Initial Environmental Examination

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IND: North Karnataka Urban Sector Investment Program Tranche 4 – Sub-projects in Hospet

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Karnataka Urban Infrastructure Development and Finance Corporation,
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North Karnataka Urban Sector Investment Program

Package IV - Bellary

Tranche I Sub-Projects in Hospet Town

Initial Environmental Examination

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Re. 1.00	=	US$ 0.022
US$ 1.00	=	Rs. 45

Abbreviations

ADB	:	Asian Development Bank
ASP	:	Activated Sludge Process
BM	:	Bituminous Macadam
DoEEF	:	Department of Ecology, Environment
EIA	:	Environmental Impact Assessment
EMP	:	Environmental Management Plan
EP Act	:	Environment (Protection) Act, 1986
GoI	:	Government of India
GoK	:	Government of Karnataka
GSB	:	Granular Sub-base
IEE	:	Initial Environmental Examination
KSPCB	:	Karnataka State Pollution Control Board
MLD	:	Million Litre per Day
MoEF	:	Ministry of Environment and Forests
MSL	:	Mean Sea Level
MSS	:	Mix Seal Surface
NKUSIP	:	North Karnataka Urban Sector Project
NOC	:	No Objection Certificate
NOx	:	Oxides of Nitrogen
OM	:	Operations Manual
PCC	:	Profile Concrete Course
PWD	:	Public Works Department
SOx	:	Oxides of Sulphur
STP	:	Sewage Treatment Plant
RSPM	:	Respirable Suspended Particulate Matter
TSPM	:	Total Suspended Particulate Matter
WMM	:	Wet Mix Macadam
WRDO	:	Water Resource Development Organization

Contents

CHAPTER – I : INTRODUCTION.....

1.1. Overview 6
1.2. Environmental Regulatory Compliance 6
1.3. Purpose of Initial Environmental Examination 7
1.4. Scope of IEE 7

CHAPTER – II: DESCRIPTION OF THE INVESTMENT PROGRAM COMPONENTS .....

2.1. NKUSIP Goal 8
2.2 Need for Infrastructure Improvement in Hospet 9
2.2.1. Karnataka – Health Status 9
2.2.2. Sewerage System 10
2.2.3. Water Supply Rehabilitation 12
2.2.4. Drainage Upgradation.....16
2.3 Sub-project Component Description..... 18
2.3.1. Sewerage System 18
2.3.2. Water Supply 22
2.3.3 Urban Drainage 26
2.3.4. Urban Road Upgradation 27
2.4. Investment Program Implementation Schedule 27
2.5. Investment Program Benefits 27
2.5.1. Water Supply System Improvements 27
2.5.2 Sewerage System Improvements 30
2.5.3 Drainage System Improvements..... 31
2.5.4 Urban Roads Improvement 32
2.6 Investment Program Alternatives.....32

CHAPTER - III. DESCRIPTION OF THE ENVIRONMENT .....

3.1. Environmental Profile of Hospet 35
3.1.1 Introduction..... 35
3.1.2 Physiography 35
3.1.3 Seismology 35
3.1.4 Climatic Conditions 35
3.1.5 Surface Water..... 38
3.1.6 Groundwater 40
3.1.7 Air Quality 41
3.1.8 Flora and Fauna 42
3.1.9 Socio Economic Characteristics 42
3.1.10 Historic and Cultural Places 43
3.2. Environmental Settings of Investment Program Component Sites 43
*3.2.*1 Sewage Treatment Plant Site 43
3.2.2. Urban Drainage Upgradation 46
3.2.3 Water Supply Rehabilitation 46
3.2.4. Urban Roads Upgradation..... ... 47

CHAPTER - IV. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES 48

CHAPTER - V. INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN 45

5.1. Institutional Requirements 61
5.2 Training Needs 63
5.3 Environmental Monitoring Plans 65

CHAPTER - VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

6.1. Overview 72

CHAPTER - VII. FINDING AND RECOMMENDATION

7.1. Findings 74
7.2. Recommendations 7 5

CHAPTER - VIII. CONCLUSIONS 76

TABLES

Table : 1 water borne / related Diseases in Karnataka
Table : 2 Access to the Basic Services – Sewerage and sanitation
Table : 3 Salient Feature of existing Sewerage system
Table : 4 Access to the Basic Services – Water supply
Table : 5 Salient Features of existing Water supply Scheme
Table : 6(a) Existing Type of Drainage System
Table : 6(b) existing Drainage System details
Table : 7 Proposed Sewage System Sub Component
Table : 8 Design Parameter of STP
Table : 9 Proposed Sewage System
Table : 10 Proposed Water Supply Sub- Component
Table : 11 Proposed Road Up gradation Sub- Component
Table : 12 Water Supply Component Investment Program Beneficiaries (2011)
Table : 13 Sewage Component Investment Program Beneficiaries
Table : 14 Drainage Component Investment Program Beneficiaries (2011)
Table : 15 Investment Program Ulternatives
Table : 16 Mean Max. & Mean Min. Temp. in oC
Table : 17 Climatologically Characteristic of Hospet
Table : 18 Tungbhadra River water Quality 2003
Table : 19 Ground Water Levels In Hospet
Table : 20 Ground Water Characteristic in Hospet
Table : 21 Land Use Characteristic Along The Road Investment program
Table : 22 Screening of Impact
Table : 23 Environmental; Impacts & Mitigation Measures Of Sewerage System
Table : 24 Environmental; Impacts & Mitigation Measures of Water Supply Rehabilitation
Table : 25 Environmental; Impacts & Mitigation Measures of Drainage Up gradation
Table : 26 Environmental; Impacts & Mitigation Measures of Road Up gradation
Table : 27 Institutional Roles & Responsibilities
Table : 28 Training Need (2007-2015)
Table : 29 Environmental Monitoring Plan for Sewerage System
Table : 30 Environmental Monitoring Plan for Water Supply Rehabilitation
Table : 31 Environmental Monitoring Plan for Drainage Up gradation
Table : 32 Environmental Monitoring Plan for Road Up gradation
Table : 33 Environmental Issues of Proposed Infrastructure component

Figures

Maps

Map: 1 location map of Hospet Town
Map : 2 Layout of proposed sewage network.
Map : 3 Existing and Proposed Water Supply Coverage .
Map : 4 Layout of Proposed Storm Water Hospet Town.
Map : 5 Proposed STP site & Surrounding.

CHAPTER - I

INTRODUCTION

1.1. Overview

The North Karnataka Urban Sector Investment Program (NKUSIP) proposes to improve the environmental quality of the urban areas through better urban infrastructure facilities and thus improve living conditions of the urban people. In the wake of poor infrastructure facilities and services such as water supply, sewerage and sanitation, the risk of infectious diseases through exposure to unhealthy environment runs high, particularly in the case of urban poor. Hence, the proposed Investment Program aims at minimizing or mitigating the risk and ensures the well-being of people.

