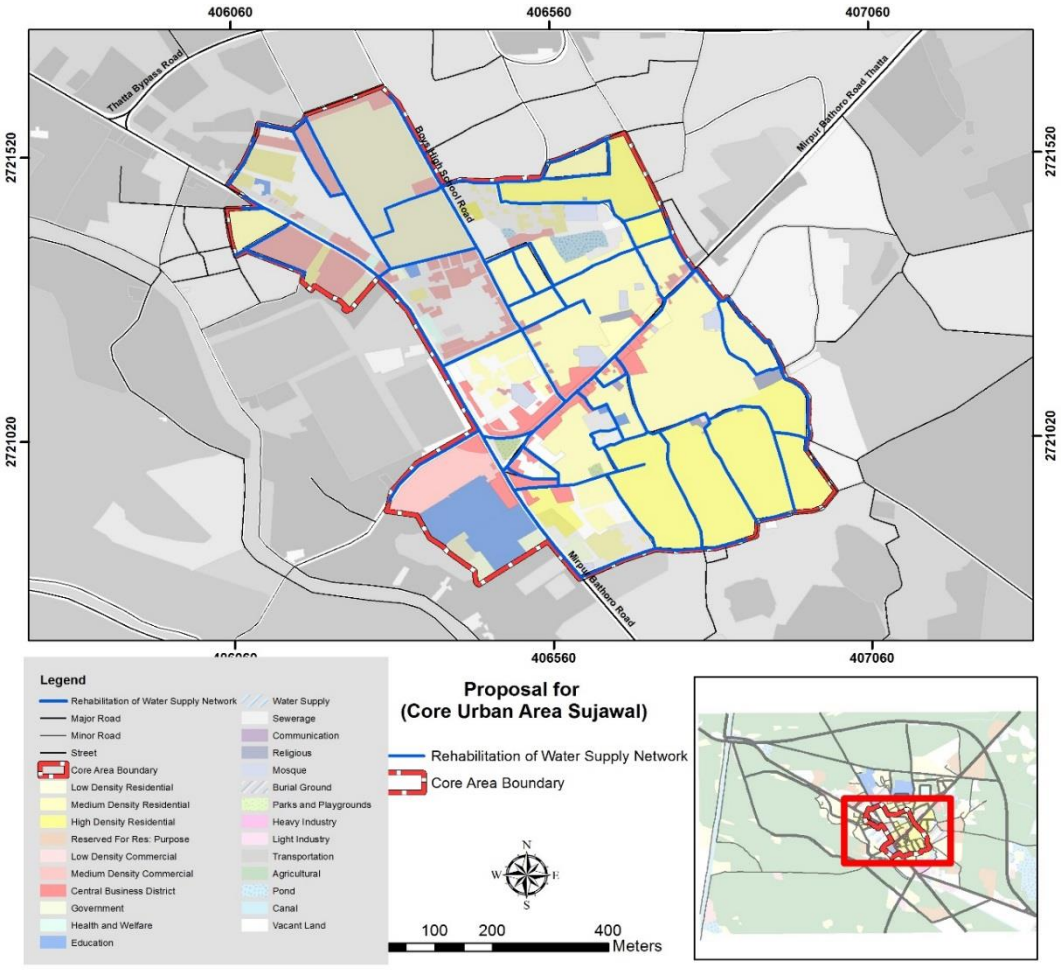


Figure 8:4: Rehabilitation of Water Supply Scheme for Core Urban Area Sujawal

8.2 Sewerage and Drainage

8.2.1 Existing Situation

The sewerage and drainage system of Sujawal town consist of a combination of underground pipe sewers constructed in various phases. The sewerage/wastewater gravitates to the collector wells (Wet Well) of 3 disposal pumping stations discharge in open Nala on main Sujawal Road, and is pumped through 10 HP pumping units at each pump house discharged into the Sim Nala which is the main carrier of sewerage in Sujawal.

Figure 8:6: Discharge into Sim Nala

Figure 8:5: Damaged Drains and leaking water mains

The drainage system is in poor condition, with open smelly drains and sewers. There is no sewerage treatment, and untreated sewerage collects in ponds/swamps. Drains are blocked by garbage and vegetation. About 76% of respondents from 6317 HHs were dissatisfied with the current sewerage system. Sewerage is mainly disposed of in roadside drains and Nalis.

Table 8-2: Existing Infrastructure of the Sewerage and Drainage System in the Town

S. No.	Item	Qty	Location	Details
1.	Drains			Type A - 4,572 m (15,000 rft)
2.	Sewer pipes			Only 12”Q – RCC pipes have been used
3.	Collection pumping stations	3 no.	At main Sujawal Road	1 no. collection well 1 no. 10 HP pump set (poor condition)
4.	Rising main			16” diameter AC pipe
5.	Effluent discharge			Into Phuleli Canal and Sim Nala.
6.	(Treatment works)	1 no.	Southern edge of town, at Old Mir Wah	Nonexistence.

Figure 8:7: Damaged Drains and leaking water mains

Figure 8:8: Discharge into Sim Nala Waste Water Treatment Plant

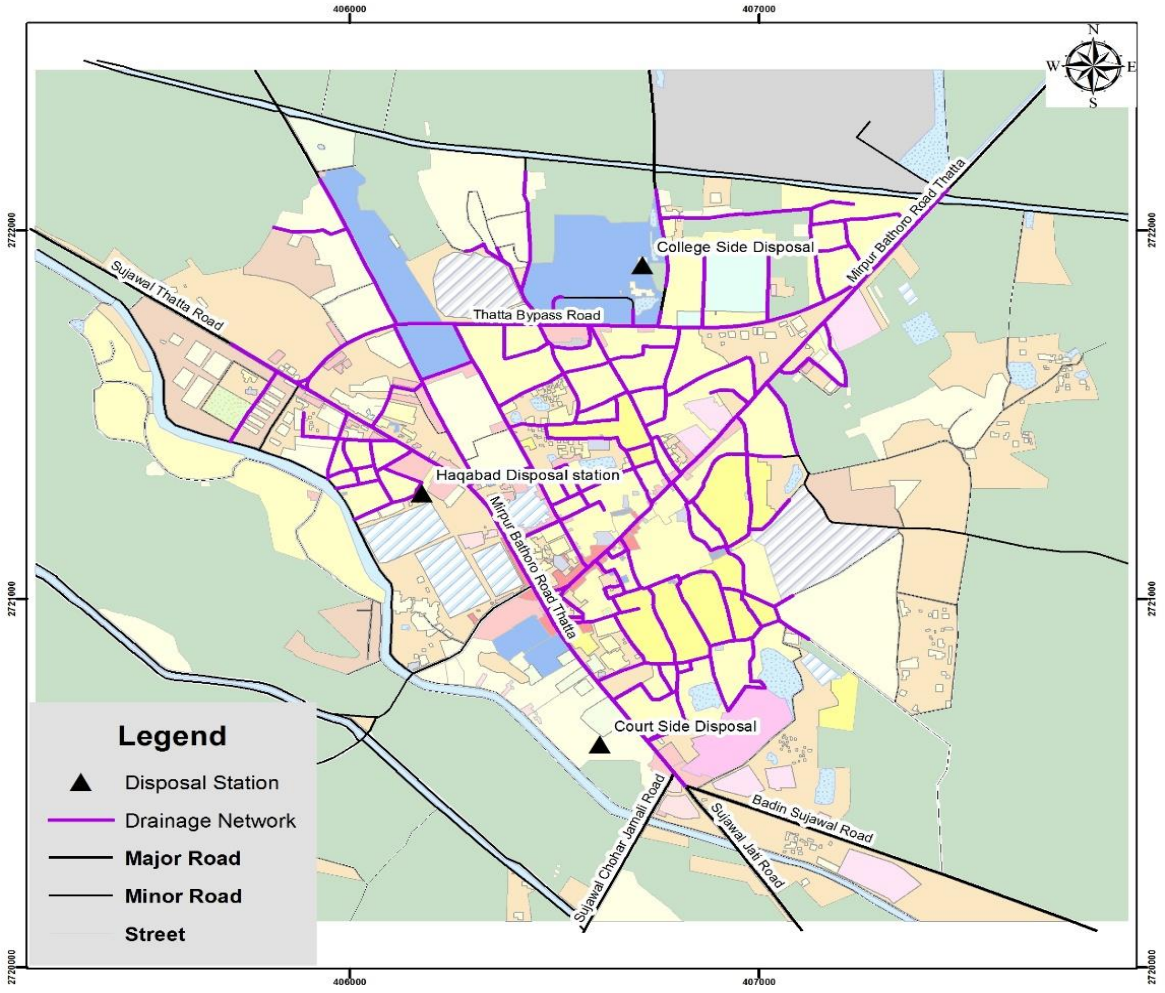


Figure 8:9: Existing Drainage Network of Sujawal TC

Sewage is mainly disposed of in roadside drains, and untreated sewage collects in ponds/swamps. Wastewater is not treated since the treatment plant is not available in Sujawal TC.

8.2.2 Issues

- Absence of comprehensive sewerage and drainage plans for cities and towns – there is urgent need for sewerage improvements and implementation in line with the standards of planning and design to implement sewerage facilities based on it and to revise the plan on regular basis taking social and physical changes into account.
- Limited budget allocation for sewerage facilities.
- Improper operation and maintenance of sewerage facilities – mainly due to the limited budget and personnel allocated for operation and maintenance of sewerage facilities, existing facilities are not operated properly. Improper maintenance might lead to earlier aging of facilities and non-compliance with the effluent quality standard.
- Insufficient sewerage facilities – existing sewerage facilities for sewerage collection and its treatment are far from sufficient in quantity to serve the rapidly increasing population. Additional sewerage collection systems including branch sewers, trunk sewers and pumping stations need to be constructed to improve the living environment of the citizens. In the same manner, preside existing sewerage treatment plants, or and Stabilization Ponds have to be installed to treat all the generated sewerage to improve water qualities of public water bodies, especially of canal system in Sindh.
- Provision of stabilization ponds and reuse of treated effluent is practiced at many places

8.2.3 SWOT analysis

Sewage Collection & Disposal			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Mostly Town is covered by sewerage network 2. Sufficient land for disposal sites is available.	1. Poor maintenance condition; garbage enters into sewers, which requires desisting. 2. Drain water is disposed of untreated into canals and drains. 3. Open sewers 4. Outdated and disconnected network. 5. No treatment before disposal 6. No policy for re-cycling, and reduction in generation of sewerage 7. Mixing of solid waste disposal into Sewerage. Rain/Flood water still standing in town centre areas.	1. An appropriate sewerage system plan should be implemented. 2. Improvement of general hygiene/ public health by cleaning sewerage system 3. Development of well-designed trunk sewerage network with less number of disposal station. 4. Job opportunities for skilled staff for proper maintenance 5. Revenue can be generated by charging services for cleaning. 6. PPP in service delivery	1. Storm water flooding/ over flow of sewers 2. Environmental degradation 3. Funding & policies. 4. Removal of encroachment 5. Land grabbers

8.2.4 Need Assessment

Estimated wastewater generation for the period to 2037 is shown below:

Table 8-3: Estimated Wastewater generation for the period 2037

Town		2017	2022	2027	2032	2037
Sujawal TC	Water Supply (mgd)	1.06	1.18	1.32	1.42	**1.62**
	Sewerage generated @70 % Water supply (mgd)	**0.74 mgd**	**0.82 mgd**	**0.92 mgd**	**0.99 mgd**	**1.13 mgd**

Source: Consultant Estimation

8.2.5 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.
- 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 stakeholder partnerships and collaborations comprising of citizens, governments, civil society, non-

[41] Sindh Water and Sanitation policy 2017

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).
- The role of women shall be an integral component of behavioral change communication strategies and project planning, implementing and monitoring through capacity development and social mobilization of relevant stakeholders.

8.2.6 Strategic Development Plan

The aim of Strategic Development plan is Provision of adequate Sewerage and Drainage facilities to the DHQ Town through equitable, efficient and sustainable sanitation services. Lanes may continue using concrete drains and to discharge into sewers through screening chamber. Some of the objectives include:

i. Long Term Plan:

- Improving standards of public health through provision of improved services supported up by legal, regulatory and binding framework.
- Wherever existing sewerage systems discharge untreated sewerage in storm water drains or irrigation canals it should be treated before discharging, and may be used for agricultural purposes or converted into lakes and ponds as part of recreational areas.
- Construction of Waste Water Treatment Plant**:**
- Land acquisition for stabilization pond replacing oxidation ditches and swamps.

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 TC 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.

8.2.7 Priority Projects

i. Repair & rehabilitation of primary and secondary drains 65% (296.85 Acres) @ rate of one million per acre) except core urban area

- **Project Scope & Justification**

In Sujawal TC Sewage is mainly disposed of in roadside drains, and untreated sewage collects in ponds/ swamps. The drainage system and structures are in poor condition with open smelly drains and sewers. Drains are in poor condition almost in all the town and need to be repaied. The drainage and sewerage system in Sujawal TC consists of surface drains, and reinforced cement concrete (RCC) pipe sewers in part of the town. The sewerage system lacks proper operation and maintenance due to funding constraints, shortage of technical staff and proper equipment and vehicles.

Repair and Rehabilitation works will include the following components.

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

- **Project Size**

According to the land use survey conducted by client, the total Landuse of DHQ town excluding Core area, agriculture, and vacant land & water bodies is about 456.7 acres approximately. According to socio economic survey results 65% (269.85 Acres) of town area is served with drainage system. Whereas, 70% of respondents from the town are 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 269.85 acres excluding core town area.

Project Size	
Landuse of DHQ town excluding Core Urban Area, agriculture, vacant land & water bodies	456.7 acres
Out of total 65% of Sujawal town served with drainage schemes, which need repair and rehabilitation.	269.85 acres

- **Project Benefit**

After the implementation of the project of surface drainage network with easy disposal to river/canals after the treatment, the risk of urban flooding will be mitigated.

- Implementing Authority – PHED Government of Sindh, Sujawal TC
- Estimate Cost: Rs. 269.85 million approx.

ii. Installation of Sewerage and drainage network for unserved areas of the Sujawal TC (approx. 159.84 acres).

- **Project Scope & Justification**

As per socio-eocnomic survey results, 35% of total area is unserved due to unavailability of drainage network; therefore installation of new network for 35% of area is proposed on priority basis.

Construction of storm water and sewerage works will include the following components.

i. Construction of Walls, bed and Top slab of drains, manholes and chambers
ii. Installation of drains, chambers and manholes where found completely damage
iii. Laying of pipes, chambers, drains and inlet gratings

- **Project Size**

Therefore it is proposed to construct new drainage scheme for un-served area of DHQ town on priority basis, covering an area of 159.84 acres. The remaining area of the Sujawal TC needs to be provided a proper drainage and sewerage network in the town. This project will help the inhabitants of the town for easy disposal of storm water drainage and sewage water in to main drainage system.

Project Size	
Landuse of DHQ town excluding Core Urban Area, agriculture, vacant land & water bodies	456.7 acres
Out of total 35% of Sujawal town's area is not served with drainage network; therefore installation of new network for 35% of area is proposed on priority basis	159.84 acres

- **Project Benefit**

After the implementation of the project, remaining area of the town shall connects with drainage network.

- **Estimate Cost: Rs.3.00 million per acre cost – Rs.479.53 million approx.**

- **Implementing Authority – PHED Government of Sindh, Sujawal TC**

iii. Construction of Sewage Treatment Plant

- **Project Scope & Justification**

Due to unavailabilty of sewage treatment plant, the preference is given to conventional / Natural treatment of waste water through oxidation ponds. Therefore it is proposed to construct Sewage Treatment Plant for DHQ town on priority basis & convert existing oxidation Ponds area into STP.

Initially, construction of STP having capacity of 1.0 Million Gallon is proposed on priority basis on land of four acres of existing oxidation pond located near Badin road. STP involves the process of pre and secondary treatment of waste water. The following components includes the process;

i. Raw water screening
ii. Grid removal
iii. Oil and gas removal
iv. Aeration Tank
v. Sludge Separation & Treatment
vi. Disposal of Sludge

- **Project Size**

  Initially, construction of STP having capacity of 1.0 Million Gallon is proposed on priority basis on land of four acres of existing oxidation pond located near Thatta-Sujawal Road.

- **Project Benefit**

  After the implementation of the plan wastewater will be used for landscaping or maybe for other use.

- **Implementing Authority - Government of Sindh, Sujawal TC.**

- **Estimate Cost: Rs.400.00 million approx.**

S. No.	Project Name	Area (acres)	Estimated Cost In Millions	Short Term	Justification
Sewage & Drainage					
1	Repair & rehabilitation of primary and secondary drains 65% (296.855 Acres) @ of one million per acre) except core urban area	269.85	269.85	**Short Term**	At the rate of 2.0 million per acre for overall Repair & Rehabilitation construction cost.
2	Installation of Sewerage and drainage network for un-served areas of the Sujawal TC (approx. 159.84 acres).	159.84	479.53	**Short Term**	At the rate of 3.0 million per acre for overall Repair & Rehabilitation construction cost.
3	Construction of Sewage Treatment Plant (1.0 Million Gallon).	4.00	400.00	**Short Term**	Area reserved 4.0 acres, having capacity of 1 Million Gallons tentative cost for overall construction.

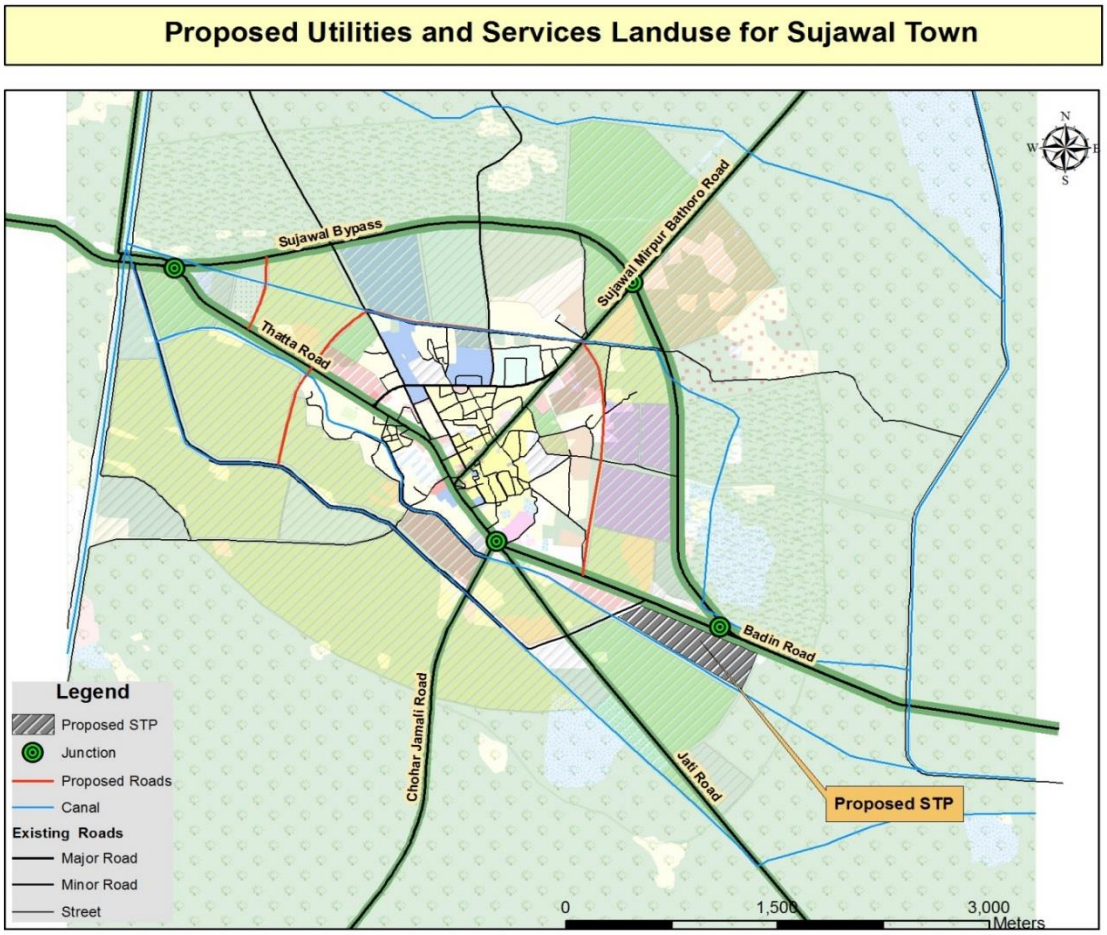


Figure 8:10: Future Land use Reserved for Proposed Site for STP for Sujawal Town

8.2.8 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.