Though the Investment Program aims to improve the environmental condition of urban areas, the proposed improvements of infrastructure facilities may exert certain adverse impacts on the natural environment. While developing urban infrastructure facilities, impacts during the construction stage are expected to be more severe than the operation phase, though for a short duration. Exceptions being some facilities such as sewage treatment plant, which may also exert adverse impacts during the operation phase also, if due care is not taken. Again, most of the impacts are activity- specific. However, if due care is taken during the construction phase, investment Program negative impacts will be far outweighed by positive impacts

1.2 Environmental Regulatory Compliance

The components of NKUSIP include environmental sanitation infrastructure, water supply infrastructure, urban roads improvement, slum infrastructure, and non-municipal infrastructure projects. Sub-components, which fall under the ambit of environmental regulations and mandatory requirement, are indicated in the following Table.

Environmental Regulatory Compliance of NKUSIP Components

Sub- Component	Applicability of Acts/Guidelines	Compliance Criteria
Sewage Treatment Plant	Environmental (Protection) Act, 1986 Water (Prevention and Control of Pollution) Act, 1974	• Consent for Establishment and Consent for Operation from KSPCB as per Water Act.
All sub-components	The Environment Policy and Operations Manual (OM) 20: Environmental Considerations in ADB Operation	• Categorization of sub-project components into A, B or C and developing required level of environmental assessment for each component

The above table indicates that as far as GoI and GoK Acts/Guidelines are concerned, the proposed Investment Programs do not need to go through environmental

assessment process; however, as specified, few sub-project components may require consent from Competent Authorities. The ADB guidelines, on the other hand, stipulate addressing environmental concerns, if any, of a proposed activity in the initial stages of Investment Program preparation. For this, the ADB Guidelines categorizes the proposed components into varies categories (A, B or C) to determine the level of environmental assessment required to address the potential impacts. Level of environmental assessment required for each category of Investment Program, as per ADB's Environmental Assessment Guidelines 2003 is presented below.

(i) ***Category A***. Sub-project components with potential for significant adverse environmental impacts. An environmental impact assessment (EIA) is required to address significant impacts.

(ii) ***Category B***. Sub-project components judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for Category A projects. An initial environmental examination (IEE) is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

(iii) ***Category C***. Sub-components unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are still reviewed.

1.3 Purpose of Initial Environmental Examination

The NKUSIP Package IV – Bellary covers seven sub- project towns. To fulfil the ADB's environmental assessment requirement for sector loans, the Initial Environmental Examinination (IEE) of sub-project have been carried out. Owing to the scale and nature of the proposed infrastructure components and environmental profile of the NKUSIP sub – project towns, prima facie almost all Investment Program components are unlikely to have adverse environmental impacts.

Therefore, as per the ADB's Environmental Assessment Guidelines, the sub-project components are proposed in Hospet under NKUSIP are categorized as 'B' and an initial environmental examination (IEE) have been carried out.

1.4 Scope of IEE

The IEE was based mainly on secondary sources of information and field reconnaissance surveys; no field monitoring (environmental) survey was conducted. Stakeholder consultation was an integral part of the IEE.

CHAPTER – II

DESCRIPTION OF THE INVESTMENT PROGRAM COMPONENTS

2.1 NKUSIP Investment Program Goal

The North Karnataka Urban Sector Investment Program (NKUSIP) will finance investment for (i) Environmental Sanitation Infrastructure; (ii) Water supply Infrastructure; (iii) Urban Roads Improvement; (iv) Poverty Alleviation; (v) Non- Municipal Infrastructure; (vi) Institutional Development; and (vii) Investment Program Assistance. The overall development goal of the NKUSIP is to facilitate economic growth in the towns of North Karnataka and bring about urban development through equitable distribution of urban basic services to the citizens that are environmentally sound and operationally sustainable. The development purpose is designed to assist Urban Local Bodies (ULBs) to "promote good urban management, and develop and expand urban infrastructure to increase economic opportunities and to reduce vulnerability to environmental degradation and urban poverty".

Thus the Investment Program goal is to facilitate economic growth in the towns/cities of North Karnataka and bring about urban development though equitable distribution of urban basic services to the citizens that is environmentally sound and operationally sustainable. The following are the urban infrastructure components proposed under the NKUSIP.

1. Water Supply;
2. Sewerage;
3. Urban Drainage;
4. Urban Roads;
5. Poverty Alleviation; and,
6. Slum Improvement

The location map of the investment program for Hospet is presented in **MAP 1**

Map : 1 Location map of Hospet Town.

2.2 Need for Infrastructure Improvement in Hospet

As hospet city is an important destination for educational, industrial and commercial needs population in the city is on growing. Providing basic amenities to ensure high level of performance in environmental safe guard is quite necessary to ensure long term urban sustainability. A study conducted by Department of Forest , Ecology & Environment, Government of Karnataka, 2003 has shown that the cities in the state of Karnataka has poor environmental performance due to lagging in ensuring basic infrastructure facilities to the urban population.

2.2.1 Karnataka – Health Status

In addition to the associated environmental pollution, importantly, due to lack of safe and adequate water supply and sanitation facilities, the risk of infectious diseases through exposure to unhealthy environment runs high, particularly in the case of urban poor. The State of Environment Report (SOER), 2003, Karnataka, brings out the fact that the lack of safe water supply and sanitation facilities is essentially leading to the health related

consequences.

The yearly occurrence of water borne diseases like cholera and gastroenteritis makes it very clear that environmental impact of water on health is very profound and significant."

Table 1: Water borne/related Diseases in Karnataka

Year	Gastroenteritis		Cholera		Leptospirosis		Viral Hepatitis		Typhoid	
1991	17,455	691	747	16	-	-	659	17	-	-
1992	15,262	608	402	14	-	-	282	17	-	-
1993	16,206	855	424	13	-	-	678	7	26,047	1
1994	15,932	325	304	10	-	-	382	0	20,349	0
1995	18,645	396	532	38	-	-	7,146	1	10,250	0
1996	22,983	377	657	6	-	-	1,332	6	22,221	12
1997	23,665	361	714	10	67	2	1,714	4	3,880	5
1998	23,881	501	434	2	1	0	3,824	2	2,435	0
1999	17,743	126	134	3	54	2	4,792	2	24,356	1
2000	31,132	265	354	3	3	1	3,011	10	27,210	0
2001	23,893	198	342	1	68	7	5,438	28	33,346	6
2002	25,218	146	384	0	27	0	4,578	15	42,936	2

Source: SOER, 2003

Hence, it is evident that the lack of safe water supply and sanitation facilities in the State adversely affects health conditions of the population. The following section details the status of water supply, sanitation and other basic infrastructure facilities in Hospet.

i) Sewerage
ii) Water supply
iii) Urban Drainage
iv) Urban road
v) Slum Improvement

Existing Infrastructure Facilities in Hospet town

2.2.2 Sewerage System

The sewerage system for the Hospet was developed in 1977 and currently covers about 30 percent of the total town area of 50.92 sq. km under sewerage system. The remaining area does not have sewerage system and only pit latrines are being used for disposal of human excreta/ wastewater which is finally connected to the open drain. Of the total 31,166 residential houses only 7,047 have sewerage connections. A total of 54 kms of sewer network withover 1750 manholes was laid and individual's connections provided.

Total area of hospet town : 50.92 sqkms
Total coverage Hospet area about : 30 %
Coverage of individual House Hold connection : 30 %
Total length of road of various categories : 270 km
Length of sewer laid : 53.62 km

Table 2: Access to the Basic Services – Sewerage and Sanitation

Description	Non-slum households	Slum households
	%	%
Sewerage Systems	30	4
Septic Tank	27	-
LCS	17	24
Public Convenience	-	7
None	16	65

Source: Baseline Socio-economic survey, 2004

Table 2, indicates the access to sewerage and sanitation facilities by households. In the non-slum areas, around 30 percent of the population has access to sewerage systems while 27 percent and 17 percent of the households are dependent on septic tanks and low-cost sanitation (LCS), respectively. Around 16 percent does not have any defined sanitation facility and resort for open defecation. The situation is worse off in the slum areas with 65 percent of the households having no sanitation facility. A meagre 4 percent have access to UGD system and 24 percent of the population is dependent on low-cost sanitation (LCS). Public conveniences serve around 7 percent of the slum households.

Most of the existing sewerage system is blocked with silt and solid waste. It was noticed that only 10 to 15 % sewage is flowing in the out fall sewer at the exist point where the collected sewage is being disposed in to the open drain. At most of the locations the sewage is over flowing from manhole in to open drain. **Table -3** shows the salient features of existing sewerage system including sewage treatment plant. Collection sump, pumping station at Ranipet and the Sewage Treatment Plant were constructed but the pumping main from the sump to the treatment plant was not completed. The treatment plant is not functional due to non receipt of sewage inflow. This together with the non-functioning and lack of maintenance has led to the collapse of the present sewerage system in Hospet town.

Table -3 Salient features of the Existing Sewerage System

	Total Area of Hospet City	50.92 sqkm
	Total length of streets of various categories	164.40 km
	Total population as on 2001 &2008	1,63,284 & 1,88,000
	Total No. of house holds as on 2001	31563
A	Sewerage System	
	Existing sewerage system	Ist Stage Scheme commissioned in 1977
	Area covered	30% of the town
	Length of Network	54 Km
	No. of Manholes	1750 no.
	Condition of the Existing Sewerage system	Poor
	Type of Sewerage Treatment Plant	Oxidation Ponds
	Condition of STP	Not working

B	Sewerage System in slum area	Partially provided to declared slums
	a) Slum population (As per CDP)	37101
	Declared Slum	46
	Undeclared Slum	-

Source : DPR (Detail Project report)

The existing STP was constructed in 1977 which is not in a working condition. Moreover, the location of the STP is not appropriate as it is located on a higher elevation above the town and does not receive sewage. The pumping station is also not in working condition and no sewage is discharged into the STP. The collected sewage at the wet well flows into the natural drainage channels. The wastewater from the non-covered areas directly enters into the open drains and meets the natural drainage channel, which carries mainly wastewater, except during monsoon.

Due to non-availability of proper and adequate sewerage system in the town, wastewater is discharged with out any treatment. In the absence of a sewerage system, a large amount of the domestic sewage is discharged into storm water drains. The wastewater channel flows towards the north of the town into agricultural fields and meets the Karlagatta channel, which eventually joins the River Tungabhadra at around 5 km north of the town. As this steam flows through the agricultural fields, the farmers use untreated waste water for agriculture purpose, which may potentially lead to health and environmental problems. However, at present out of the total generated sewage, only a fraction of it reaches the agricultural field because of non availability of proper sewage collection system. Hence, it may not have much significant impact on agriculture land but at the same time creating unhealthy condition in the town.

The goal of the NKUSIP is to improve the level, quality and sustainability of the basic urban services provided to the citizens, while maintaining the operation, economically viable to the ULB. In order to achieve the above objectives it is necessary to rehabilitate the present system especially, the existing sewer network, collection wells, pumping station and extend the sewer network and provide a suitable treatment system to the sewage collected. In order to make the system economically viable and at the same time meet the maximum degree of basic needs of the citizens it is necessary to extend and strengthen the sewer network system. This would increase the coverage and at the same time enhance the sustainability of the system. This would make the ULB the facilitator, implementer and operator of urban utilities in an environmentally and economically sustainable manner, thereby accomplishing the long term objective of the KUIDFC.

2.2.3 Water Supply Rehabilitation

The First Stage Water Supply Scheme for Hospet was built in the 1966, with Tungabhadra Power Canal is of 4.54 MLD capacities as the source and the Second Stage Water Supply Scheme was commissioned in May 1999 with Raya - Basavanna canal for 27.24 MLD capacity but the actual supply is 18.16 MLD due to lower installed capacity of the filters . Both together produce 22.70 MLD. The per capita water supply is about 104 lpcd.
At the consumer end due to high water losses in the system.

	
Tungabhadra river	**Power canal, Chittawadi**
	
High level canal	**Basava canal Intake**

The existing water treatment plant, constructed in 1966, has a total capacity of 4.54 MLD and has subsequently been upgraded to 6.48 MLD is located behind Government Junior college in Amaravathi area. It is a conventional coagulation, sedimentation and filtration treatment system. The treatment has following units.

(a) Inlet channel with V notch for flow measurement.

(b) Flash mixer.

(c) Rectangular Flocculator.

(d) Two rectangular settling tanks.

(e) Two rapid sand filter beds.

(f) Wash water tank, located above the filter house.

(g) One chlorinator, which has been recently installed but not brought in use.

(h) Bleaching powder dosing in filter water channel.

Though the plant is in working condition, the chemical dosing system and filter controls need to be repaired / replaced. The second treatment plant of capacity 18.16 MLD constructed in 1999 is in good condition. To treat the total water supply of 22.4 MLD, the rehabilitation works for the first treatment plant is necessary. Around 80 percent of the population is covered through the water supply system.

Together, both works supply 22.70 MLD to the town at 135 litres per capita per day (lpcd), gross supply – it is estimated that 30-40 percent of water supplied is lost through transmission and distribution, with consumers receiving a net supply of 104 lpcd. The supply is intermittent, daily and for 3 hours every day, between 6 am and 9 am.