S. No.	Name	Area (acre)	Per acre cost (PKR) million	Cost (PKR)
Total Core Urban Area : 107.80 Acre				
1	Sewerage System	**107.80**	**1.68 million Per acre**	**181.58**
2	Storm Water Drain System			
			Total Cost (PKR). Million	**181.58**

Note:
- *Sewerage system includes all urban core area network system with all related machinery and equipment's.*
- *Storm water drain system includes all the coverage core town area storm drain system through all steeps slopes and peak areas with all linking equipment's and machinery.*

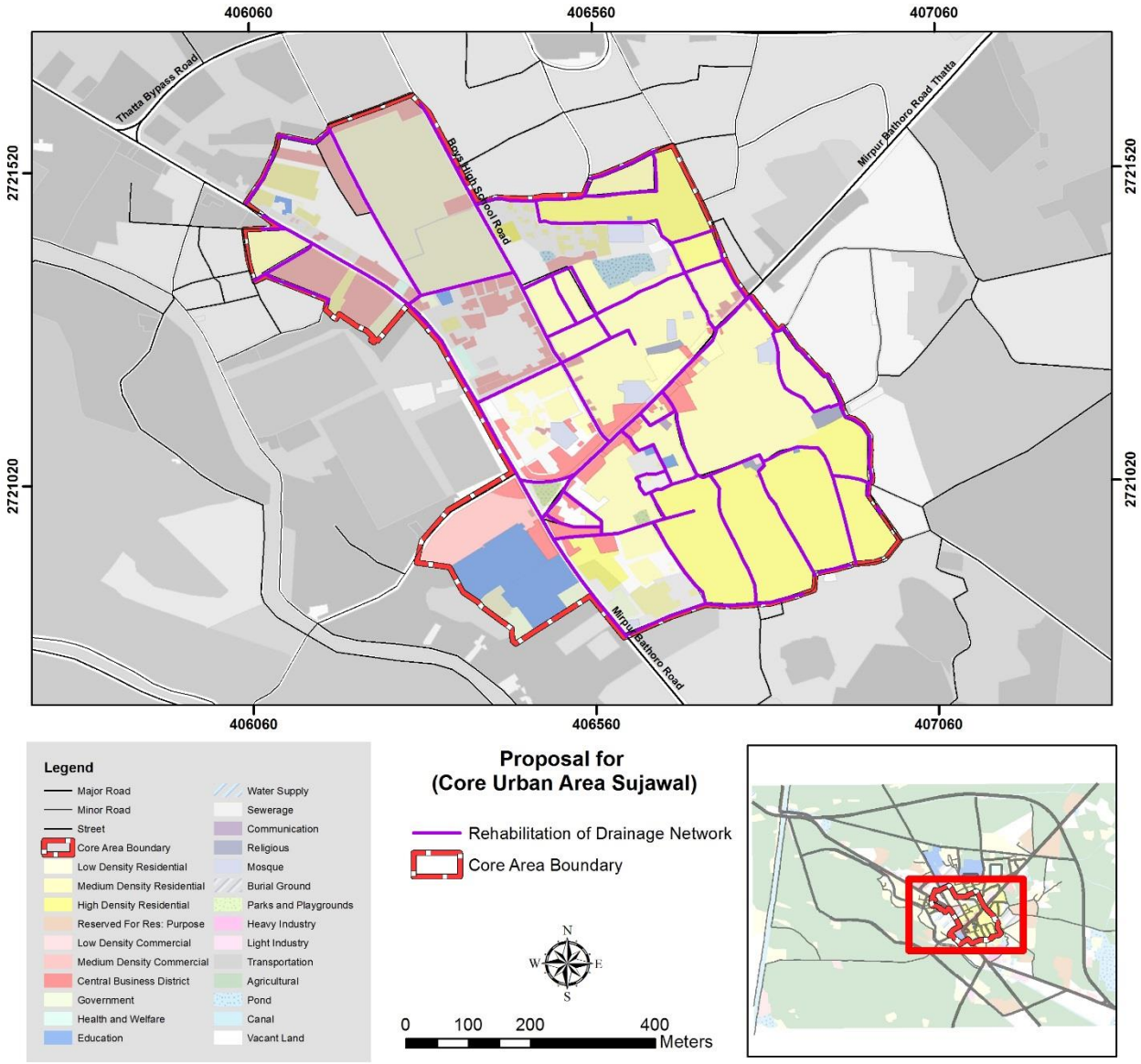


Figure 8:11: Rehabilitation of Sewerage Scheme for Core Urban Area Sujawal

8.3 Solid Waste Management

8.3.1 Existing Situation

Sujawal is a new district of Sindh. "Solid Waste Management (SWM) is the generation, separation, collection, transfer, transportation and disposal of waste in a way that takes into account public health, economics, conservation, aesthetics, and the environment, and is responsive to public demands[42]". Like some other major districts of Sindh, District Sujawal also has no proper solid waste management system, while indiscriminate dumping and open burning of waste is a common practice. It is responsibility of the municipal authorities to collect and dispose of solid waste but they had failed to perform their job because of the lack of the required machinery, capacity, expertise and mismanagement. However, municipal administration and district-level annual plan, reports and such other concerned projects details can be useful in understanding the situation of solid waste management in the concerned district. Though the urban parts of the district have waste management facilities up to some extent as compared to rural parts are totally neglected in this regard.

Figure 8:12: Solid Waste accumulation in Sujawal

In Sujawal, Town Committee is responsible for the solid waste disposal, drainage and sanitation and water supply facilities. Likewise other major districts of Sindh this district also faces irregularities in the solid waste management system majorly at talukas level, as well as, district level too. However, a common method of solid waste collection from the source point to the disposal at dumping site is followed. Furthermore, indiscriminate dumping and open burning of waste is a common practice in many areas of the district.

The collection mechanism that exists in Sujawal is still primary waste management system. The garbage is collected in open containers / community bins placed in streets or empty spaces designated as throw away places. The waste is collected and transferred/ transported outside limits of town to designate / non-designated dumping sites by means of refuse vehicles and tractor trolleys which are usually inadequate in numbers for handling of MSW by the sanitary / waste collection staff. Total actual numbers of Sweepers /and Cleaning staff is 173 in numbers. The employed staff in the municipality is 278 in numbers (including Mali) and the sanctioned employees are also the same.
The equipment, machinery and vehicles presently in possession with the municipality are:

1. Refuse Vans Nos. N/A
2. Tractors Trolleys Nos. 03
3. Tractors Nos. 03

[42] *(Journal of Environmental and Occupational Science Environ Occup Sci 2012; 1(2):129-131)*

4. Fire Tenders Nos. 01
5. Dewatering machines (petrol) Nos. 22
6. Dewatering machine (diesel) No. 01

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

1. Waste Loader Nos. 01
2. Tractors Trolleys Nos. 02
3. Tractor with front & rear blade Nos. 01
4. Water tanker Nos. 02
5. Fire tender (Large) Nos. 01

8.3.9 Issues

Some of the major issues faced by 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 Town 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.

8.3.2 SWOT Analysis

Solid Waste Management			
Strengths	**Weakness**	**Opportunities**	**Threats**
1. Town committee is responsible for operating mechanism for solid waste management 2. Recycling by scavengers. 3. Existence of primary collection system in Sujjawal.	1. Poor financial and operational management system. 2. District Sujawal has no proper solid waste management system. 3. There is no system to identify toxic wastes produced by various activities. 4. Communities' particularly low income groups are not aware with disposal procedures.	1. Appropriate measures could be adopted for collection and re-cycling of MSW. 2. Solid waste recycling will help to generate revenue. 3. More landfill sites should be identified for future disposals. 4. Establishing of a secondary 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. Outdated drainage system 3. Threats to plants and animal life Loss of trust building with people in future.

8.3.3 Need Assessment

The waste generation rate estimated from the studies conducted earlier in SCIP-3 project suggests to be around 0.4 – 0.45 kg per capita per day. However it is recommended to undertake the field study for the determination of waste generation and characterization for Sujawal 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 Town committee of Sujawal as 31,676 the total municipal solid waste load arising in the municipality is approx. 14,260 kg or 14.3 tons per day. As it is planned for 2037 there will be 12.5 tons per day solid waste management.

Based on National Reference Manual (NRM): on population of 10, 000, one acre of landfill area is required. So for the population of 31,676 in 2017, landfill area of 3.16 acre is needed and for the projected population in 2037 of **43,769** landfill area of approx. 4.376 acre is required.

8.3.4 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. Atleast each mega/intermediate city has a WTE (Waste to energy options) in place.
- Provide each town with a centralized and functional high risk hospital waste disposal facility.
- Update status of all slaughterhouses (recognized and unrecognized) in each district and prioritize those for rehabilitation, solid waste and wastewater management.
- Provide refresher training on slaughterhouse safety and hygiene practice guidelines to 100% slaughterhouse staff in recognized slaughterhouses in safe handling and disposal of carcass, entrails, hides, and wastewater.
- Efficient and effective management of Industrial solid waste by determining the current status of industrial solid waste production and disposal and development of strategies and actions for efficient and effective management of industrial solid waste.
- Develop and use technologies that are affordable, applicable and cost effective to maintain the solid waste management.

[43] Solid Waste Management Policy for Sindh

- 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.

8.3.5 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 TC. The mechanism for solid waste management is not available, so therefore a detailed feasibility is proposed to develop an efficient solid waste management in Sujawal town.
- 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.

8.3.6 Priority Project

i. Feasibility Study for Solid Waste Management Mechanism and Mechanism for Primary and Secondary Collection and recycling.

- **Project Scope & Justification**

The collection of the solid waste is the responsibility of Sujawal TC. TC has been contributing to keep clean the city by providing the basic municipal services include solid waste management. As street sweeping and collection are by far the most expensive activities in TC'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. There is a practice in Sujawal TC that at community level garbage generated from household is placed outside the house that is collected by the sweepers in the morning through door-to-door collection.

Central Composting Plant: In order to handle a large quantity of waste it is essential that organic waste is segregated from the municipal solid waste (with possible recovery of recyclable items) for which a setup of large-scale central composting plant is required. This should be done with private sector participation.

Landfill Site: Landfill is an ultimate safe disposal option for Municipal Solid Waste and is imminently required. Land fill should be in the radius of 2-3 km of the town.

- **Project Benefit**

The project will identify the feasible solution to improve hygienic conditions of the town and a positive impact over the whole population.

- **Implementing Authority -Government of Sindh, Sujawal TC**
- **Estimate Cost: Rs.30.00 million approx.**

S. No.	Project Name	Area (Acres)	Estimated Cost In Millions	Short Term	Justification
Sewage & Drainage					
1	Feasibility Study for Solid Waste Management Mechanism and Mechanism for Primary and Secondary Collection and recycling	564.5	20.00	**Short Term**	At the present, the town lacks in the provision of integrated mechanism of municipal solid waste management.
2	Land acquisition for landfill site.	5.00	10.00	**Short Term**	At the rate of 2.0 million per acre

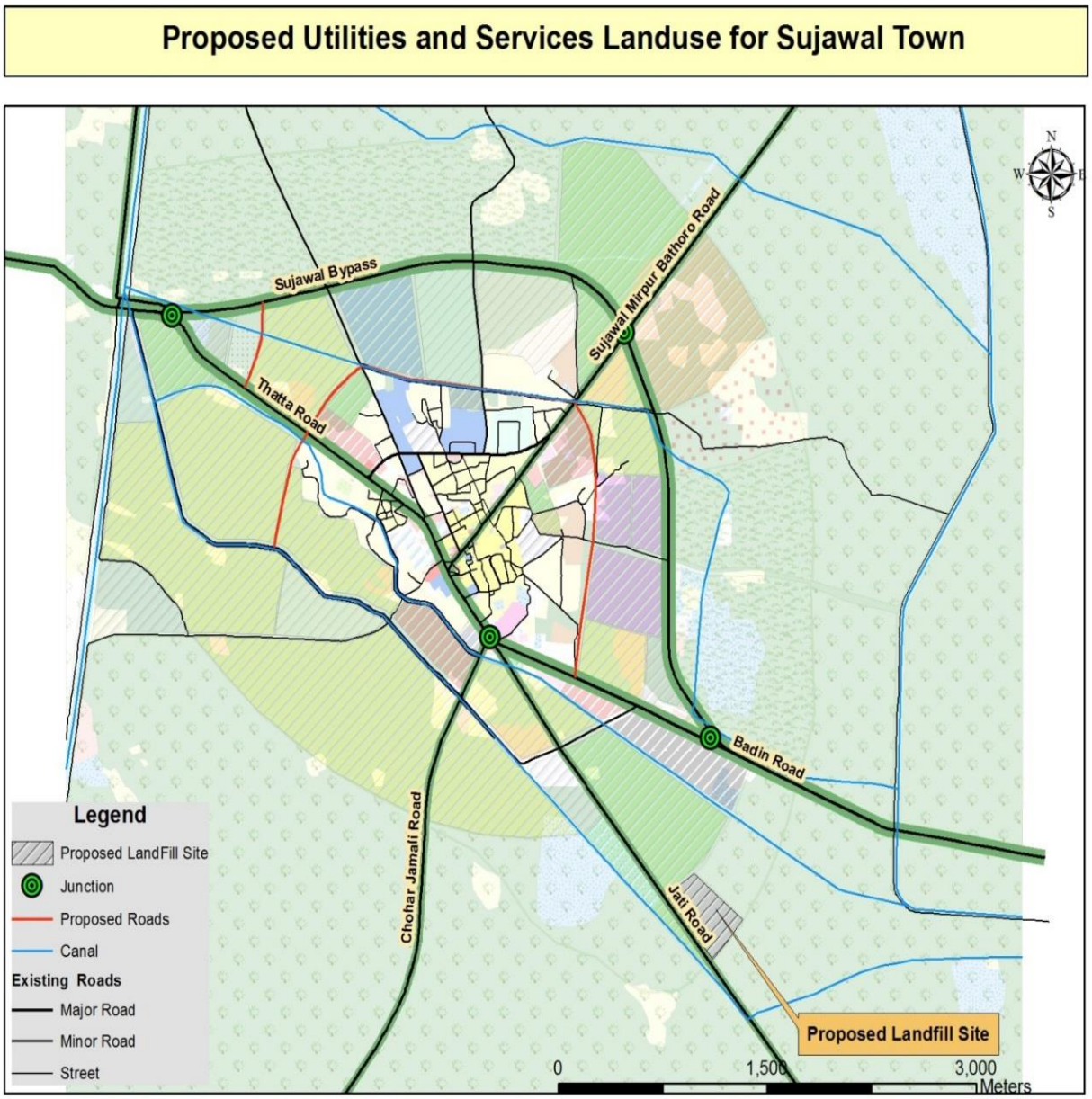


Figure 8:13: Future Landuses Reserved for Proposed as Landfill Site for Sujawal Town

8.3.7 Immediate Action Plan for Core Urban Area

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.

SUJAWAL 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 : 107.80 Acre				
1	Placing of Garbage Container at different sites/locations in core town area	50.00	520,000.00	**26,000,000.00**
			Total Cost (PKR). Million	**26.00**

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 TC office.
3. Sindh solid waste management department/authority should kept control on each project for the uplifting of town as per master plans.

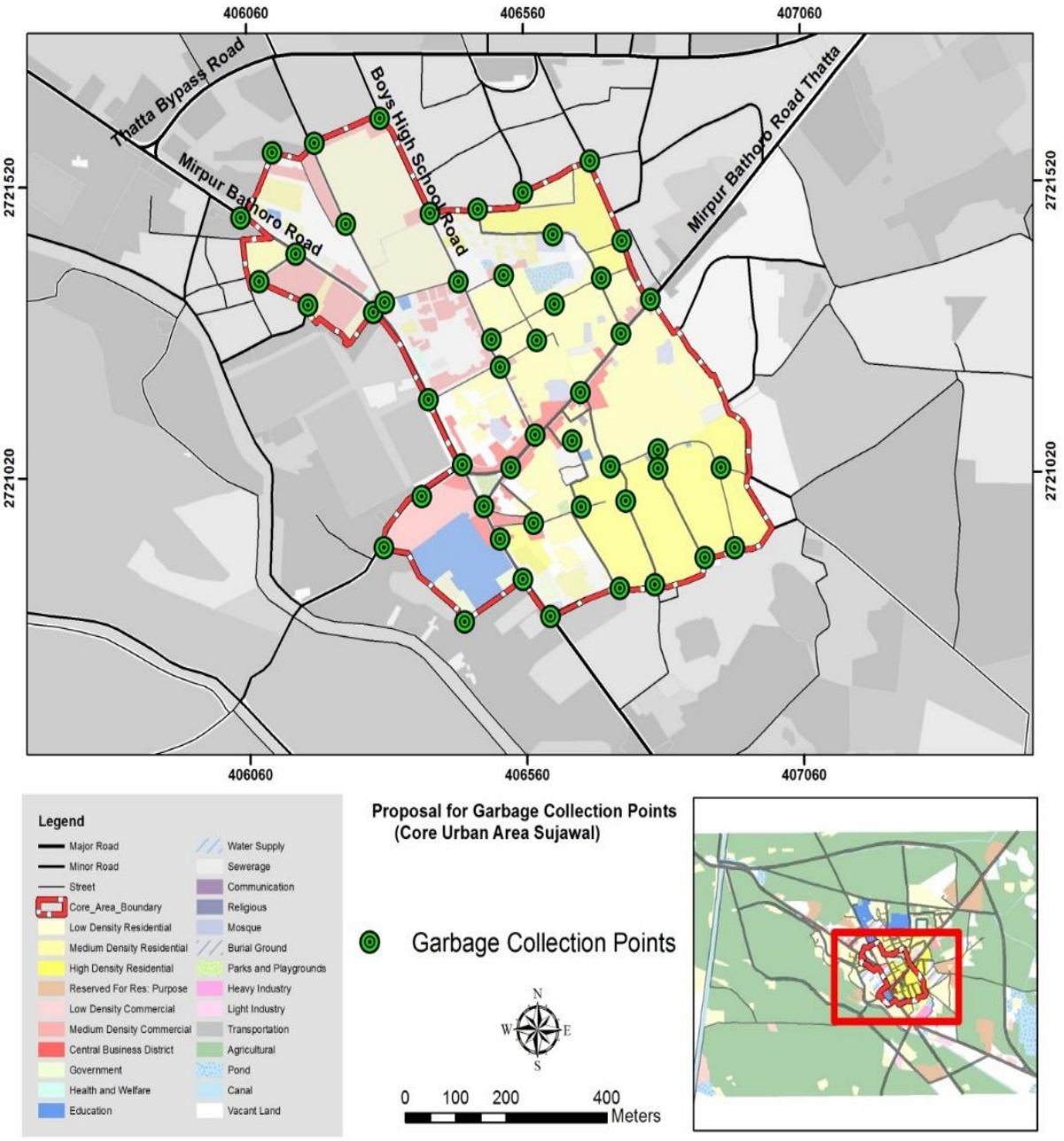


Figure 8:14 : Proposed Garbage Collection Points for Core Town Area Sujawal

8.4 Firefighting

8.4.1 Existing Situation

Currently there is one fire brigade station situated in Sujawal with 2[44] firefighting staff, out of which one driver and other is helper and one functional firefighting vehicles. The Town committee Sujawal has no separate budget for firefighting and no vehicle maintenance facility in town.