There are six storage reservoirs (with 7.26 ML capacity covering 33 percent of total water supply) and the total length of the distribution network is 103 km covering 38 percent of the town's total road length. The town population is served through 8,090 domestic, 200 non-domestic connections, and 996 public stand posts – all house service connections being unmetered.

	
Kondanayaka nahalli OHT (2.5LL)	**OHT near WTP (2.5LL)**
	
OHT along Sandur road (13.6LL)	**Proposed OHT site at Kondanayakanahalli**

According to the survey results, indicated in **Table 4**, safe water supply is available only to 65 percent of the surveyed non-slum household and 40 percent of the slum households. Most of the population are not getting Municipal water supply and 60% of slum populations are getting only bore water. Hence, it is necessary to provide water supply for the uncovered areas. In addition, the existing network suffers from heavy leakages. Though the present water supply levels are on a higher side, around 70 percent of the surveyed households indicated water shortage; mainly attributed to system losses. Therefore, it is proposed to provide the water supply network of 149 km in uncovered areas to cover 2,94,511 populations by 2026, replacement of leaking pumping water main of length 4.77 km, improvements to the filter controls and chemical dosing system of the WTP. In addition to check the water losses,

Table 4: Access to the Basic Services – Water Supply

Description	Non-slum	Slum households
	%	%
WSC	35	31
Stand post	30	9
Open well/Bore well	19	60
WSC + Open well/Bore well	16	-

Source: Baseline/Socio-economic Survey, 2004

Table 5: Salient features of existing water supply schemes

Existing Water Supply	Ist Stage Scheme (Power canal)
	2nd Stage Scheme (Raya Basava Canal)
Present Water Supply rate (2003) LPCD	104 LPCD
Condition of the Existing Water Supply	Moderate
Soil Type	Red soil
Ground Water Availability	In sufficient
Existing Source of Water and Quality	Canal and Good

Source : DPR (Detail Project report)

2.2.4. Drainage Up gradation

The existing drainage system in Hospet consists of three major nalas (Hampi nala, from Jambunathnagar road to Hampi road and nala from Chitwadgi to Tungabhadra River) and a network of secondary and tertiary drains built around these main channels. Total length of the primary drains is 14.50 km while that of secondary and tertiary drains is 35 km. **Table 6 a & b** shows existing type and details of drainage system.

Table – 6 (a) Existing type of Drainage System

Sl. No.	Drain Type	Length in Km
1.	**Secondary Drain**	
	Drain from AC office to Kankadas circle	2.50
	Drain from AIR to Ranipet	2.50
	Closed drains(Pucca)	20.00
	Open drains(Kutcha)	10.00
	Total	**35.00**
2	**Primary drain channels**	
A	Hampi Nala	7.00
B	Nalla from Sankalapura to Hampi road	6.00
C	Nalla from Chitwadgi to Tungabhadra river	1.50
	Total	**14.50**

Source : DPR (Detail Project report)

Table -6 (b) Existing Drainage System details

1	Area covered	15% of the town
2	Length of Drains including all types	50.00 Km
3	Condition of the Existing Drainage system	Poor
4	Type of Drainage System	Primary , Secondary Tertiary Drainage System

Source : DPR (Detail Project report)

Over flow of storm water drain near sugar factory road

Government school flooded near shanthi nagar road

Over flow of storm water drain along Basveshwara nagar 5 th cross street

Storm Water drain connecting Raya canal near Ranipet sewage pumping station

Hospet experiences moderate levels of rainfall averaging 620 mm in a year. Heavy rains occur normally in the months of August and September during which some of the existing drains overflow on the road as shown in the above photograph, as they are heavily silted and also often blocked due to indiscriminate throwing of the garbage. In the absence of a well-reticulated sewerage system covering the entire town and inadequate sanitation facilities, a large amount of the domestic sewage is discharged into storm water drains.

This result in pollution of public water bodies such as river and canals, as the waste runoff leads to these watercourses.

2.2.5 Urban Roads

The road network in Hospet covers a length of 270 km, of which 76.6 km is municipal roads. Only 22 percent of municipal roads are surfaced roads and 78 percent are unsurfaced.Proposals for urban road improvement are governed by the Project Environmental and SocialSafeguard Framework. Key roads are undertaken for improvement under the Project.