8.4.2 Need assessment

As the current total population of Sujawal is 35,325, which will be 54,802 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 are one vehicle is available with Town committee. So there is one fire engine is needed for Sujawal 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] TC office Sujawal

9. INFRASTRUCTURE

9.1 Transport and Communication

9.1.1 Existing Situation

- **Airport**

Sujawal has direct access to both airports i.e. Hyderabad Domestic Airport via N-5 via Kotri-Hyderabad Road and Jinnah International airport via N5 road. Travel time from Sujawal to Hyderabad and Sujawal to Karachi Airport is approx. 130 Km which is two and half hours approximately. But due to some technical reasons Hyderabad domestic airport is now closed for commercial traffic as of 2013. An air strip is located in Jung Shahi. Travel time from Thatta to Jung Shahi Airstrip is approx. 50 km from Sujawal town.

Figure 9:2: Jung Shahi Station

- **Railway Station**

The City is not directly linked with the national network of Pakistan Railways. But Jungshahi railway station is the nearby railway station, located at Jungshahi, Thatta district of Sindh province, Pakistan. The City is not directly linked with the national network of Pakistan Railways. But Jungshahi railway station is the nearby railway station, located at Jungshahi, Thatta district of Sindh province,

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

Inter-city buses are very limited and do not operate regularly. There is no proper bus stand but illegal bus and qinqui stands of public transport are evident everywhere. Some bus and truck stands are observed on the periphery of Badin, which connect Badin to other Towns. There is one bus terminal construction going on near grid station.

Figure 9:3: Bus Stand

- **Intra City Modes of Transportation:**
  There are no major Bus and Truck stands within Badin. Unregistered Qingqi and Rickshaws are more in numbers than buses. In percent majority of transport is private vehicle.

6.7.1 Local Road Network

- **Condition of Road**

Sujawal city is situated, 20 kilometers west of Thatta, on the national highway (N5). This highway passes through District Thatta for a length of 100 kilometers. N5 National Highway, which connects Karachi and Thatta with Sujawal-Badin roads. District headquarters of Sujawal is connected with other talukas Jati, Mirpur Bathoro, Shah Bandar and it self Sujawal through well-built roads.

Figure 9:4: Road Condition

Sujawal has significant connectivity with surrounding towns as well as other parts of the country through the regional and national road network. N-5 National Highway is connecting Sujawal- Thatta and Badin with Hyderabad and rest of the country. Most of the Private transporters run passenger buses and vans on all the regional and national routes.
Drainage issues on road side are evident due to which roads are worsening day by day. Absence of street furniture is another issue due to which traffic incidents takes place. Encroachments and unorganized/illegal Qinqui and Rickshaw stands are also evident on the road side which causes on street and off street parking issues.

- **Parking/Street Furniture/Street lightning**
  No separate parking is available except roadside parking. Similarly, no street furniture is observed. Street Lightning is available but need to be upgraded and maintained where installed and as need extension in other areas as required.

- **Street Pattern Role in Urban Morphology**
  Town shaped like an oval pattern of irregular shape. The city extended in two directions i.e. north-east and north-west along National Highway N-5 (Thatta-Sujawal road). Town's spatial growth during last 7 years was hardly 5% of built-up area increased at outskirts of town area mainly Sujawal-Bathoro road. The city grew mainly in north-east and north-west directions. The administrative complex and offices i.e. DC office, Session Court, police station, SSP office etc are situated along Thatta-Sujawal Road which passes through the centre of city.
  Number of Registered Vehicles:
  90% of vehicles are registered i.e cars, bikes, rickshaw, Suzuki etc.
  Number of Public transport (buses)
  Number of public buses in town amount to 15-20.
  Common routes of Public Buses
  i) Sujawal to Badin
  ii) Sujawal to Jati
  iii) Sujawal to Thatta

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

LAND USE &TRANSPORTATION			
Land Use Pattern & Transportation			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Mixed land uses (residential, commercial, industrial, administration) 2. Good national / regional connectivity through road networks. 3. Appropriate road space available for street furniture installation in most locations	1. Unplanned street network 2. Absence of public transport 3. Drainage Issues on Road Side 4. Ribbon type commercial development in residential neighborhoods. 5. Poor traffic management. 6. Lack of coordination between different transport operating agencies. 7. Less provision of street furniture 8. Haphazard on street parking 9. Illegal Bus Stands of Public Transport.	1. Promotes compact development. 2. Activity centres (support local business) 3. Wider road space can be used to facilitate multiple transport activities by implementing road space design standards 4. Proper management can promote public transport services. 5. Removal of encroachments 6. A new transport terminal for goods transport will facilitate timely supply of industrial goods.	1. Encroachments 2. Congestion 3. On street parking (paid/unpaid) 4. Reduced flow of traffic (low speed) 5. Security issues Inconvenience due to traffic congestion

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.

iii. Accessible surfaces:

[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)

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 Sujawal 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 roads of Sujawal.

  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. Sujawal-Thatta Road, Thatta –Sujawal Road and Bathoro Road needs repair rehabilitation with allied missing facilities.

- **Project Benefit – By implementation of the project agricultural, industry sector could be enhanced.**
- **Implementing Authority-Government of Sindh, Sujawal TC, Works and Services Department Sujawal.**

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

- **Project Justification**

  Most of the Streets of Sujawal 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 – Sujawal TC, Government of Sindh**

- **Estimated Cost: 843.42 Million PKR Approx.**

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) (Approx. 15,294 meters @ rate of 4500 per running meter) 226.68 Million Repair & Rehabilitation of Streets (Excluding Core Urban Area) (Approx. 114,919 meters @ rate of 4500 per running meter) 517.13 Million • Pedestrian pathways • Designated Parking Spaces • Provision of Footpaths and Street Furniture • Installation of traffic signals & new solar Street Lighting On main roads **Lump sum Amount 100.00/ Million**	843.42	-	Non ADP	**Short Term**	-

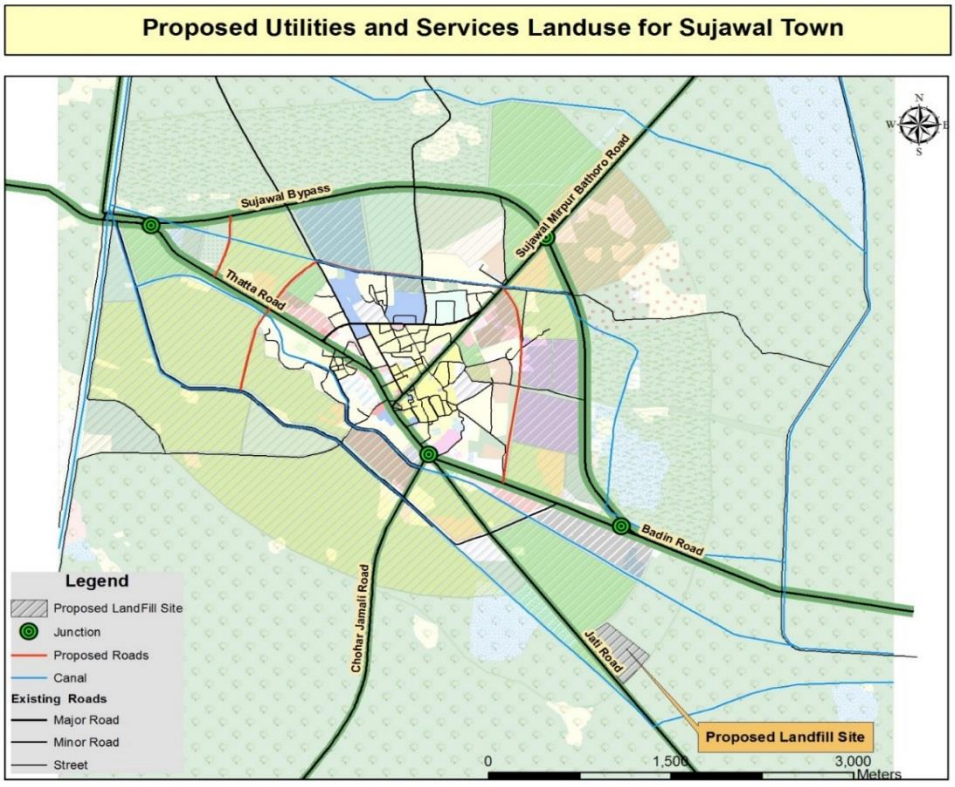


Figure 9:5: Future Proposal for Transportation for Sujawal Town

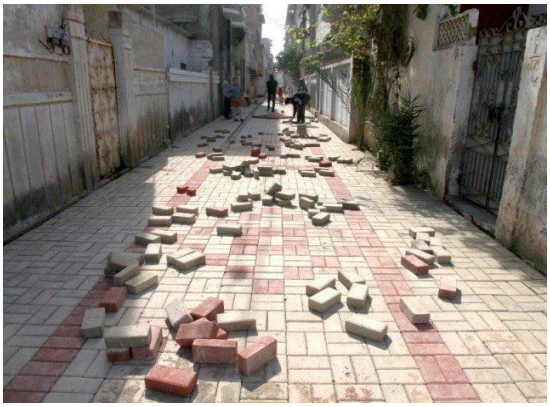
9.1.8 Immediate Action Plan

Repair & Rehabilitation of major and minor roads i.e. Thatta – Shjawal Road, Sujawal-Mirpur Bathoro road, SDM Masjid Road, High School Road and Main Bazar Road. The improvement in road pavements with green medians, road markings, signals, pedestrian crossings, will be developed.

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 encroachment, 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 Sujawal 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.

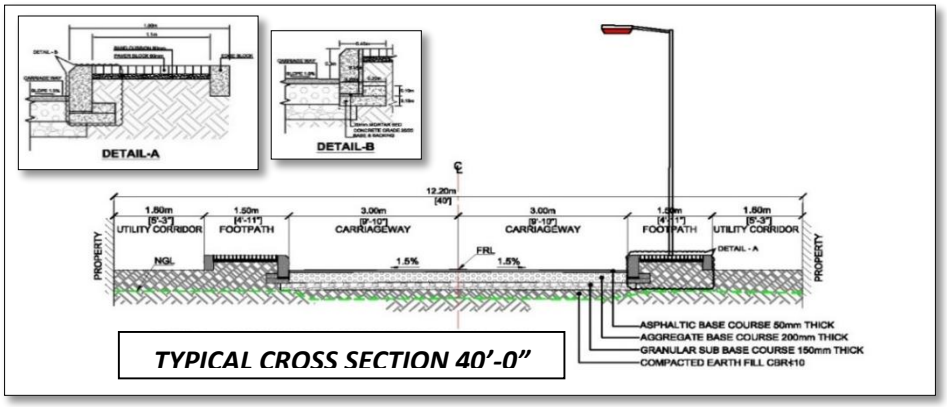


Concrete Pavers for Streets

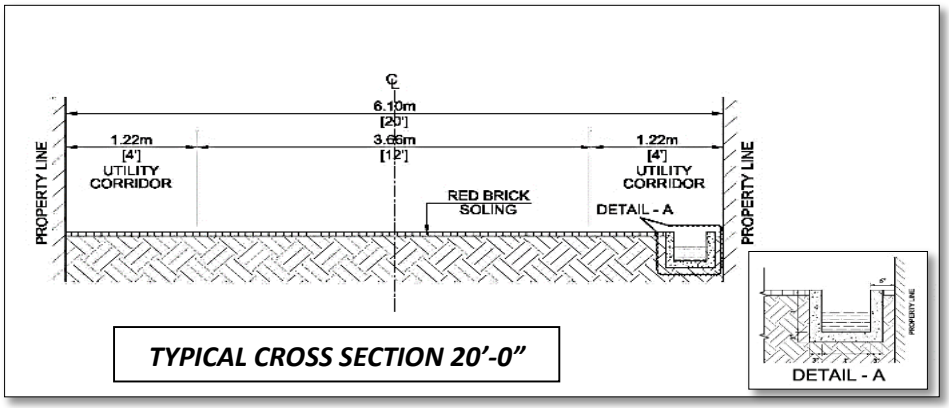
Model of Monuments

List of Roads for Rehabilitation								
S. No	**Area / Locality / Address Major**	**Length (km)**	**Length (m)**	**Width (feet)**	**Width (m)**	**Area (sq.m)**	**Per sq.m cost (PKR)**	**Total Cost Millions (PKR)**
1	Repair and Rehabilitation of Mirpur-Bathoro Road	**1.35**	**1345.05**	**40.00**	**12.20**	**16,403.11**	**4,500**	**73.81**
2	Repair and Rehabilitation of Thatta-Sujawal Road	**0.35**	**350.00**	**40.00**	**12.20**	**4,268.29**	**4,500**	**19.21**
							Total PKR Rs. Million (A).	**93.02**
Minor Roads								
1	Boys High School Road	**0.606**	**605.66**	**40.00**	**12.20**	**7,386.04**	**4,500**	**33.24**
2	Post Office Link Road	**0.107**	**106.62**	**40.00**	**12.20**	**1,300.28**	**4,500**	**5.85**
3	16 Minor Roads	**3.095**	**3094.61**	**40**	**12.20**	**37,739.10**	**4,500**	**169.83**
							Total PKR Rs. Million (B).	**208.91**
Streets								
1	Up-gradation of streets of Core Town Area Sujawal	**6.00**	**6,000**	**20**	**6.10**	**36,585.37**	**2,500**	**91.46**
							Total PKR Rs. Million (C).	**91.46**
							(REHABILITATION OF ROADS) - Total PKR Rs. Million (A+B+C).	**393.39**

Typical cross section is given as below;



TYPICAL CROSS SECTION 40'-0"



TYPICAL CROSS SECTION 20'-0"

➢ 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 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.

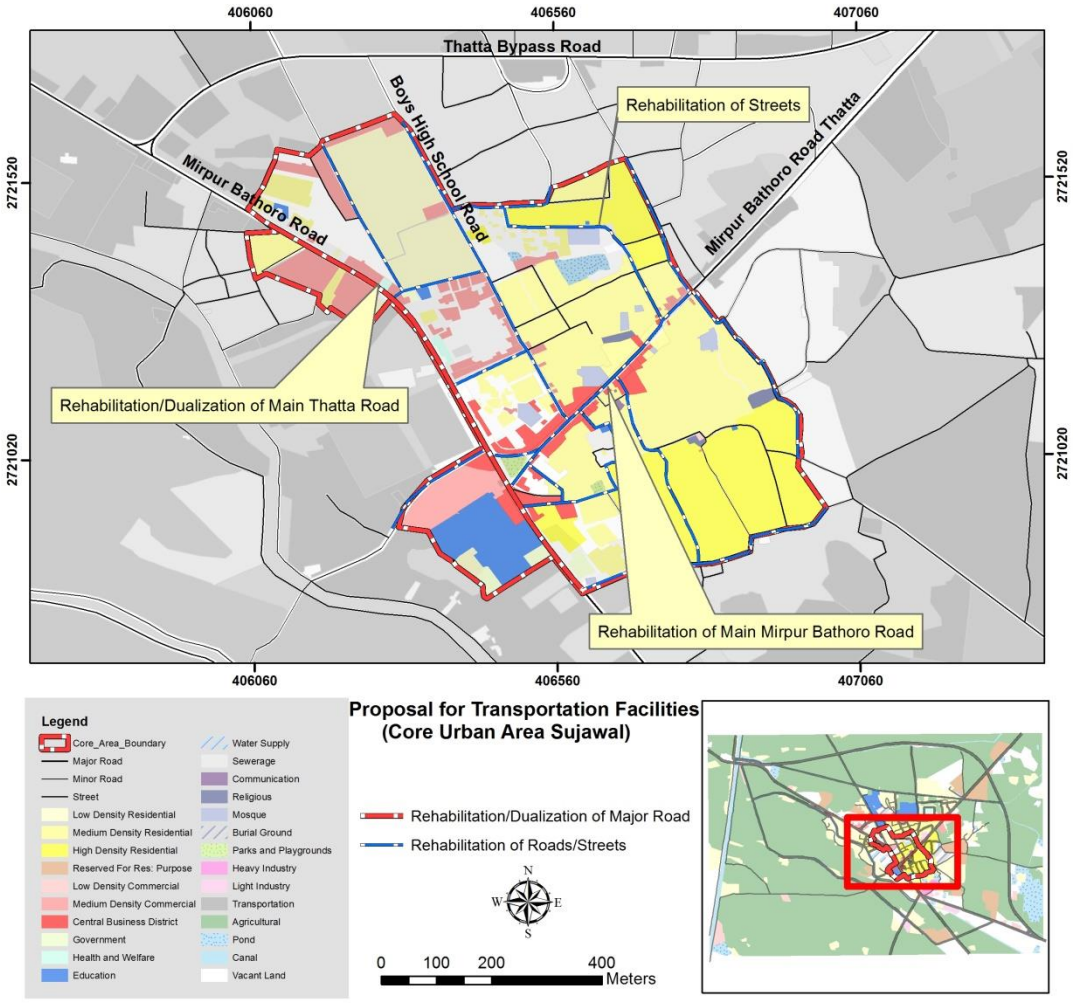


Figure 9:6: Repair and Rehabilitation of Core area Roads

9.2 Communication

- **Telephone, Mobile, Internet**

  The survey result shows that 178 households use mobile/smart phones, whereas only 1 households use PTCL land line and 3 household use both modes. The PTCL charges are more and complain rectification is slow. People prefer other service providers in the area for cell phones and internet.

- **Internet/ Wi-Fi Access**
  - Mobile phones and televisions rank as two of the most commonly owned consumer electronic items in Pakistan.
  - The difference in mobile phone ownership between urban and rural areas is not significant (94.7% compared to 83% respectively).
  - However, the difference in percentage of households that have an internet connection is notable, with 17.4% of urban homes having access to internet compared to 1.3% of rural homes.
  - At present the internet usage is limited to educated families, and it is by the pace of time increasing with the decline of illiteracy rate.
  - As per survey out of 188 numbers of households, only 9% are using internet and remaining 91% are still without using this new technology, the users are increasing day by day.

9.2.1 SWOT analysis

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

9.2.2 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

i. Source of Power Supply

There are power generation stations adjacent to Sujawal (TC) in Jhimpir and Gharo are areas of District Thatta; they are connected with WAPDA network. In Jhimpir there are about 16 Wind Power Plant in operation having the capacity between 50 and 55 MW each station and more than 25 Wind power stations are under construction and will be operational in 2018-2019. There is a power plant in Jhimpir adjacent to JDW Sugar Mill, the power plant works on Bagasse. The power supply to Sujawal is through HESCO-WAPDA transmission system.

During the socio-economic survey, respondents were also asked about Electric power in their house. Most of the respondents replied to the questions asked about electric power. Analysis of the answers revealed that 82% of households have HESCO electricity and only 18% have no HESCO power supply

Table 9-1: Electricity Power Availability

S. No.	Availability of Electric Power	%age
1	Available	82%
2	Not Available	18%
	Total	**100 %**

Source: Consultant's Survey, July 2017

Figure 9:7: Power Supply Feeder

Figure 9:8: Power Supply feeders in the Sujawal TC

HESCO Supply Urban Feeders

The power supply from HESCO HT feeders 132KV is stepped down to 66/11KV at grid station and distributed to consumers via power main transformers which further reduce the voltage to 420V/220V as required by the individual households. The secondary data received from HESCO officials, we find that 11,349 connections have been provided to consumers from three grid stations. Different sizes of transformers are installed varying from 10 KVA to 630 KVA. The main feeder for Sujawal is shown in the table below:

Table 9-2: 132 KV Grid Station in Sujawal

S. No.	GRID NAME	FEEDER CODE	FEEDER NAME	LOSSES CATAGORY
1	132KV Sujawal	020302	11KV City	V

In the current national energy crisis, electricity is facing a shortage. Greater emphasis should be laid on alternative energy like solar and biogas. Solar energy should be immediately applied for street lighting and tube wells.

The survey also bring the fact that about 26% of respondents in Sujawal TC have alternative power source in addition to HESCO supply and 76% respondents no alternative source of power supply.

Table 9-3: Source of Alternate Energy

S. No	Source of alternate Energy	Percentage %
1	None	76%
2	**Solar Power**	**10%**
3	**Diesel generator / UPS**	**14%**
	Total	**100%**
Source: Consultant's Survey, July 2017		

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
- Circular Debt
- Transmission and distribution losses are directly connected to Leakage Current Losses, Dielectric Losses, open circuit Losses and theft of electricity.
- Electric theft
- There is a big gap between demand and supply resulting in load shedding of electricity. Such a big gap has led to load-shedding of 12-16 hours across the country.

9.3.3 SWOT Analysis

Power Supply & Distribution			
1. Almost whole urban area gets coverage of electricity	1. Poor maintenance of electricity supply infrastructure 2. Power shortage due to non-payments of bills 3. Line losses and power theft. 4. Outdated network in old town areas	1. By increasing the capacity of grid station will minimize electricity shortage & maximize production 2. Opportunities available for alternative energy production through solar energy and wind power 3. Renewal of outdated network to meet existing and future demand	1. Load shedding. 2. Threat to agriculture and industrial production and overall economy 3. Crime rate. 4. Political will and policies at work 5. Electricity theft

9.3.4 Current Power Supply/Demand

If load is projected further from year 2018 to 2037 with average increase of watts per person from 63 (2017) to 85 (2037) gradually the additional increase in Megawatts every year as shown in below table, even it may increase more if houses are air-conditioned and use of electric appliances is increased .

Table 9-4: Current power supply Demand Projected up to Year 2037

Year	Population	Average Minimum Power Requirement
1998	23,286	Total Load MW
2017	31,676	2.152
2020	33,253	2.328
2025	36,058	2.705
2030	39,099	3.128
2035	42,367	3.602
2037	43,792	3.723

Source: Consultant's estimation

9.3.5 Strategic Development Plan

Strategies for Electricity includes;

- 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
- Up gradation of grid station
- Promote energy efficient appliances and devices
- Feasibility study for alternate energy sources (Solar, wind & biogas)

Proposed Utilities and Services Landuse for Sujawal Town

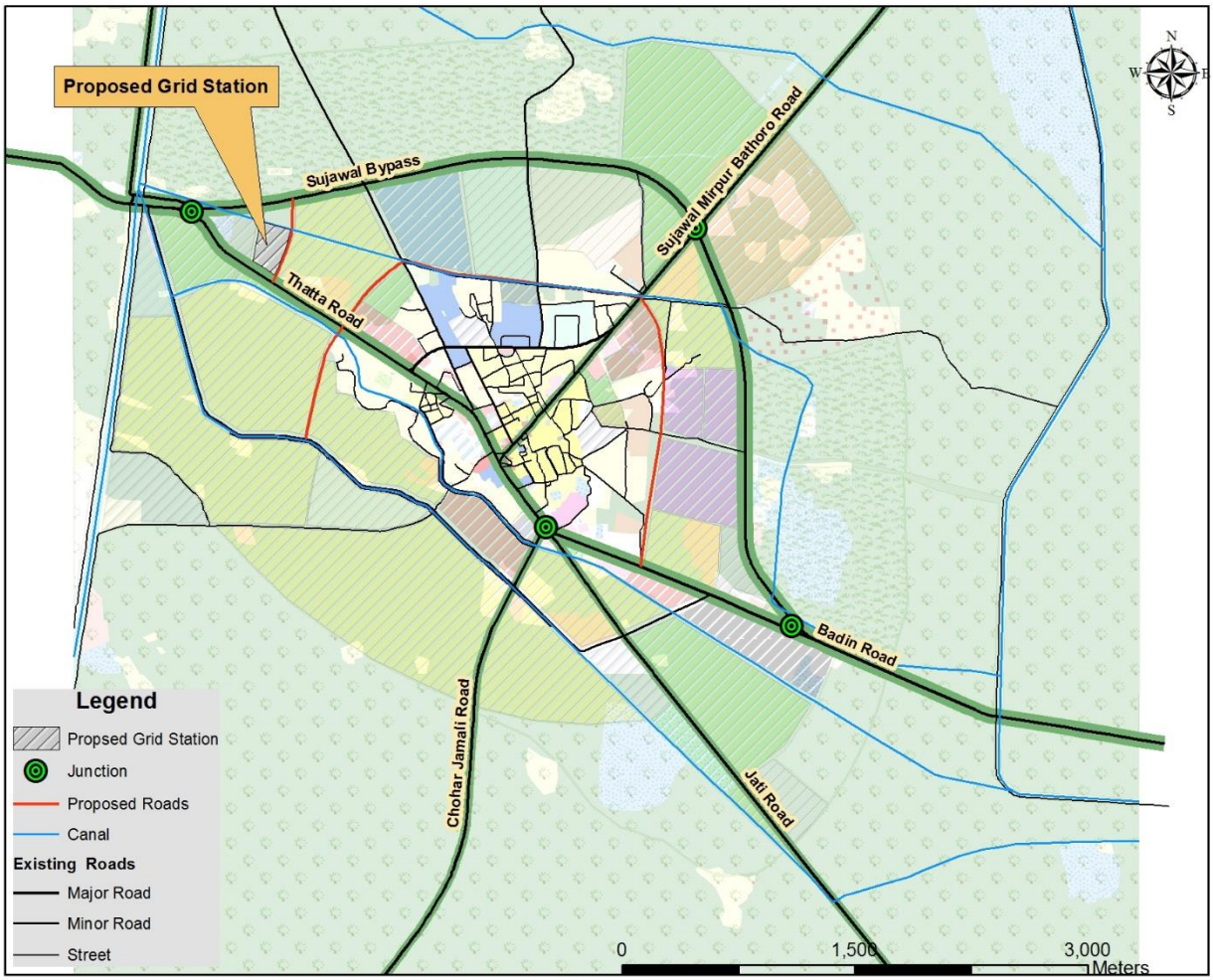
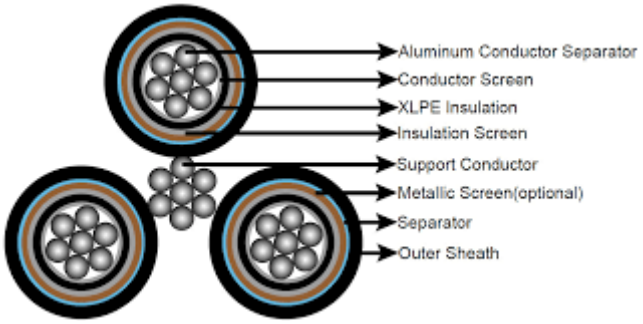


Figure 9:9: Proposed Grid station

9.3.6 Immediate Action Plan

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.



9.3.7 Streetlights

It is proposed to installed streetlight in all over core urban area. 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.	8.00	26,240	6.560,000
			Total Cost (PKR). Million	**6.56**

- Wall mounted street lights approximately should be placed on distance of 15 to 20 feet apart.
- Each wall mounted street light cost (Rs. 5000/-).
- As per total length of Streets for this proposal 1,312 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.

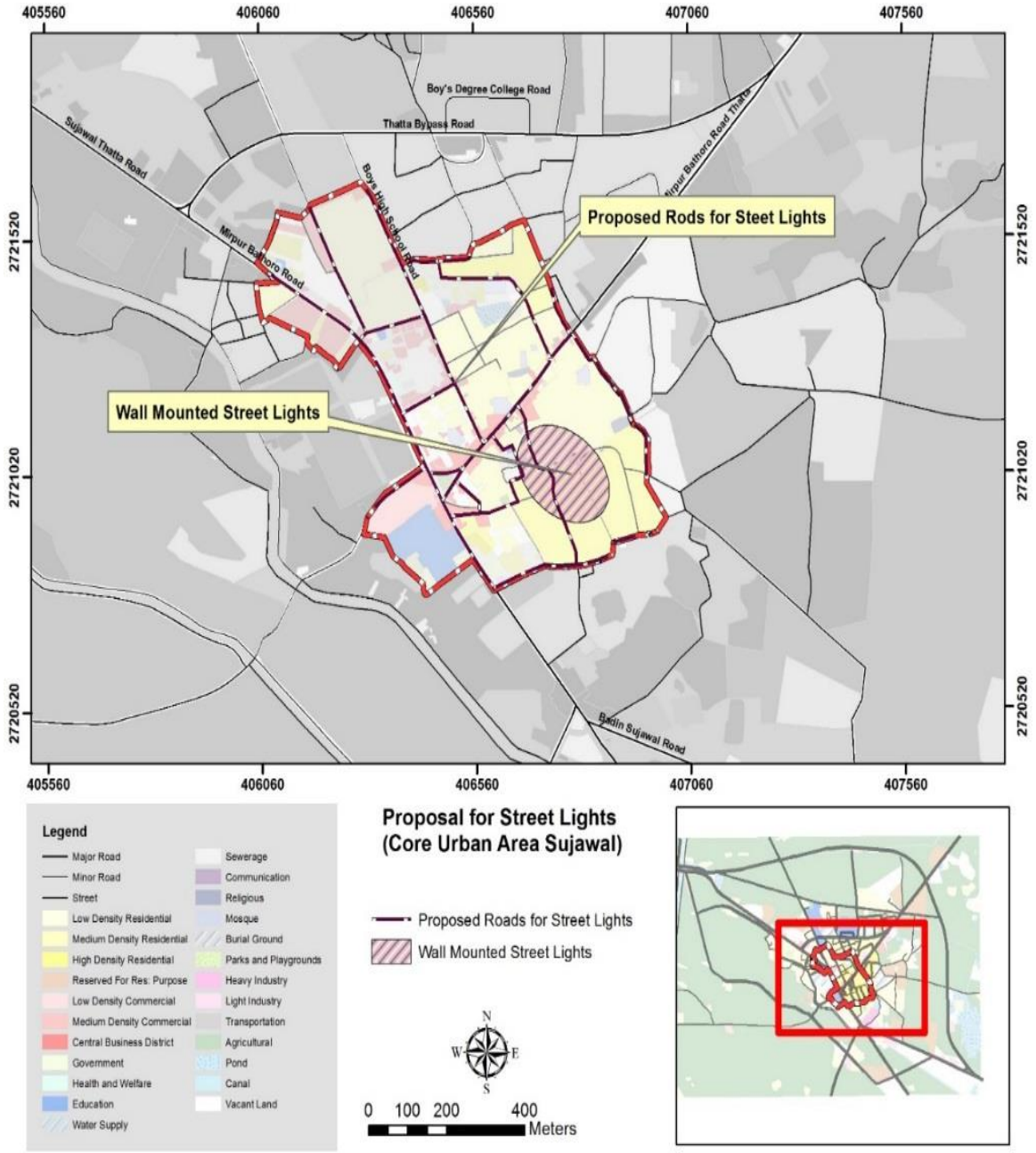


Figure 9:10: Provision of Wall Mounted Street Lights for Sujawal Core Urban Area

9.4 Gas Supply

9.4.1 Existing Situation

A maximum of 188 houses residents had responded to the question asked on availability of Gas. As given in the Table below, 158 houses had the gas available to them, while the gas was not available to 30 houses. Therefore about 84% households have the gas supply by SSGC and 16% were using alternate source of fuel for their daily household needs.

Table 9-5: Availability of Natural Gas

Availability of Natural Gas	Percentage
Available	84%
Not-available	16%
Total	**100%**

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

Sujawal District is a new district of the Sindh province of Pakistan. It is located at 24°36'23" of North and 68°4'19" of East and is bordered in the northwest by the Indus River which separates it from Thatta District.

District Sujawal lies on the Left bank of river Indus. This district is bounded by Thatta district on the West, district T.M Khan and Badin on the North and West, Arabian Sea on the South and India on the East and South east. Indus River is the boundary between district Thatta and district Sujawal. Sujawal district has four (04) talukas namely Sujawal, Jaati, Mirpur Bathoro and Shah Bander. Taluka Sujawal is the DHQ of Sujawal district.

The topography within 3 kilometers of Sujawal is essentially flat, with a maximum elevation change of 23 meters and an average elevation above sea level of 11 meters. Within 16 kilometers is essentially flat (75 meters). Within 80 kilometers contains only modest variations in elevation 467 meters.

Sujawal is located at about 20 km west of Thatta on Badin to Karachi road. Sujawal is an agricultural town with a few industries located near it. Sujawal is a multi-community and ethnic city containing different sects and religions. Sujawal got its name from its illustrious resident, Sujawal Khaskheli, who was a loyal servant of 19th century Sindh ruler Mir Fateh Ali Khan. According to books on history of Sujawal, the town has its beginnings in a small village known as Maanjar because of its wetlands. Sujawal has produced many illustrious personalities who have rendered valuable services for society.
Thatta & Sujawal district is also rich in bio diversity and an abode of some of the most important environmental resources of Pakistan. Out of the six RAMSAR wetland sites in Sindh, 3 lies in Thatta and one in Sujawal, out of 34 protected areas of the province, 16 are in Thatta & Sujawal, and of 13 game reserves of Sindh, 3 are in this district. 17% area of the district is under forest cover.

Jubho Lagoon is a large shallow brackish lagoon located in Sindh, Pakistan. In May 2011 Jubhoo lagoon was inducted into the list of RAMSAR sites, consisting of wetlands of international importance.

The lagoon is located about 138 km south-east of Karachi in Jati, a subdivision of Sujawal District, in Sindh province of Pakistan. The site is located at an altitude of 50 m and has a total area of 1,745 acres (7.06 km2). The natural wetland features brackish coastal and inland lagoons with associated marshes and mudflats. The site is also linked with other wetlands in the region through a tidal link canal. The region has a maritime climate with the monsoon period starting in June every year.

- **Forest resource**

  The DHQ-Town Sujawal is located in the eastern and western side of the Indus River, where there is a number of Reserve Forests. The one major forest type that falls within the area is Riverine forest along the banks of the Indus.

  District Sujawal is located at the tail end of the River Indus where the water flow in the river is very little. In addition to this, due to hot weather and sporadic rainfall the flora cannot be expected to be

very rich and diverse. Also, because of growing population and increasing agricultural activity, most of the natural vegetation in the macro-environment has been replaced by agricultural fields. Major crops in the area include Wheat, rice, cotton, sugar cane, pulses and maize. Most of the plant species present in the site are cultivated. Among trees Lohiro (Tecoma undulate), Khunbhat (Acacia Senegal), Babul (Acacia nilotica), Kandi (Prosopis cineraria), Devi (Prosopis juliflora) are common.

Commonly found shrubs include Khabar (Salvadora oleoides), Calotropis procera, Kirir (Caparis aphyla), Lai (Tamarix aphylla), Lawa (Tamarix dioca), Ber (Ziziphus numularia), Gugal (Commiphora wightii), Kaanhn (Saccharum spontaneum).

- **Ecologically Sensitive Areas**

The terrain of Sujawal district is quiet even, gently sloping towards the Arabian Sea. The area supports a network of canals and small channels originating from the River Indus. Due to warm humid weather, arid and saline soil and limited availability of water from river, the bio diversity is not very striking and rich. Few species of flora thrive mostly thorny shrubs, grass and some species of trees. Ephemeral vegetation grows after rain.

On the southern and south eastern part of the district are the coastal belt where sea water intrusion has become a serious issue rendering thousands of acres of land unsuitable for agriculture. Mangrove forest along the sea belt are also diminishing due to shortage of fresh water and increased sea water intrusion.

- **Meteorology & Air Quality**

The results depict that the air quality parameters SO2, NO2, NO, CO, SPM and PM2.5 are well within the prescribed SEQS. However, the concentration of NO2 is observed to be near the permissible limits suggesting increased movement of vehicles thus deteriorating air quality. PM10 exceeds the permissible limits indicating dirt content in the air due to dirt roads at the sampling location. Similarly, the noise level at most point of time exceeded the prescribed limits of SEQS for commercial area i.e. 65dBA which also shows the movement of heavy vehicles on site.

The hot season lasts for 3.0 months, from April 3 to July 5, with an average daily high temperature above 36°C. The hottest day of the year is May 10, with an average high of 39°C and low of 26°C.

The cool season lasts for 2.0 months, from December 10 to February 10, with an average daily high temperature below 28°C. The coldest day of the year is January 6, with an average low of 11°C and high of 25°C.

- **Waterlogged and Salt Affected Area**

Irrigation is essential for the arid climates of Pakistan for achieving and sustaining food security. However, inappropriate and inefficient irrigation has raised the water table in the Indus Basin Irrigation System. Twin menace of salinity and waterlogging is reducing the productivity of agricultural lands. These two problems co-exist at most of the places; however, sometime problems with excess water occur in the absence of salinity (Kahlown and Azam 2002). Canal irrigation without adequate drainage in arid environments of the IBIS (flat topography, lack of natural drainage, porous soils, and

arid climate with higher soil evaporation) certainly leads to rising problems of salinity and waterlogging.

Some parts of macro-environment have become waterlogged due to Sea water intrusion, and small lakes and ponds have formed. Many areas are also salt affected. Waterlogged and salt affected areas have become unsuitable for crop cultivation and some natural vegetation is found in such areas. However, vegetation in such areas is limited to salt resistant species such as Tamarixsalina (Tamarisk), Tamarixindica (Tamarisk), Tamarixaphulla (Tamarix) and grasses like Saccharumspontaneum (Sar). Saccharumbenghalenesis. Other species include Vallisnera, Typha (Pun) and some sedges etc.

10.2 SWOT Analysis

Strengths	Weakness	Opportunity	Threats
ENVIRONMENT			
Urban Area & Areas Suitable For Urban Development			
1. Land is 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 centres. 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.
Land			
1. Flat fertile land suitable for development 2. Rural rich fertile agriculture land that produces quality crops.	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. Application of appropriate urban design principals & standards, that can be transmitted into mixed land use development and creation of strong activity centres. 2. May increase productivity if crops are cultivated at full strength. 3. Rice crop if transported in a proper manner to other areas of the region can generate revenue.	1. Land shortage for new development. 2. Slum formation 3. Contamination of land in un-irrigated areas.