Proposed Improvement in Basic Infrastructures Of Hospet Town

2.3 Sub-project Component Description

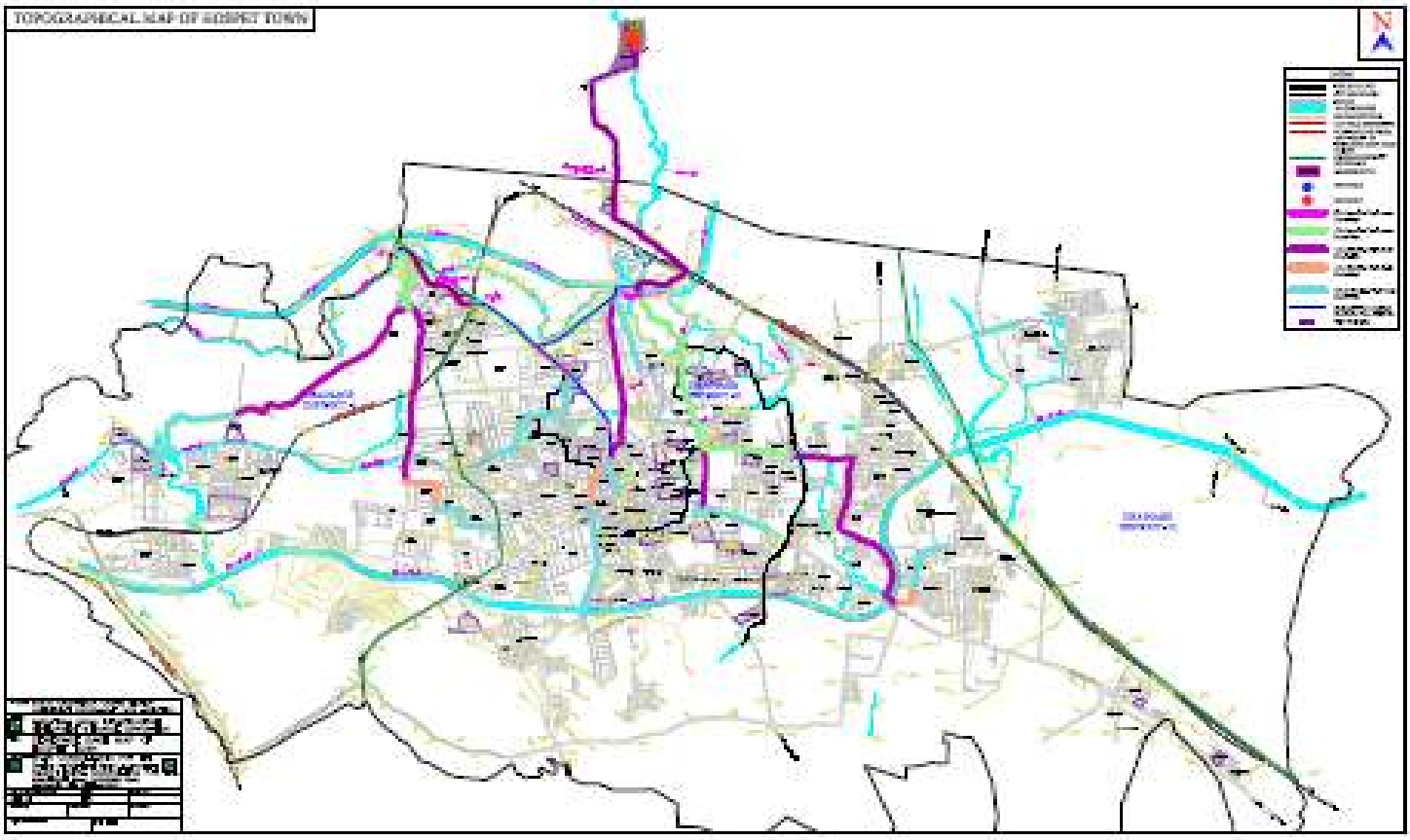
2.3.1 Sewerage System

As already mentioned, the existing sewer network has not been functioning due to incompletion of the pumping main from Ranipet pumping station to the sewage treatment plant and therefore there is no pumping from the wet well at Ranipet. This was further complicated due to lack of sewer cleaning through sewer connections. The result was that the complete network was clogged. It was also noticed that the existing pipelines laid were at a comparatively greater depth. Considering the physical and financial aspects of clearing the existing network for integrating with the new proposals, it has been decided not to take into account the existing network of pipes laid. Hence the entire sewer networks have been designed accordingly.

It is proposed to have sewerage system for this town. Preliminary data were collected and topographical survey taken up and completed. Based on the survey map, sewage collection points (wetwells) have been identified. There after the location of the sewerage treatment plant was identified considering the topography of the town. From the contours, it has been seen that practically there is a falling gradient from west to east except for a small segment in the western portion of the town. Hence from a practical point of view and also on technical grounds it is proposed to have the treatment facility on the north side of the town near Belagodu village. Based on the above considerations, the site for the proposed treatment facility is finalized with an extent of 15.34 acres. This location is about 2.8kms from Hospet city and also the main pumping station. Among the various technologies it is proposed to design and construct 27.00 MLD capacity of STP based on ASP technology.

The important sub-component proposed in the sewerage system is developing of a sewage treatment facility. In addition, it is also proposed to replace the existing sewage network for a length of 54 km and to provide new network in the uncovered areas to cater to future requirement till 2041. **Map 2** shows the lay out of proposed sewerage network with treatment facility.

Map 2 shows the lay out of proposed sewerage network with treatment facility.



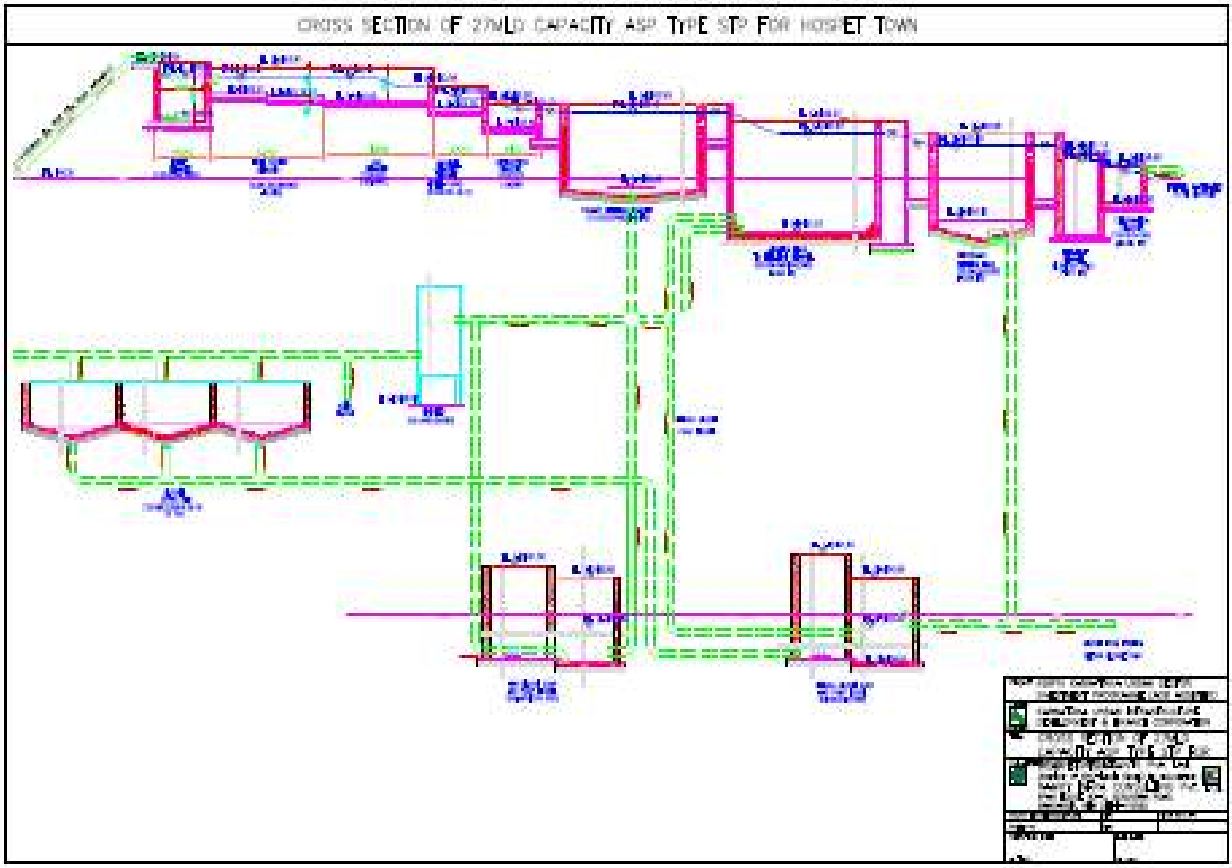

CROSS SECTION OF 27MLD CAPACITY ASP TYPE STP FOR HOSPET TOWN

Table 7: Proposed Sewerage System

1	Cost Estimation for Sewerage Network
2	Electrical works of 11KV express feeder main of 33KV from sub-station near Rama theatre to wet well-1, wetwell-2 and for sewerage treatment plant at Basavadurga village via. Amarawati and railway station
3	Providing and Laying 450 mm ductile iron rising main from wet well-1 to nearest manhole-No.1226
4	Providing Pumping machinery & D.G. set for wet well-No-1
5	Electrical control cum Generator room 4.00 x 5.00 m at for wetwell-1
6	Construction of Wet well no-1 (7.00m dia)
7	Providing and Laying 1100 mm PSC rising main from wet well-2 to sewerage treatment plant
8	Construction of Wet well no-2.00 (12 m dia)
9	Providing Pumping Machinery & D.G set for Wet well-2
10	Electrical control cum Generator room 8.00 x 5.00 m at for Wet well-2
11	Approach road to Wet well no.2
12	Construction of STP of 27.00 MLD capacity (ASP)

Source : DPR (Detail Project report)

The capacity of proposed Sewage Treatment Plant is 27.00 MLD and is designed to cater to a population of intermediate design year 2026 to serve projected population of 2,94,511. There are various options to treat the wastewater to the standards of either river discharges or for land disposal after treatment. The options like Attached Growth Aerobic or Anaerobic Systems or Suspended Growth Systems have been reviewed for selection of suitable technology. The cost of treatment and its operation and maintenance and also the requirement of skilled manpower, land availability are the prime issues while selecting the treatment option. It is always advantageous to go for a treatment process which has simple operational and maintenance aspects and therefore the Activated sludge process is proposed for Hospet. **Table 8** shows the Design parameters of STP.

Table 8: Design Parameters of STP

Parameter	Unit	Domestic Sewage	Design Influent	Design Effluent	CPCB standard
Design Flow	MLD	--	27.00	27.00	
Biochemical Oxygen Demand	mg/l	250	300	20	30
Chemical Oxygen Demand	mg/l	600	700	250	250
Total Dissolved Solids	mg/l	650	800	500	2100
pH		6.5-8.2	6.5 – 8.2	6.5 – 7.5	5.5 – 9.0

Source: * KUWSDB, Hospet and Design Standards

** CPCB standard to discharge effluent into Inland surface water & IS 2490 (1974).

The proposed treatment plant consists of preliminary, secondary and tertiary treatment units. The Preliminary Treatment Unit comprises of inlet chamber, bar screen chamber with bar screens, grit removal unit with Grit Hopper, Parshall flume or flow measuring unit with devices, Distribution Box, connecting channels and inlet weirs. There are arrangements to by pass the flow to the desired channels, through sluice gates of required dimension. The Secondary Treatments Units are Activated sludge process.

Table 9: Proposed Cost of Project and Operation & Maintenance

1	Total Cost	3982.00 Lakhs.
2	Cost of Operation & Maintenance	Rs. 142 lakhs

Source : DPR (Detail project report).

The Tertiary Treatment is proposed with chlorine disinfection and mixing baffles to mix the chlorine solution. The disinfected treated sewage flows into the natural nala. The green plantations have been proposed all around the STP site. There are provisions for access roads, lighting, and etc. with the total area completely fenced and entry into the Sewage Treatment Plant.

2.3.2 Water Supply

The proposed water supply system rehabilitation in Hospet aims at providing safe, adequate and reliable water supply to the inhabitants. The objectives of system improvement comprise:

(i) Improving the longevity of the individual components and the system;
(ii) Improving the operational performance of the components and the system; and
(iii) Reducing the loss of the water and increasing the utilizable output of the system.

The water demand of the newly extended areas would be met from the existing sources only and no source augmentation measures are proposed to cater to the town's need till 2011. Though the existing gross water available at the source is around 134 lpcd the net supply to consumer end is about 108 lpcd, the supply at the consumer end is considerably low due to losses in the system (estimated system losses is approximately 52 percent). Hence, under the proposed Investment Program more stress is laid on improving the existing system. The projected supply is taken as 100 lpcd at the consumer end which is substantially higher than the current supply at consumer end); the system is designed for a gross water supply of 115 lpcd accounting for system losses of around 15 percent. The following are the proposed rehabilitation measures under the water supply component.

Map 3 indicates the existing and proposed water supply coverage in Hospet.