Strengths	Weakness	Opportunity	Threats
Climate			
1. Suitable for producing crops.	1. Rainfall shortages affect the efficiency of canal system. 2. Tropical climate change effects the town area, in winter there is much more rainfall than summer.	1. Agricultural practices can be changed in accordance with weather condition for maximum production	1. Droughts 2. Heavy rains Climate change affects agricultural production
Air			
1. Air quality in the rich agricultural belt is good for human health, and also keeps ecological balance in atmosphere.	1. Inner city air is polluted by high volume of traffic	1. Planned Development with respect to air circulation can provide relief to inner city's polluted environment. 2. In future the town can be planned as Green City.	1. Air pollution 2. Respiratory diseases
Fresh Water Bodies			
1. Huge irrigation canal based network available 2. Sujawal TC area lies on right bank of Indus River in which different canals, branches and minors were observed. 3. Inland of fisheries water ponds exists. 4. Major canals in the project area are Darro Branch, Pinyari. 5. There are 296 different wells and tube wells in the district.	1. Water contamination due to waste disposal 2. Contamination of standing water bodies created by rain and flood water at open lots is an invitation to malaria and dengue. 3.	1. Fishing can be used as a source of strong revenue generating resource. 2. Canals and other water bodies can be used for tourism purpose if handled and maintained properly and as a result can be a strong source for revenue generation. 3. Enforcement of fisheries enactment in their respective domain 4. Fish seed stock replenishment in natural water bodies in their respective domain	1. Contaminated water is a serious threat for human health. 2. Standing water gives birth to diseases 3. Threat to agricultural land 4. Affect agricultural production 5. Water logging

10.3 Issues and Problems

- Water logging and salinity
- Water Contamination
- High water table
- 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
- Increase the productivity of rangelands
- Provide recreational facilities for public by improving forest parks, wild life sanctuary
- 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
- Afforestation along riverine belt

11. DISASTER RISK MANAGEMENT

11.1 Existing Situation

Sujawal District is a district of the Sindh province of Pakistan. It is located at 24°36'23" of North and 68°4'19" of East and is bordered in the northwest by the Indus River which separates it from Thatta District. The district has an area of 7335 km. River Indus flows downstream the Kotri Barrage through numerous creeks till its delta in the Arabian Sea near chachdehwali Mohammad at Keti Bunder. The northern part of the district is paramount and known as "Kohistan" connected with a Kheerthar range of mountains. Below table shows the previous history of disasters. District Sujawal is vulnerable to various natural and human induced hazards including floods, cyclones, droughts, sea Intrusions, deforestation of mangroves, water logging and salinities and earthquakes as natural hazards, while fires, civil unrests, road accidents and health epidemics are prominent human induced hazards. Besides, poor communication infrastructure, lack of health facilities, low literacy ratio and poverty especially in the remote coastal villages makes the area very vulnerable to various hazards.

Sujawal District is one of the oldest districts of Sindh. It was hit by 2010, 2011 and 2012 rains/ riverine floods. The relative severity of floods was ranked as medium in district Sujawal. 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, Kamber Shahdadkot located at on the right bank of River Indus. And, Ghotki, Sukkur, Khairpur, Naushahro feroze and Shaheed Benazirabad on the left bank of River Indus.

- **Disasters in district Sujawal**

i. Floods / Rains.

District Sujawal is vulnerable to various natural and human induced hazards including floods, cyclones, droughts, sea Intrusions, deforestation of mangroves, water logging and salinities and earthquakes as natural hazards, while fires, civil unrests, road accidents and health epidemics are prominent human induced hazards. Besides, poor communication infrastructure, lack of health facilities, low literacy ratio and poverty especially in the remote coastal villages makes the area very vulnerable to various hazards.

Flooding has been reported as the most frequent and damaging natural hazard in the district which occurs at regular intervals during the monsoon seasons. In addition, other potential hazards are hail storm, earthquakes, epidemics, water logging and salinity and conflict are also reported time to time.

Like other part of the country, the monsoon season which brings major proportion of rainfall starts from June and lasts till September in the district. During the recent years, the behaviors and distribution of rainfall has been observed very abnormal mainly due to the impacts of climatic changes where the district receives heavy rainfall in the form of erratic and cloud burst especially during different time period of the monsoon season. These types of rainfall generate flash floods and witnesses of heavy loss of life and property in the district. Sujawal was hit by various episodes of flooding during the recent past.47 The district was badly hit by the 2010 and 2011 severe flooding.

[47] DDMP THATTA 2017

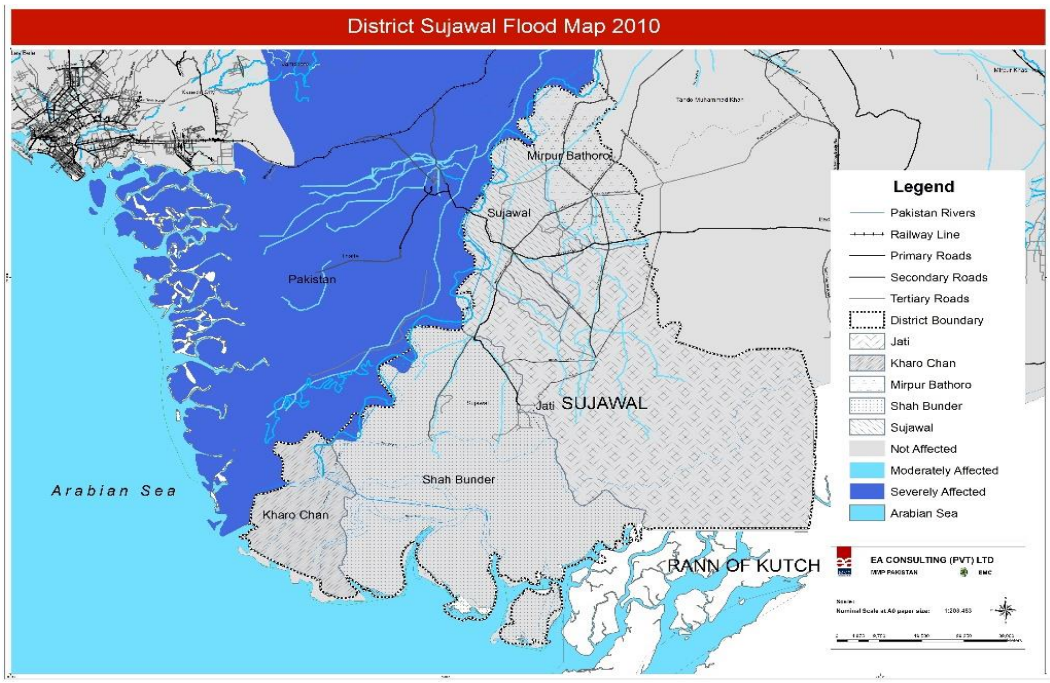


Figure 11:1: Flood Map of District Sujawal 2010

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 164,889 acres. 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.

Table 11-1: Crop losses and damages summary 2011

Crop Loss and Area Damaged Due to Floods 2011			
Major Crops	**Sown Area (Acre)**	**Area Damaged (Acre)**	**%**
Cotton	24,075	20,223	84%
Rice	169,511	110,182	65%
Sugarcane	33,247	8,452	26%
Other	33,247	26,032	78%
Total Area Sown	259,341		
Total Area Damaged	164,889		

Source: Pakistan Emergency Situation Analysis, District Thatta 2014 Flood Situation Update, 2011, Food & Agriculture Organization (FAO)

The given table shows the damage of crops due to floods 2011. 84% of the cotton crop was damaged along with 65% of the rice crop, 26% sugarcane and 78% of other crops. 65 livestock heads died due to the floods.[48] Due to the lack of an 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, poor infrastructure with poor access to education and health facilities show a higher level of poverty and deprivation in this district.

Table 11-2 : Losses and Damages due to Floods 2010, 2011 and 2012

Attribute	Figure 2010	Figure 2011
Total households		285,678
Affected households	175,569	34,904
Total UCs	55	55
UC Affected	55	23
Total Revenue Villages		7,200
Villages/ Settlements Affected	977	901
Total Houses Affected	107,981	15,693
Partially Damaged	n/a	15,693
Destroyed	n/a	n/a
Katcha	77,396	n/a
Pakka	30,585	n/a
Total Population		1,456,955
Affected Population	895,400	178,011
Death	7	3
Injuries	0	23
Total Area		**1,778,043**
Total Affected Area	**874030**	**198,111**
Crop Area Affected	**177,800**	**108,303**

Source: Pakistan Emergency Situation Analysis, District Thatta 2014

ii. EARTHQUAKES

According to the seismic zone map of Pakistan, the Sujawal district is situated at zone where moderate to severe damage can occur.

Accordingly, a seismic risk factor of 0.1 needs to be incorporated in the design for constructions and installations in the coastal zone, for operational basis earthquakes (OBE) pertaining to damage due to moderate level earthquakes.

[48] Flood Situation Update, 2011, Food & Agriculture Organization (FAO)

iii. DROUGHTS

Being part of the dry region, District Sujawal always faces the risk of droughts. The Kohistan and desert zone of the district are especially vulnerable to drought hazard as the areas face extreme shortage of potable water. Geography, District Sujawal can be divided into four zones, namely eastern desert, western hilly / mountainous area, a coastal area in the south and irrigated agriculture area in the middle. Most of the Sujawal's lands along the costal belt have been encroached by the sea. The sea intrusion has also severely affected the aquifers and at many places in the district, the underground water and lands have become saline. Mangroves plantation works as blanket cover to prevent the sea intrusion. But unfortunately, the destruction of mangroves owing to deforestation and reduce the flow of water in River Indus has resulted in affecting the reproduction of fish and thus causing reduction in the availability of fish especially to the poor fishermen. The Federal Flood Commission (FFC) has conducted a study of sea intrusion spread over 150 kilometers of the District Thatta, Sujawal and Badin. The study reveals of rising in sea level caused flooding in the coastal areas of Sujawal. In other study conducted by the Pakistan Meteorological Office indicates sea water flooding in the coastal areas of Sindh. As a result of which panic have been created among the residents of Sujawal and Keti Bunder, and in the villages located in the coastal belt of District Sujawal

iv. SEISMICITY

According to the seismic zone map of Pakistan, the Sujawal district is situated at zone where moderate to severe damage can occur.

Accordingly a seismic risk factor of 0.1 needs to be incorporated in the design for constructions and installations in the coastal zone, for operational basis earthquakes (OBE) pertaining to damage due to moderate level earthquakes.

v. CYCLONES/ TSUNAMIS

Six coastal districts including Karachi, Thatta and Badin from Sindh Province and Lasbela, Gwadar and Ketch from Baluchistan Province are highly vulnerable to cyclone hazard. Due to its geographical setting, District Sujawal is among district badly affected by the surge of cyclone on several occasions. Due to its geographical location, District Sujawal can be affected by the tsunami disaster also. The abnormal rise in water detected by tide gauge station in Keti Bunder area of District Thatta created panic in the coastal population including Karachi.

vi. HOT WIND TWISTERS

Sujawal district frequently accommodates hot wind and dust storm twisters during peak summer season starting from May and ending till mid of August every year.

vii. FIRE

Accidental Fires

No such event of large scale accidental fire has been noticed/ identified within the history of the district.

Minor Fire Accidents -2017

No such event of minor scale accidental fire has been noticed/ identified within the history of the district.

viii. IMPACTS OF FLOODS

Food

As established previously, district Sujawal is a food insecure district of Pakistan. District Sujawal is an agro-based district with majority of the households engaged in agriculture farming, livestock rearing and non-agriculture activities/casual labor. Among these three types of the households, empirical studies have shown that poverty has been relatively higher in the non-agriculture households, followed by livestock households and small farmers.49 As stated in the previous section, many families of this flood affected district lost their homes (15,693 houses were damaged), their crops (108,303 crop area affected) and heads of livestock (65 livestock died). Due to the lack of industrial base, the sources of income of households, situated in this severely affected district, are less diversified. All the social indicators including large household size, poor literacy level, higher mortality rate and inadequate infrastructure with poor access to education and health facilities show a higher level of poverty and deprivation in this district.

The losses to crops and livestock along with the poor functioning capacity of the market significantly reduced the expected income of the population of this district. Thus the floods and rains affected people of district Sujawal had to face a number of key challenges to recover their livelihood; directly affecting the food security situation.

ix. HEALTH

In 2010 floods, 32 BHUs, 13 Dispensaries, 4 RHCs and 2 SHCs were damaged. During 2011 floods, out of the 47 BHUs, 13 BHUs were reportedly damaged. Out of the 8 RHCs 2 were reported damaged.50 In response to the floods, Aga Khan Health Service Pakistan (AKHSP) provided health services in RHC Keti Bundar. Merlin covered 11 UCs and provided health facilities to the needy. GRC also provided health facilities. Besides, ACF provided nutritional facilities in 8 UCs. In 16 UCs of the district, HANDS provided Antenatal, Post Natal, and routine health services.

x. EDUCATION

Due to the 2010 floods, 696 schools (Boys: 406, Girls: 66, Mixed: 224) were affected.51 During 2011's heavy rains 172(Boys': 138, Girls': 34) schools were affected, of which 44 (Boys': 32, Girls': 12) were completely destroyed and 128 (Boys': 106, Girls': 22) were partially damaged. In response to the damage in 2011, Education Cluster planned to provide transitional school structures for the 44 destroyed schools. A refurbishment of 128 partially damaged schools was also planned along with the training of 344 teachers in psycho-social support and joyful learning

[49] Arif, *et al* (2010), *"The 2010 Flood and Poverty in Pakistan: A Preliminary District-level Analysis"*, Pakistan Institute of Development Economics Islamabad, Background Paper for Conference on the " The Environments of the Poor", 24-26 Nov. 2010, New Delhi
[50] WHO, G. N. (8th to 12th September, 2011). Health Initial Rapid Assessment, 22 flood affected districts in Sindh. Islamabad
[51] Flood Report, 2010-11, RSU, Sindh

and training of 430 school management committees. Unfortunately there was no response from the humanitarian community to carry out the planned activities.[52]

xi. 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.

11.2 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.

11.3 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).

11.4 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

[52] District Profile Thatta April 2012, UNOCHA

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.

11.5 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.

11.6 Identification of Land uses for Potential Terrorists Attack

Consultant identified different land uses in Sujawal which are potential crowd pulling places.

Table 11-3 : Potential Terrorists Threat

S. #	Land use	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

11.7 Existing Situation

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.

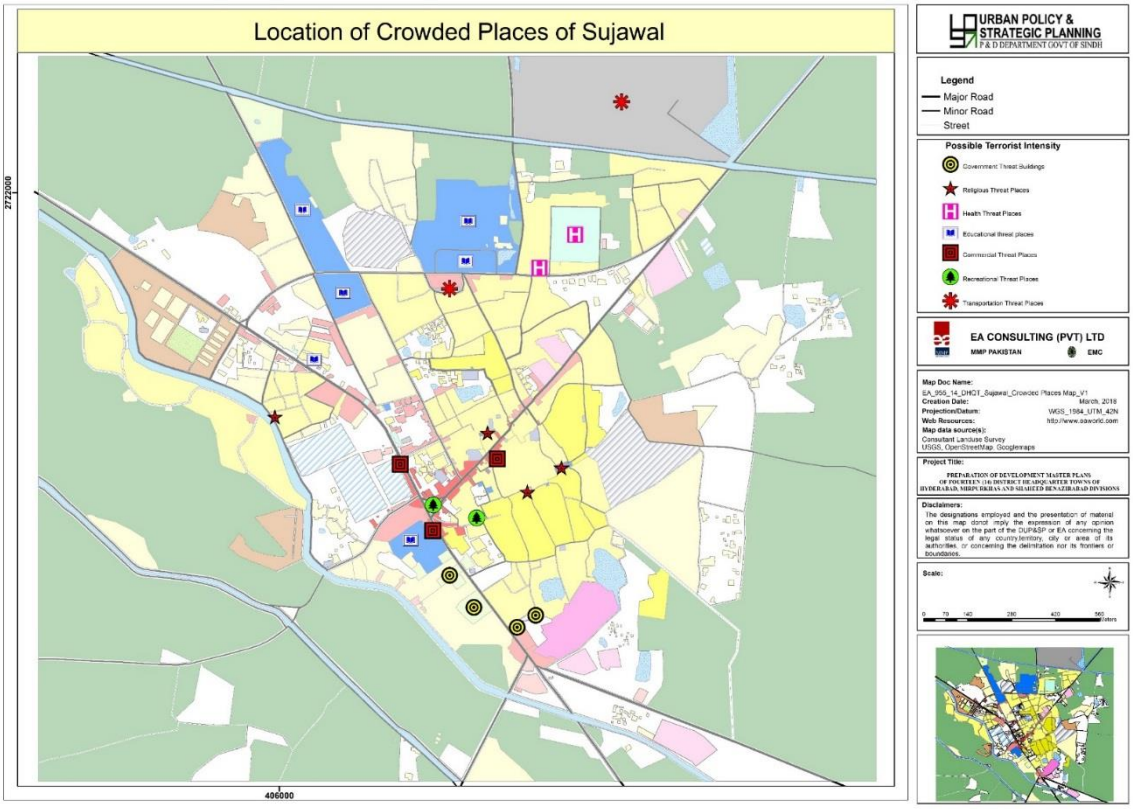


Figure 11:2 Crowded Places of DHQ Town Sujawal

- **Possible Terrorist Intensity Places of DHQ Town Sujawal**

  Consultants identified some possible terrorist Intensity places of DHQ Town Sujawal on the basis of Crowd and most visiting places by the residents of DHQ Town Sujawal, 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.

  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

11.8 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

11.9 Policy Guidelines[53]

- Provide training and awareness courses to district, Town 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.

11.10 Strategic Development Plan

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.

[53] National Disaster Risk Reduction Policy 2013

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.

11.11 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 Town 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**

The districts in the lower Sindh prone to riverine based flooding includes Dadu, Jamshoro and Thatta on the right bank of River Indus and Sujawal, Tando Allahyar, Matiari and Hyderabad on left bank of river. The length of River Indus along the province is 750 kms in length. Sujawal district is prone to river flooding, floods caused by heavy rainfall and epidemics.

- **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**

12.1 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. <u>Flood Forecasting Division (FFD)</u>

- 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. <u>Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)</u>

- 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. <u>District Disaster Management Authority (DDMA) Response</u>

- 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.

12.2 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

12.3 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.

12.4 Agriculture Department

I. Pre-Disaster

- Assessment of high risk prone areas and estimation of possible damage
- Create community Seed Bank at UC/ward 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.

12.5 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

12.6 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

12.7 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.

12.8 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

12.9 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

12.10 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.

12.11 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

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

III. Post-Disaster

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

12.12 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.

12.13 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].

[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

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.'

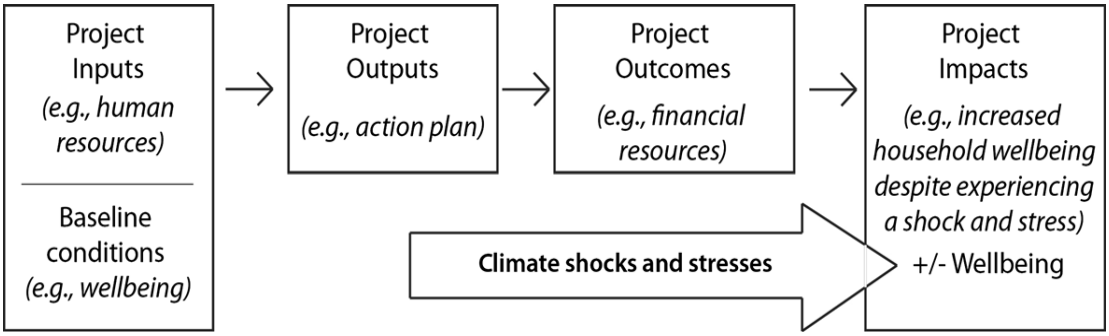


Figure 12:1: Four phases of a resilience initiative, and the timing of baseline and post-shock measurements of wellbeing (Brown, et al., 2018)

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

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.
- 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.

[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 early warning and health hazards dissemination outlets, by type of outlet (e.g. radio, newspaper, and website), geographic coverage, and 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.

➢ **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 (SE)
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 Evaluation57**

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 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.

[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

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

i. 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.

ii. 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.

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

iv. 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.

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

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 Sujawal, 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 Sujawal

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 Sujawal

13.8 SWOT Analysis and Need Assessment

Strength	Weakness	Weakness	Threats
GOVERNANCE			
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	1. Week coordination may give birth to poor governance.

Strength	Weakness	Weakness	Threats
3. Participation of Sindh Building Control Authority (SBCA)	2. Lack of information sharing between line departments.	through policy frameworks. 2. Organizing events to make strong coordination between different departments.	2. Political interference
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.

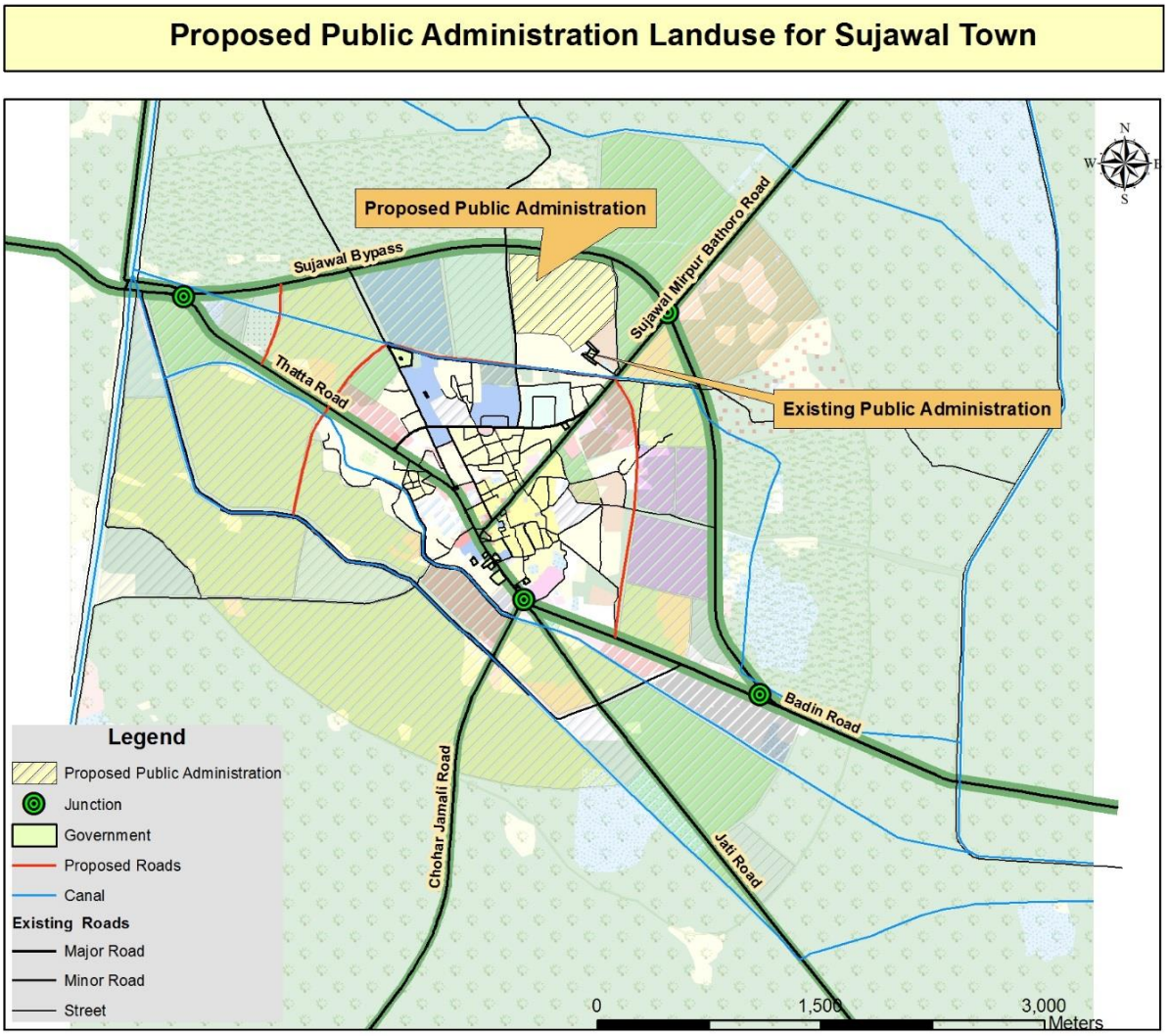


Figure 13:1: Future Administrative Proposal of Sujawal

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 Sujawal 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 Sujawal 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 Sujawal. 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 Sujawal 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 Sujawal 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 & 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 & 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 secretariat of Commissioner and Deputy Commissioner 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 & Management Unit would also facilitate the office of District 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** Town shaped like an oval pattern of irregular shape. The city extended in two directions i.e. north-east and north-west along National Highway N-5 (Thatta-Sujawal road). Town's spatial growth during last 7 years was hardly 5% of built-up area increased at outskirts of town area mainly Sujawal-Bathoro road. The city grew mainly in north-east and north-west directions. The administrative complex and offices i.e. DC office, Session Court, police station & SSP office are situated along Thatta-Sujawal Road which passes through the centre of city. **2. Development Control** • High prices of houses and developed land • The informal housing sector lacks provision of utility services like gas supply, clean water and drainage facilities. • Required Amendment in Zoning Bye laws • Restrict the provision of utility services for approved planned areas • Sujawal development isn't in particular form due to absence of development authority. The infrastructure in town is continuously under pressure due to un-planned development. **3. Transportation** • Sujawal district has the centralized position and also The district is well-connected with other districts through good quality roads • Contribution in positive regional and local economic development **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** **(A)Traffic Management Program** • 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 **(C) Congestion Reduction in Core Urban /CBD Area** • Designated stands for qingqi / rickshaws & pickups vans • 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 • Beautification plan	**Implementation Responsibilities** International Development and Fund Supporting Agencies/Public Sector/ Private developers
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	**Time of Implementation**
Provincial / Local Government/ Public Health Engineering Department	Short Term (1 year to 5 Years) Long Term (above 5 years)

Strategy:	**Programs/ Policies**
Drainage & Sewerage System Improvement	• 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	**Implementation Responsibilities**
• Need Assessment/Demand & Supply Study • New Master Plan for Drainage & Sewerage services improvement.	Public sector / Private developers
Concerned Agencies	**Time of Implementation**
Provincial / Local Government/ Public Health Engineering Department Municipality (TC/MC)	Short Term (1 year to 5 Years)

Strategy:	**Programs/ Policies**
	• Immediate designation of walled Landfill Site with special attention for hospital waste disposal.

Solid Waste Disposal System Improvement	• 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 Municipality (TC/MC) / Sindh Solid Waste Management Company SSWMB	**Time of Implementation** Short Term (1 year to 5 Years)
Strategy: **Improving Efficiency of Municipal Committee's (MC)** • Municipal /Town 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	**Time of Implementation**
Provincial / Local Government/ Public Health Engineering Department Municipal Committee (MC)	Short Term (1 year to 5 Years)

Strategy:	**Programs/ Policies**
Improving Fire Fighting Capacity	• 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	**Implementation Responsibilities**
Assessment on Municipality's firefighting potential	Public Sector
Concerned Agencies	**Time of Implementation**
Sujawal TC.	Short Term (1 year to 5 Years)
Strategy:	**Programs/ Policies**
Energy (Gas, Electric Power, Energy Generation through Alternate Resources)	• 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:	**Programs/ Policies**
Health Sector Improve access to healthcare facilities & minimize the long journeys to access basic medical facilities	• Check and balance to accomplished existing health care projects. • Addition of 2,148 beds to achieve the target of 2 beds per 1,000 district population • Hiring of 1,159 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 375 classrooms at school and college level. • Repairing of school existing buildings with furniture • Training of teaching staff • 650 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. • construction of family parks and playground near residential areas • Construction of auditoriums and art councils • Provision of boundary wall for graveyard • Provision of parks and open spaces
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	**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	**Programs/ Policies**
Economic Development Plan	• 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/ 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
Sujawal 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 - Sujawal 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]2.6% 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	62% 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 Sujawal DHQ town in the future.	o The total extent of the area included in the overall proposed Sujawal Master Plan is 5,200 acres approx. for a population of 55,000 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 Sujawal DHQ town is 14.3 tons per day. Regular	- The collection and disposing of solid waste is the responsibility of the TC. - 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 Sujawal
[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% (2.5 acres) out of total 881 (3.56 Sq KM[12])acres park area is available in Sujawal	• 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.

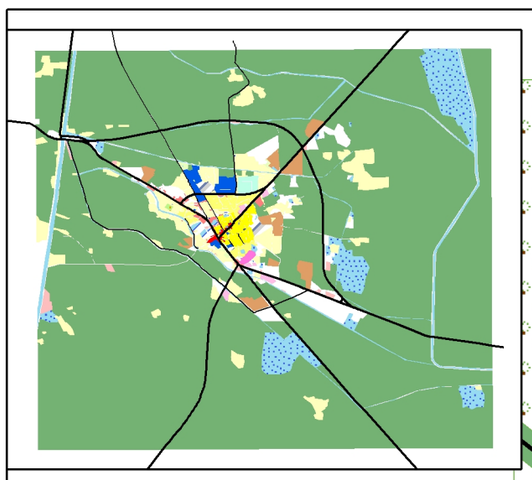
[13] Poverty Reduction Strategy for Sindh

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.	

Proposed Master Plan for Sujawal Town



Legend

- Junction
- Proposed Roads
- Canal
- Major Road
- Minor Road
- Street
- Residential
- Low Income Housing
- Commercial
- Economic
- Education
- Health
- Recreational
- Livestock
- Public Administration
- Religious
- Electricity
- Graveyard
- Land Fill Site
- STP
- Transportation
- Water Supply
- Emergency Reserved
- Agriculture Fields
- Agricultural Reserved Area

Daro Mirpur Bathoro Road
Agricultural Reserved Area
Festival Ground
Extension of Public Administration
Health Zone
Educational Zone
Cultural Complex
Cattle Farm
Bus Terminal
Grid Station
Sports Complex
Water Supply
Park
Religious
Sujawal Mirpur Bathoro Road
Emergency Reserved
New CBD
Warehouses
Trade and Commerce
Sujawal Bypass
Industrial Area
Graveyard
Low Income Housing
Commercial
Residential
Truck Terminal
STP
Badin Road
Amusement Park
Jati Road
Green
Land Fill Site
Agriculture Fields
Chohar Jamali Road

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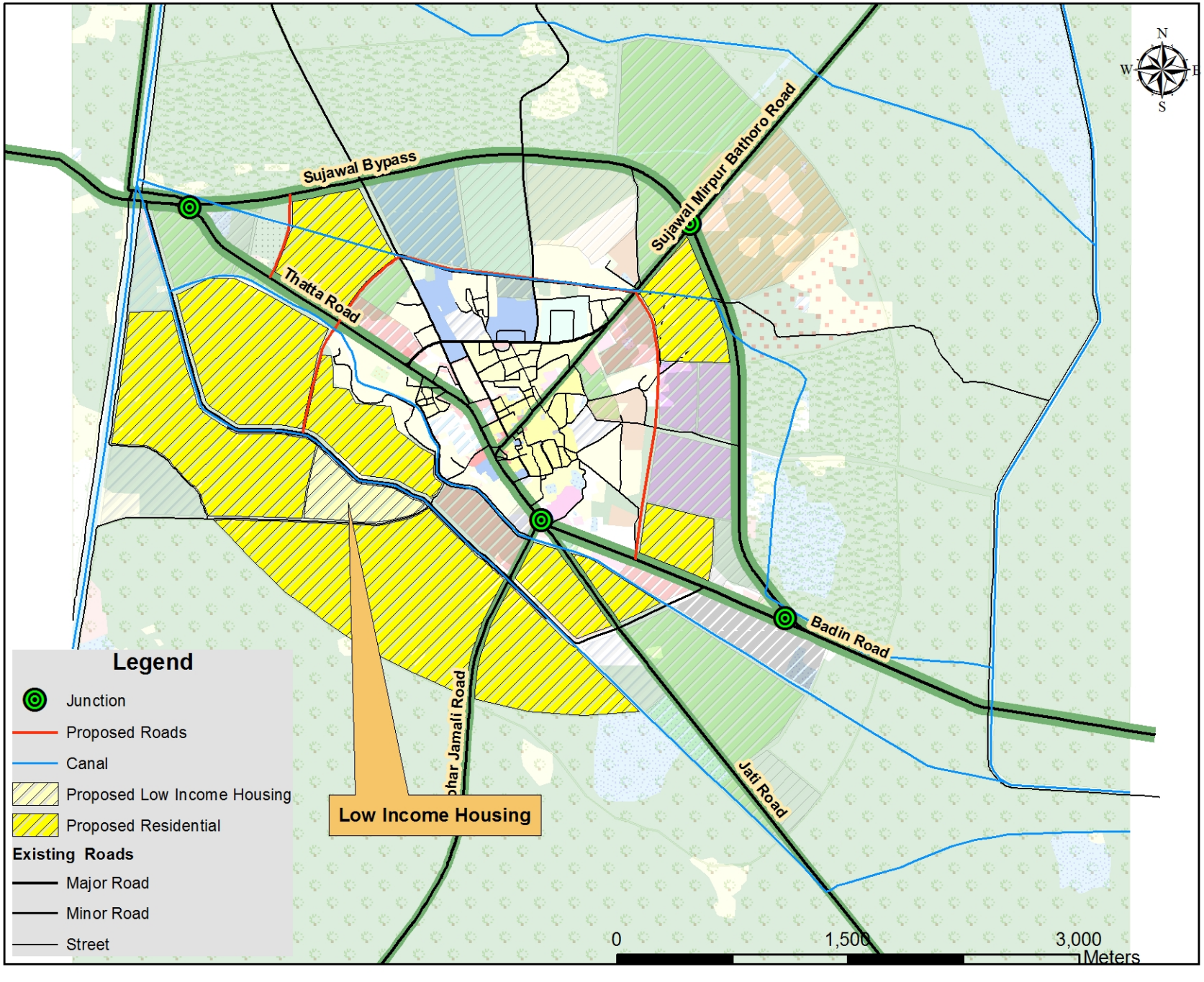
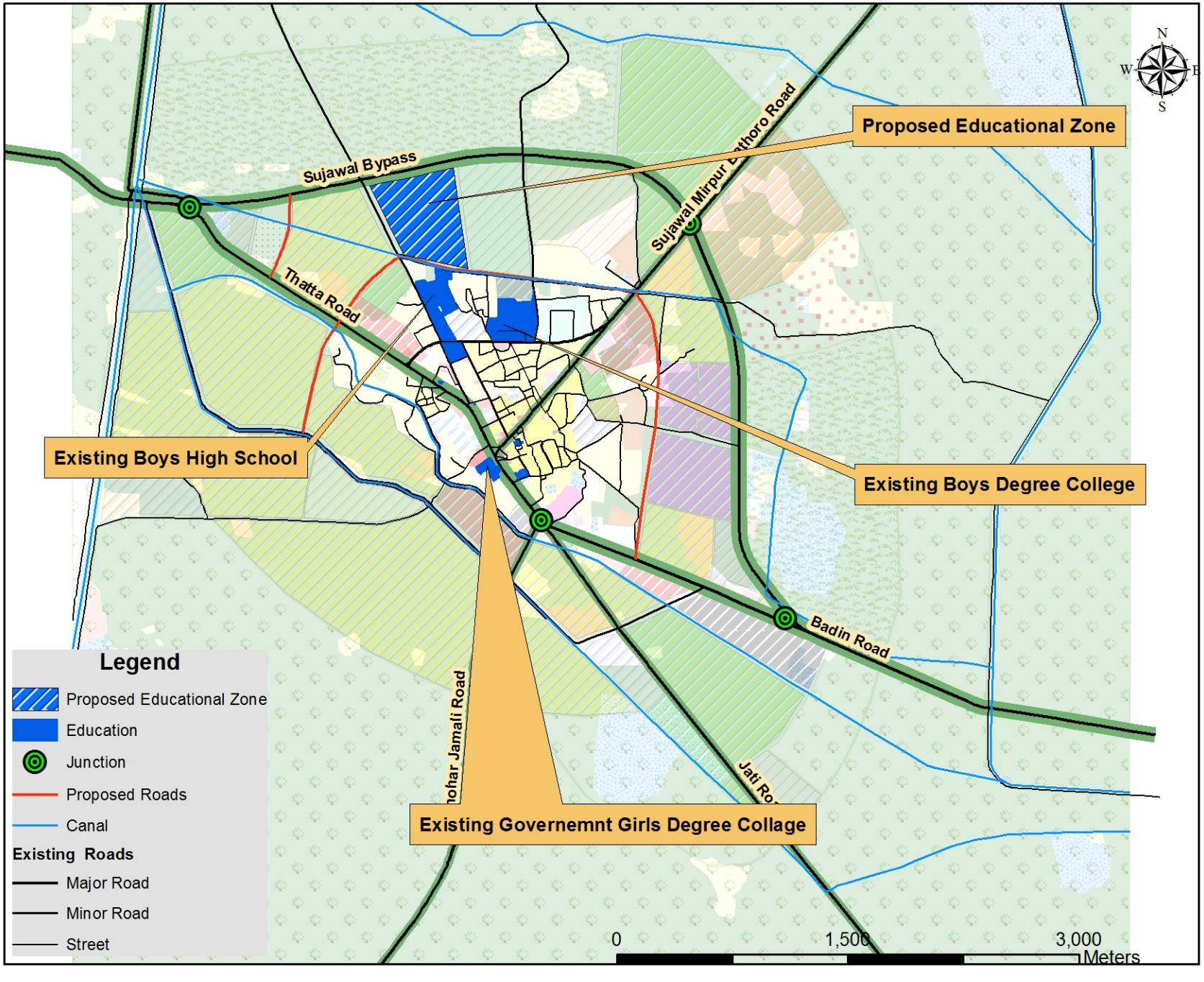
Meters

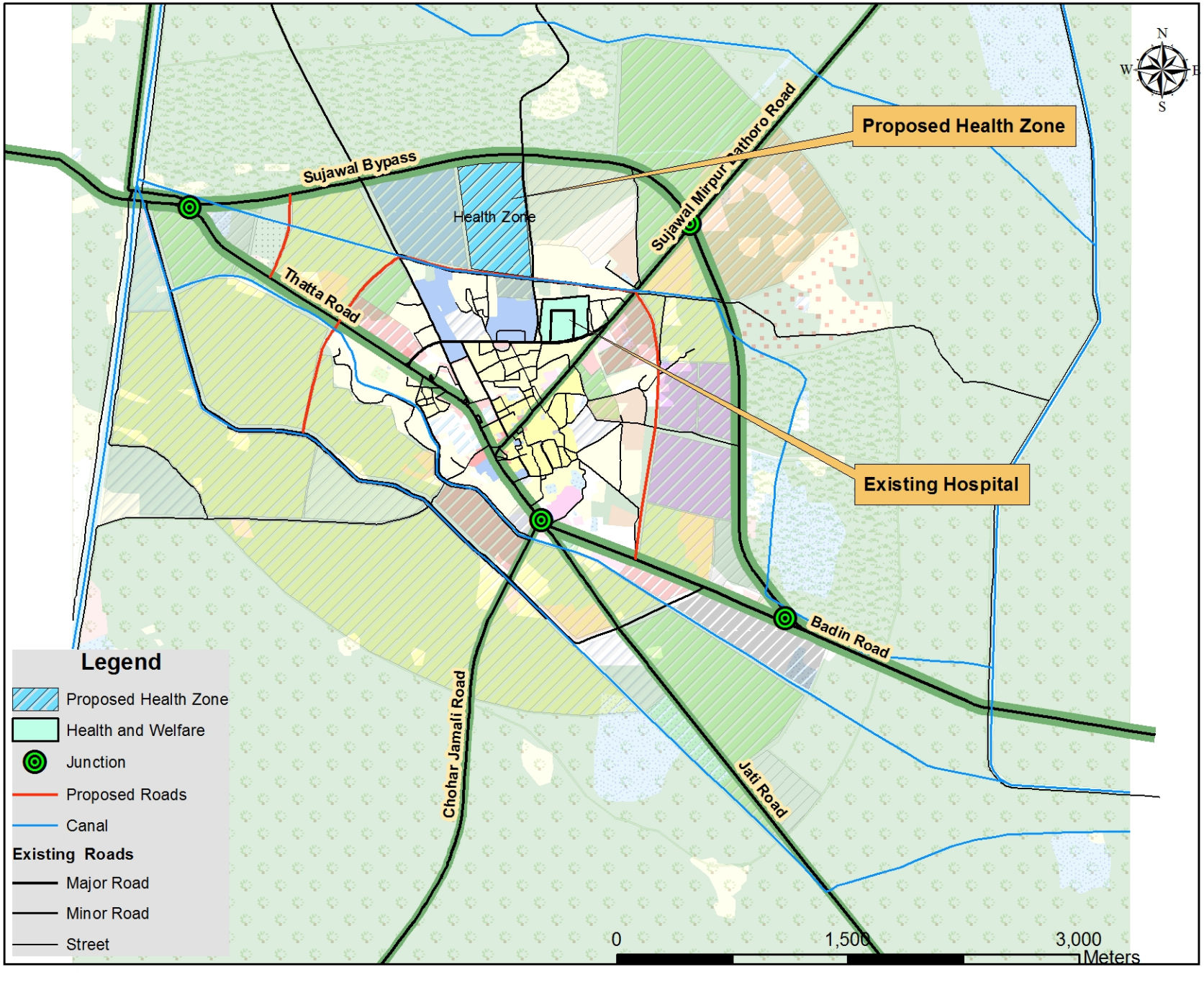
Proposed Residential Landuse for Sujawal Town