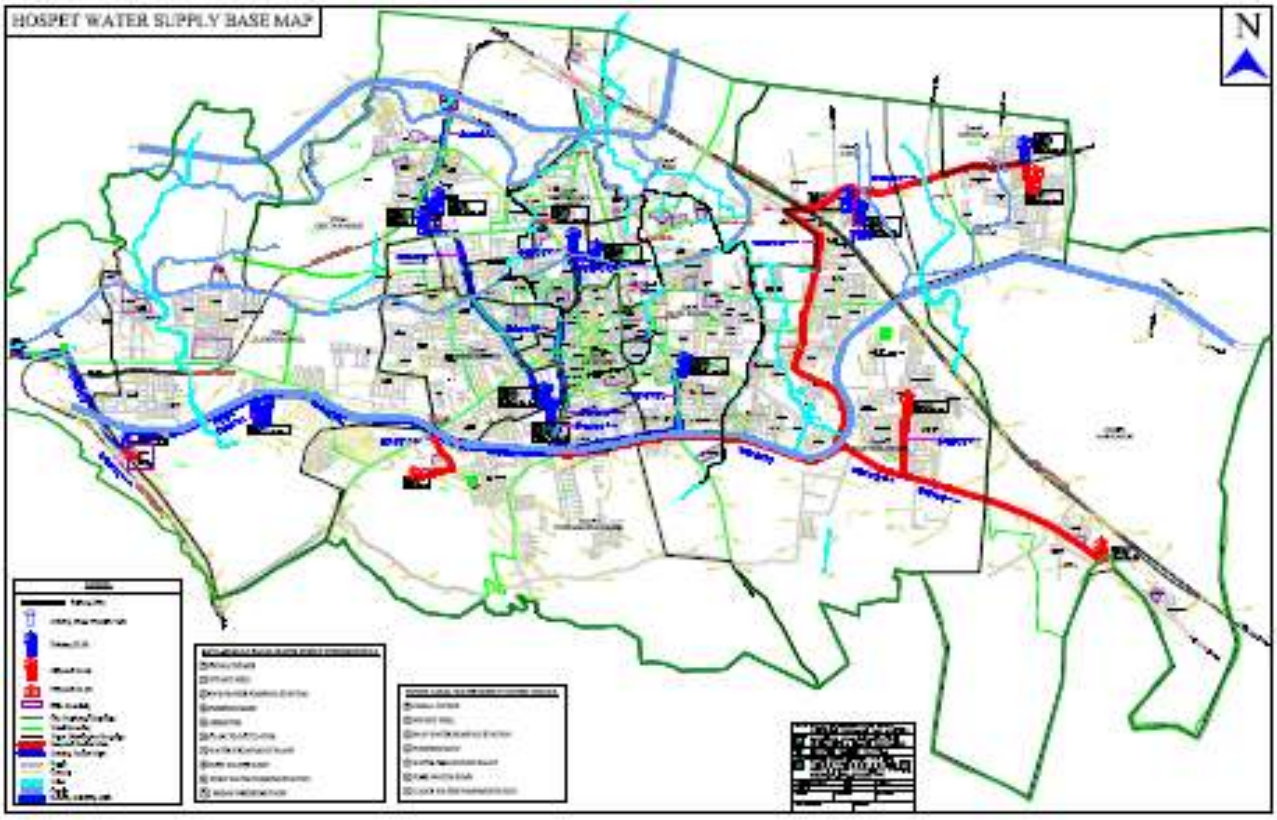


Table 10: Proposed Water Supply Sub-components

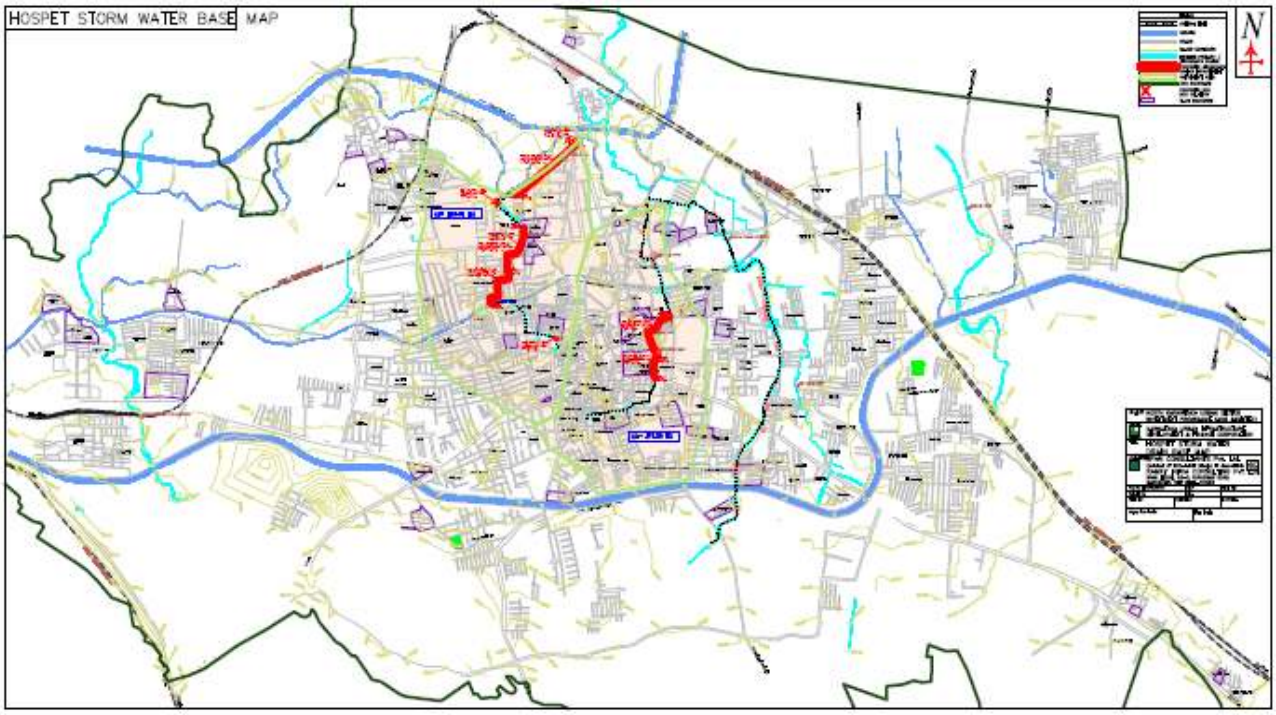
No.	Component
A.	**PROVIDING & FIXING OF BULK WATER METERS**
1	BULK FLOW METERS FOR EXISTING SOURCE TO SERVICE RESERVOIRS
2	BULK FLOW METERS FOR PROPOSED SERVICE RESERVOIR
B.	**HEAD WORKS, WTP & TRANSMISSION MAIN, REHABILITATION & STRENGTHENING**
3	REHABILITATION OF ELECTRICAL WORKS FOR RAW WATER PUMP HOUSE AT POWER CANAL
4	REHABILITATION OF ELECTRICAL WORKS FOR CLEAR WATER PUMP HOUSE AT POWER CANAL
5	RAW WATER PUMPING MACHINERY & ELECTRICAL WORKS AT RAYA - BASAVA CANAL WATER SUPPLY SYSTEM (368.37 LPS, 35 Mts. Head)
6	PURE WATER PUMPING MACHINERY & ELECTRICAL WORKS AT RAYA - BASAVA CANAL WATER SUPPLY SYSTEM (352.36 LPS & 50 Mts. Head)
7	ESTIMATE FOR RAPID SAND FILTER OF 9.08 MLD CAPACITY
8	PROPOSED RISING MAIN FROM PURE WATER SUMP TO BPT FOR RAYA-BASAVA CANAL WATER SUPPLY SYSTEM (813mm DIA & 150mtr LENGTH OF M.S.PIPE)
9	FEEDER MAIN FROM BPT TO PROPOSED ELSR's (11.853km LENGTH OF K-7 DI PIPE)
10	CONSTRUCTION OF 10.00 LAKH LITRES CAPACITY & 12MTS. STAGING ELSR AT VINAYKANAGAR
11	CONSTRUCTION OF 5.00 LAKH LITRES CAPACITY & 9.0 STAGING ELSR AT KARIGANUR
12	CONSTRUCTION OF 5.00 LAKH LITRES CAPACITY & 9.0 STAGING ELSR AT KONDANAYAKANAHALLI
13	CONSTRUCTION OF GROUND LEVEL SERVICE RESERVOIR AT VIVEKANANDNAGAR:5.00 LAKH LITERS
14	CONSTRUCTION OF RCC SUMP OF CAPACITY 70000 LITRES AT KARIGANUR
15	PUMPING MACHINERY & ELECTRICAL WORKS INCLUDING RCC HUME PIPE AT KARIGANUR SUMP (18 LPS & 22mtr HEAD)
C.	**CITY WATER SUPPLY SYSTEM DISTRIBUTION NETWORK OPTIMIZATION & STRENGTHENING**
16	PROPOSED DISTRIBUTION NETWORK PRIORITY 1&2 (149 KM LENGTH OF 90MM DIA TO 350MM DIA OF HDPE & DI PIPE)

Source : DPR (Detail Project Report)

2.3.3 Urban Drainage

Under this component, it is proposed to improve the condition of the existing nalas, namely, Hampi Nala, Nala from Jambhunath Nagar Road to Hampi Road and Nala from Chitawadigi to Tungabhadra River. These nalas are passing through the town and warrant clearing of all blockages and providing with properly designed built up sections at certain strategic locations. The construction may be in cement concrete for the base and stone masonry with cement plaster for the sidewalls. The drains also need to be desilted and cleared of obstructions by trees and weeds.