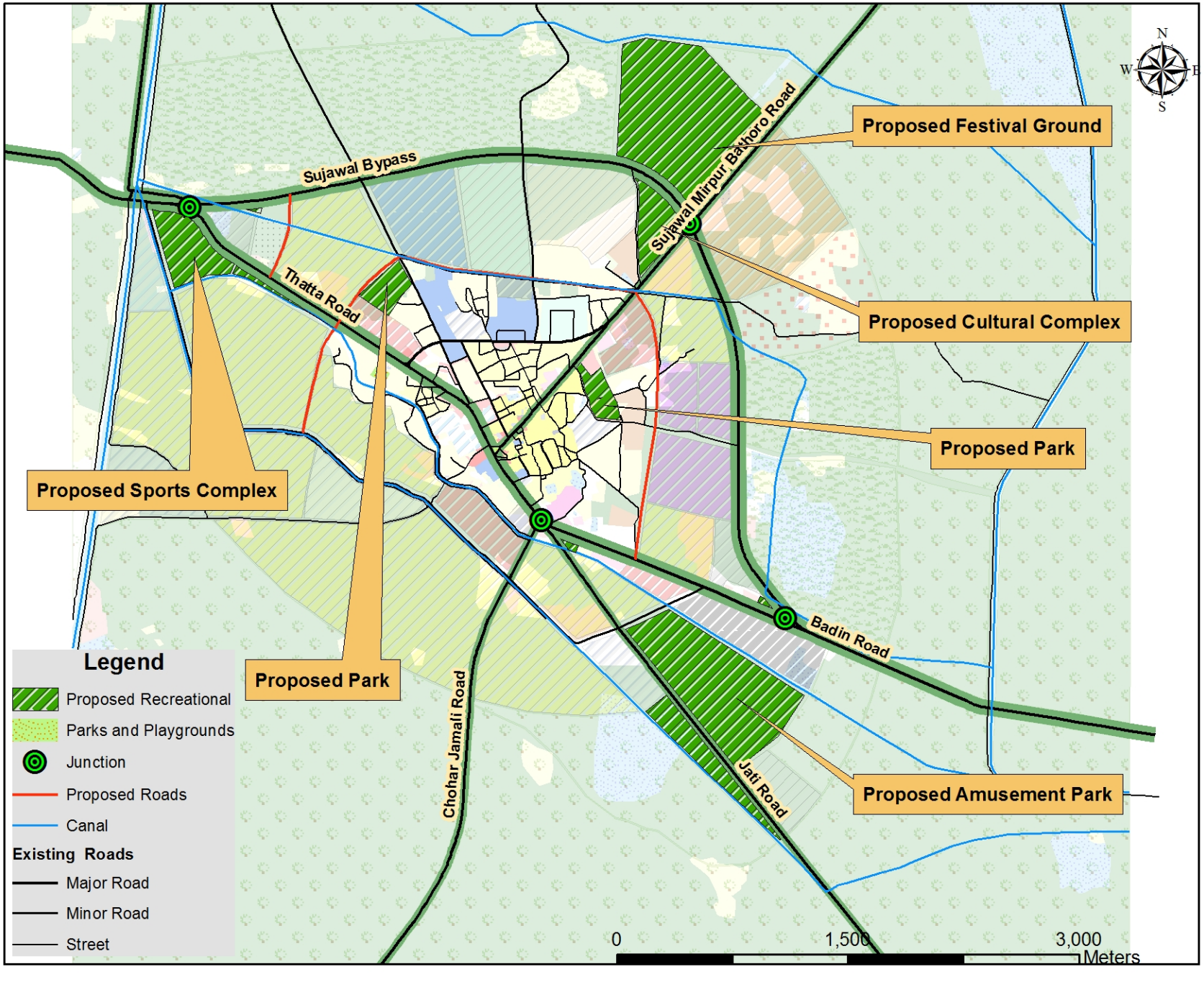
Proposed Educational Landuse for Sujawal Town



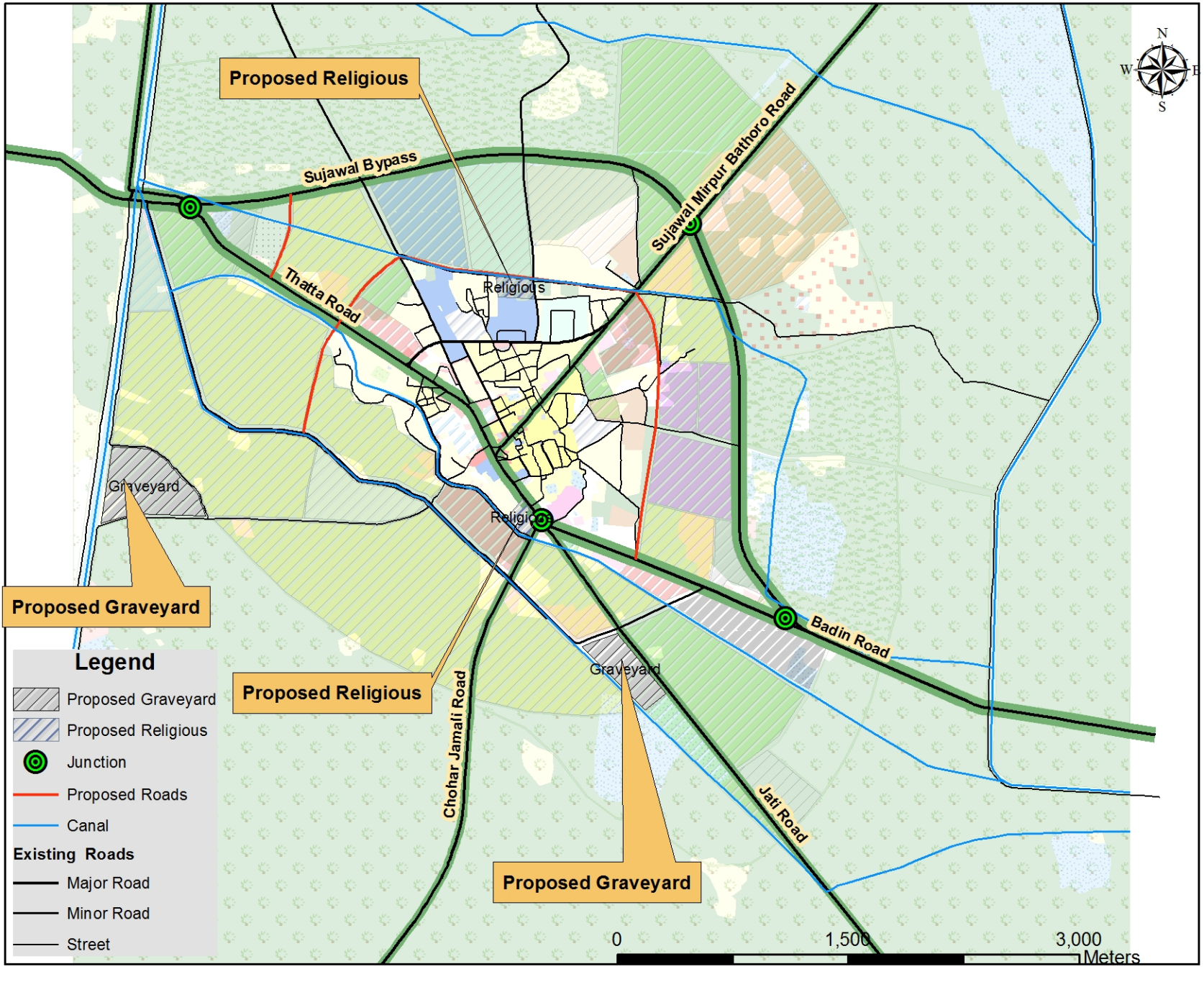
Proposed Health Landuse for Sujawal Town



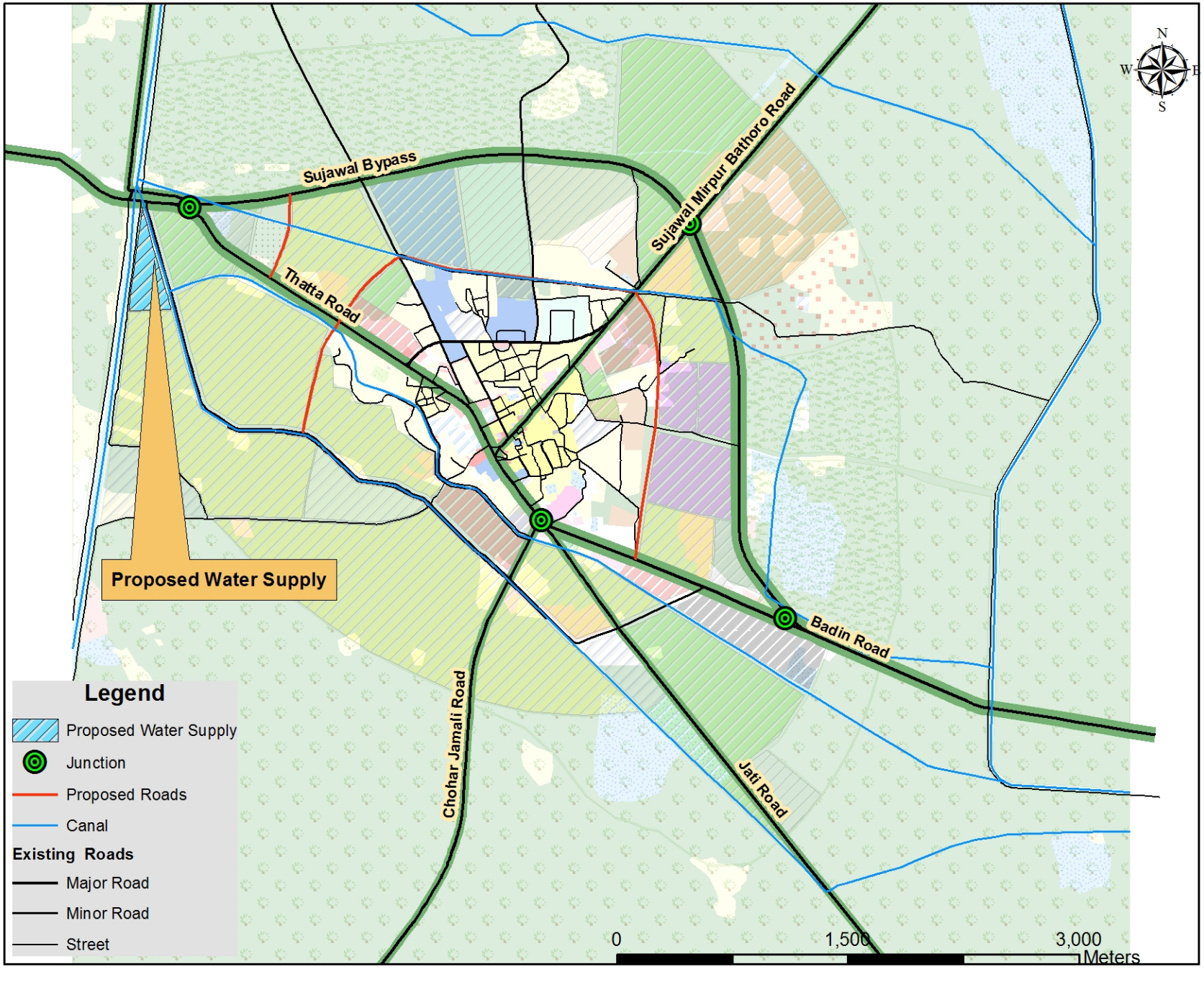
Proposed Recreational Landuse for Sujawal Town



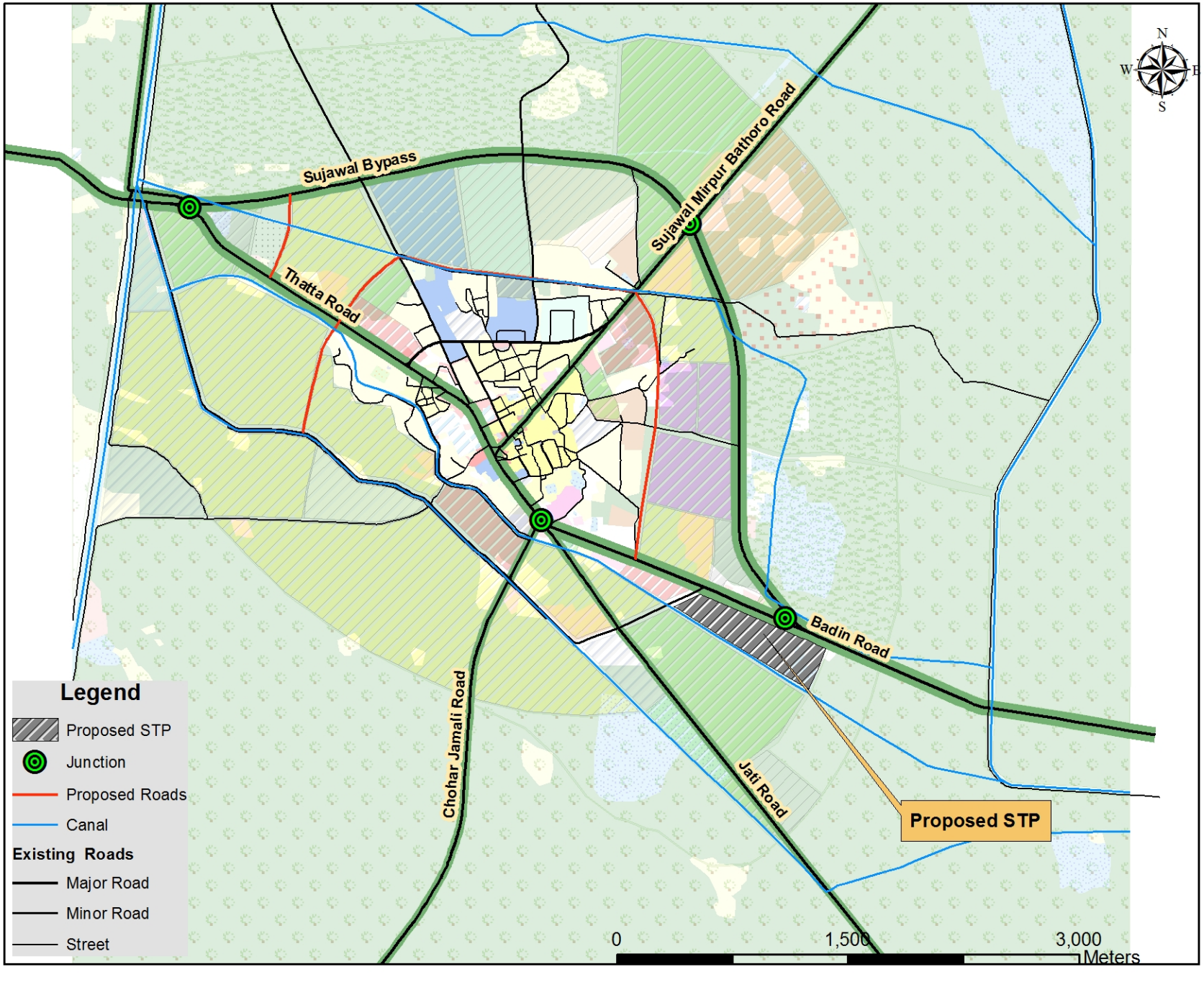
Proposed Religious & Graveyard Landuse for Sujawal Town



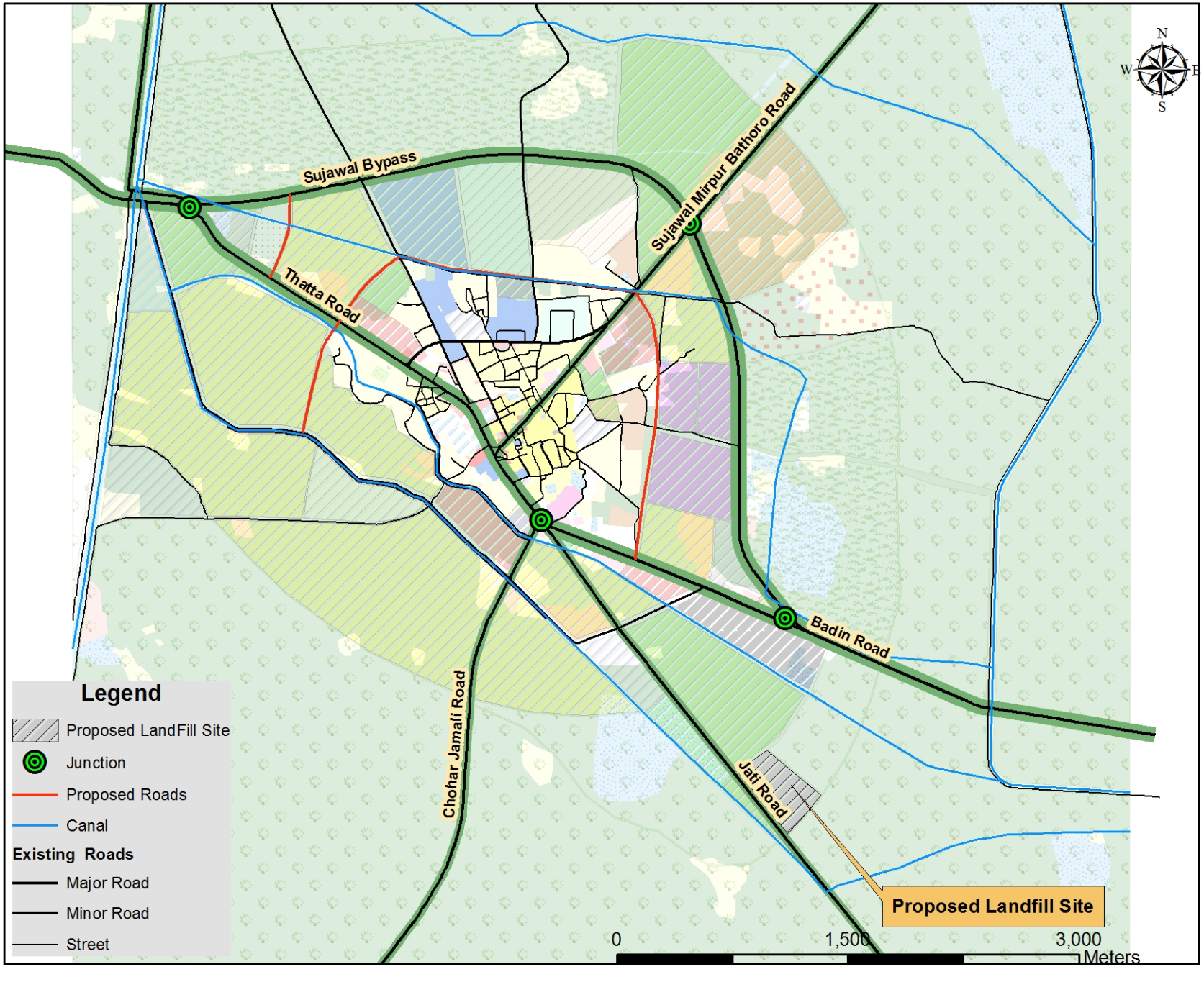
Proposed Utilities and Services Landuse for Sujawal Town



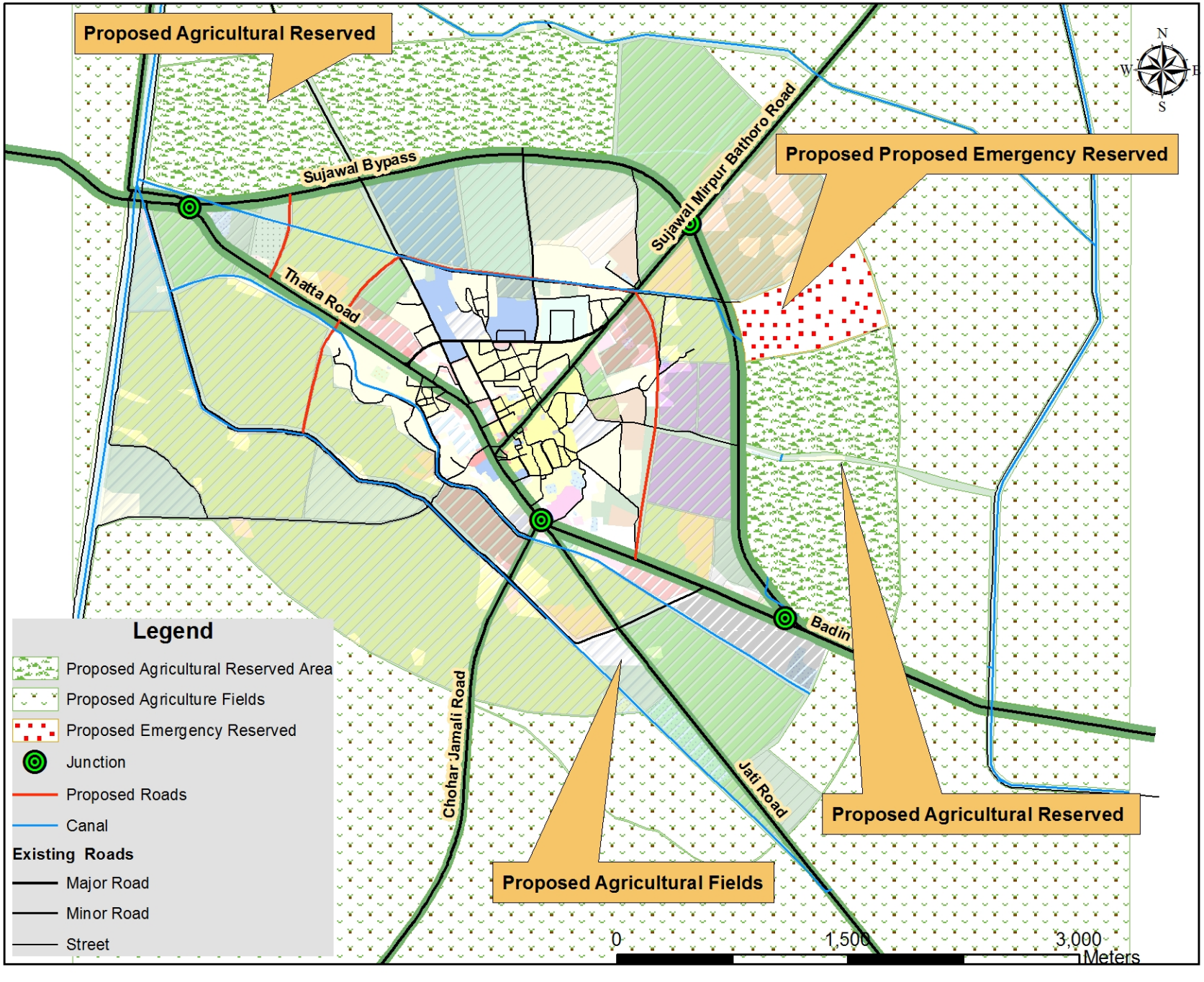
Proposed Utilities and Services Landuse for Sujawal Town



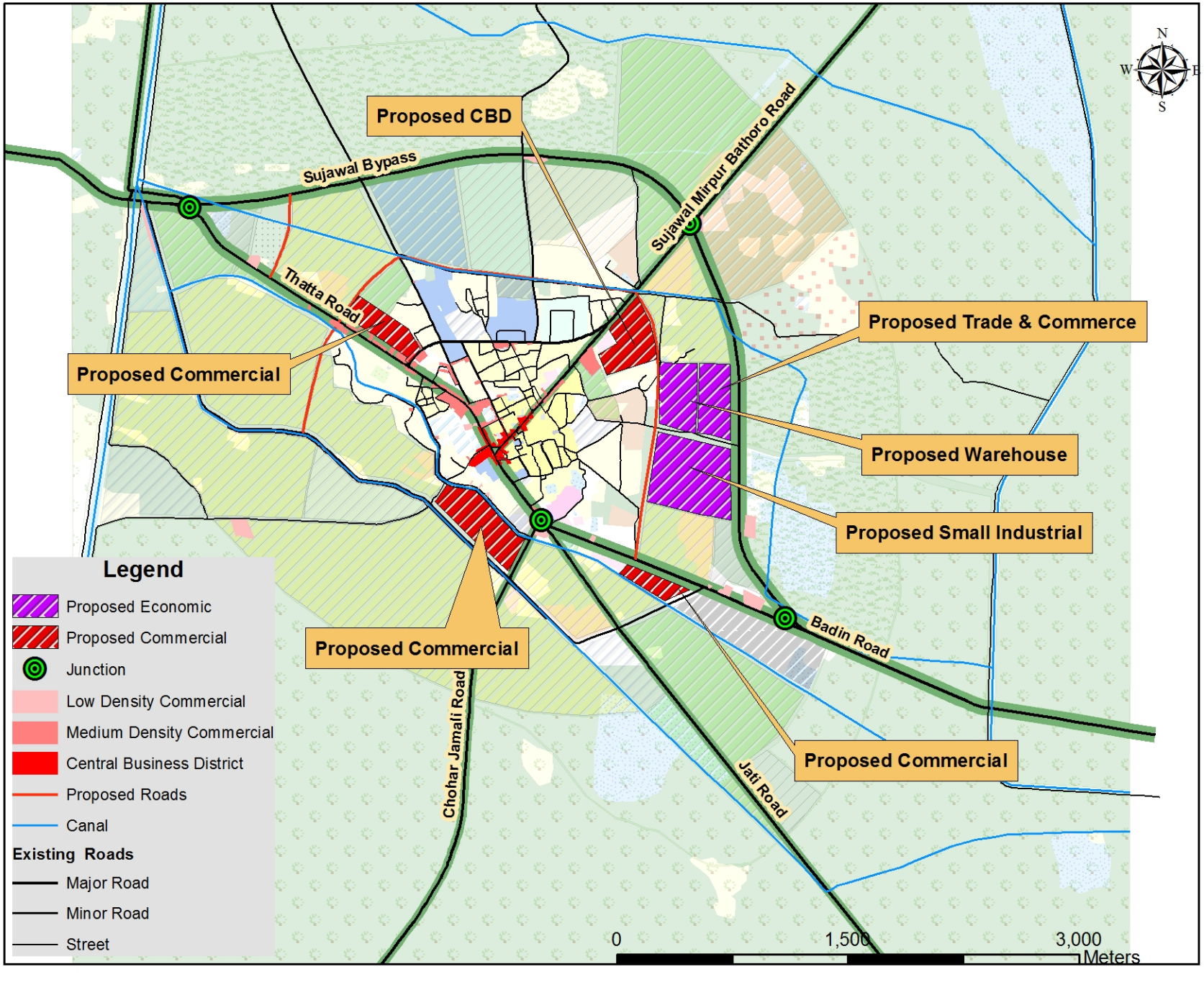
Proposed Utilities and Services Landuse for Sujawal Town



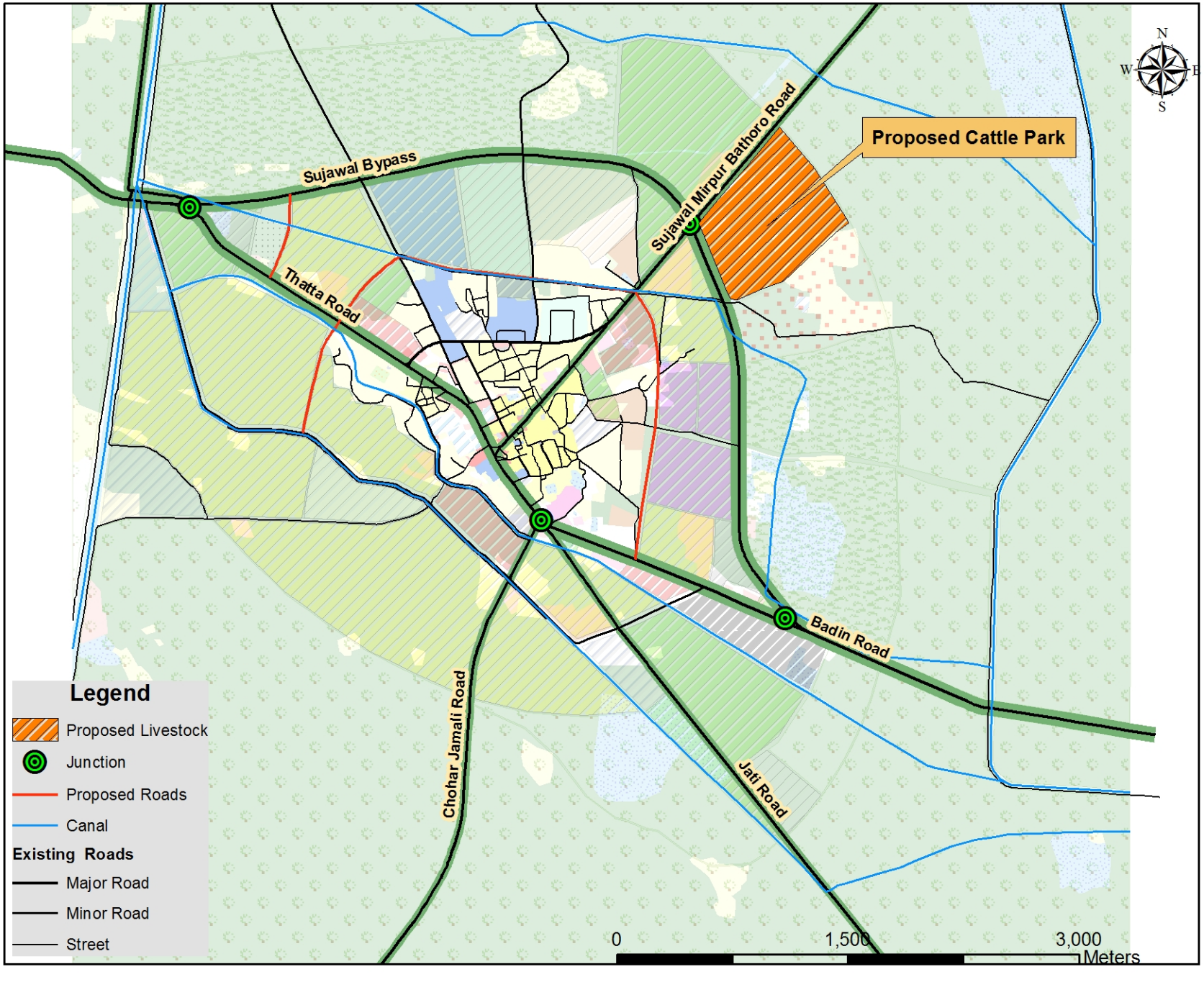
Proposed Agricultural Landuse for Sujawal Town



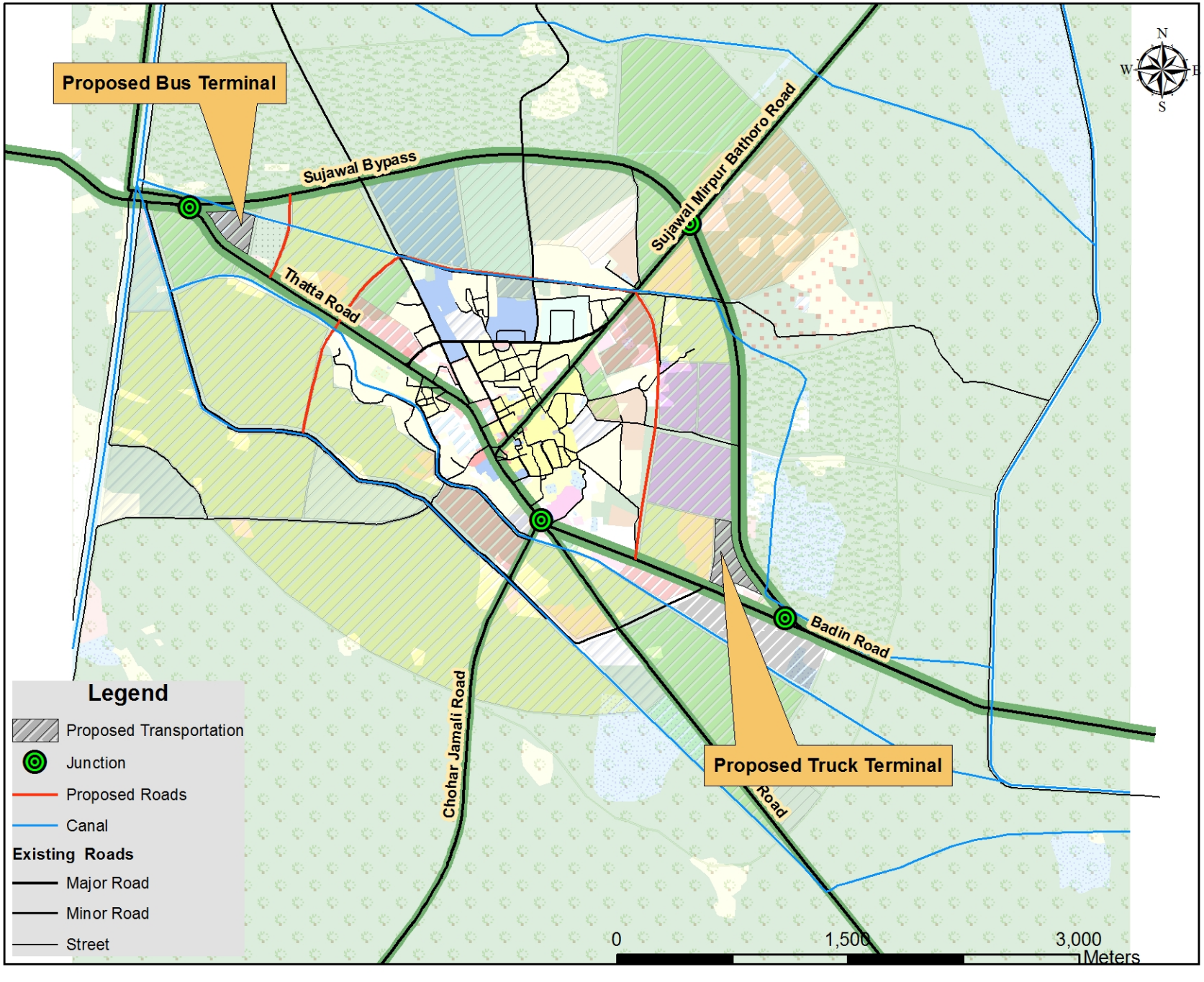
Proposed Commercial & Economic Landuse for Sujawal Town



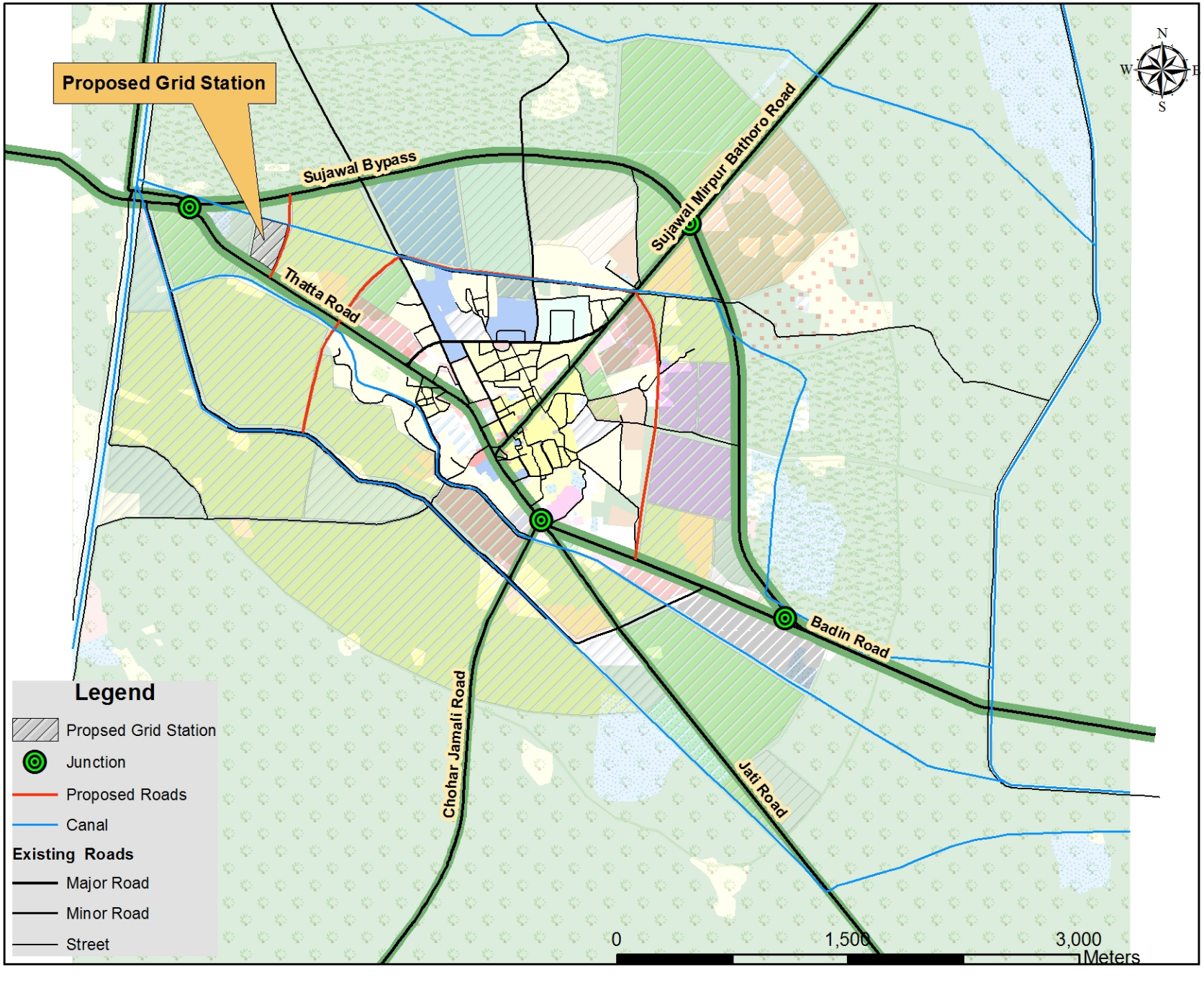
Proposed Livestock Landuse for Sujawal Town



Proposed Transportation Landuse for Sujawal Town



Proposed Utilities and Services Landuse for Sujawal Town



Proposed Public Administration Landuse for Sujawal Town