Map 4. Shows the layout of proposed storm water drain in the Hospet town



2.3.4 Urban Road Up gradation

Under this component the following improvement to the road network are proposed. Initially based on the transportation and traffic survey, most of the roads in Hospet were identified for improvement, however, due to limited funds under NKUSIP, only the following roads are taken up for improvement based on traffic and transport importance

Table 11: Proposed Road Up gradation Sub-components

Name	Proposed Improvement	Length
		Km
Sugar Factory Road	Strengthening the existing road by providing PCC, 50BM, and 20 MSS	3.90
Link from Road 1 to Road 16	Strengthening the existing road by providing PCC, 50BM, and 20 MSS	2.10

Source : CLIP Report, Hospet Town. .

2.4 Investment Program Implementation Schedule

The Investment Program is to be implemented over an six-year period, commencing in FY 2009-10 and civil works construction starting in FY 2009-10. Completion is scheduled by end FY 2015-16

2.5 Investment Program Benefits

In view of the lack of basic infrastructure facilities and its adverse impacts on the environment and also on socio-economic characteristics, the proposed Investment Program aims at providing infrastructure facilities such as adequate and safe water supply and sanitation facilities, to overcome negative environmental impacts. Investment Program benefits and beneficiaries in the Hospet are provided below.

2.5.1 Water Supply System Improvements

Based on Government of Karnataka (GoK) Water Policy, 2002, and subject to supply criteria for the region of 100 lpcd at consumer end (115 lpcd at source and accounting for 15 percent transmission and distribution losses), the focus of water supply investments in Hospet is on water conservation by reducing leakages through rehabilitation and rectification of water supply systems. With a basic assumption of daily water supply to consumers in two shifts (four hours in the morning and four hours in the evening), it is proposed to carry out the following improvements.

(i) Improvements to the existing Water Supply Schemes;
(ii) Provision of flow meters at head works, treatment plants, along transmission system, and at service reservoirs;
(iii) Installation of two pumps in the new intake works on Raya Basavanna canal
(iv) carry out leak detection and rectification at bulk supply works, and along the distribution network;

(v) Supply and laying of distribution system for 149 km (covering 100 percent of road length in 2011) along with 12,500 house service connections (catering to 49,000 households and covering approximately 90 percent properties in 2026).
(vi) Up gradation of existing filter capacity to meet interim demand of 2026.
(vii) Providing additional transmission main to convey treated water to newly propose four service reservoir.

Benefits arising from improved water supply comprise

(i) Reduced risk of water-borne diseases due to access to potable and adequate water supply;
(ii) Reduced ground water exploitation; and
(iii) Reduced time and costs in accessing alternative sources of water.

Investment Program beneficiaries will comprise households with existing connections and households with new connections who previously obtained municipal water from stand posts. The number of households benefiting and their distribution by socio-economic category is shown in **Table 12** There could also be benefits to households, which continue to use stand posts due to better facilities, less crowding and time spent at the stand posts; however, the data required to quantify these benefits are either not reliable or not available. **Table 12** indicates the following results arrived from the socio-economic baseline survey conducted in the town.

Table 12: Water Supply Component Investment Program Beneficiaries (2026)

Details	Value
HHs with existing connections (2004)	
No of households	8,089
Average HH size	5.00
Total connected population	42,620
% of population covered	25%
HHs with new connections (2026)	
No of additional households	41,000
Total beneficiary HHs	49,000
Total beneficiary population (Projected)	2,94,511
% of Population covered	90%

Source: DPR Hospet Town

Salient features of Proposed water supply schemes		
	Proposed source of water	Canal
	Quality of water source	Good
	Rehabilitation to electro mechanical equipments for power canal water supply system	2 Nos.
	Water supply distribution network	149 Kms.
	Pure water pumping main from pure water sump to BPT	150 mtr.
	Proposed Pumping Machinery for Raya – Basava canal water supply system (Raw & Pure water)	2 Nos. (for each system)
	Proposed Feeder Main	11.85 Kms.
	Proposed ELSR's	10 Lakh, 5 Lakh 2 nos. & 5 Lakh Ltr GLSR

Source: DPR Hospet town.

2.5.2 Sewerage System Improvements

Benefits arising from the provision of a well reticulated sewerage network and safe treatment and disposal of sewage comprise

I. reduced incidence of water-borne diseases;
II. improvement in public health conditions;
III. reduction in risks of ground water contamination;
IV. stoppage of sewage flow in open storm water drains and consequent health hazards resulting from stagnating sewage pools;
V. reduced risk of treated water supply contamination;
VI. reduced health risk of agricultural labourers due to usage of raw sewage for irrigation;
VII. reduced risk of contamination of agricultural fields; and (viii) availability of treated effluent for agricultural purposes.

Investment Program beneficiaries will be households getting new connections through proposed sewer lines under this Investment Program. Households who are getting new connections will gain from improved environmental sanitation conditions through properly functioning sewerage system. About 52 percent of the projected population of 2011 will be the beneficiaries of the proposed sewerage improvement Investment Program, as indicated in the following table.

Table 13: Sewerage Component Investment Program Beneficiaries

Details	Value
HHs with existing connections (2004)	
No of households	8,089
Average HH size	5.00
Total connected population	42,620
% of population covered	30%
HHs with new connections (2026)	
No of additional households	41,000
Total beneficiary HHs	49,000
Total beneficiary population (Projected)	2,94,511
% of Population covered	90%

Source : DPR Hospet town.

2.5.3 Drainage System Improvements

Benefits arising from improvement in the drainage system comprise (i) reduction in blocked drains and canals and overflowing of culverts, thereby reducing adverse health impacts on residents in low-lying areas; and (ii) improvement in health and environmental conditions due to non-incidence of water stagnation and mosquito breeding; (iii) reduction in pollution risk of downstream water bodies; and (iv) direct benefits to households from avoided flood damage costs and work time lost.

Investment Program beneficiaries will comprise the households located within the drainage catchments areas with the improved environment and amenity provided by a proper functioning drainage system.

Table 14: Drainage Component Investment Program Beneficiaries (2011)

Details	Value
No. of HHs in catchment area (2011)	
Numbers	20,347
% of HHs affected by flooding	13.16%
Total beneficiary HHs	2,677
Average HH size	5.00
Total beneficiary population	15,454
Projected population	206,090
% of population covered	7.50%

Source : DPR (Detail Project Report) Hospet Town

Proposed Drainage system		
1	Improvement works in Storm water drain	1.92 Km
2	Cost of project	200 Lakhs

2.5.4 Urban Roads Improvement

The improvements would increase the effectiveness of the road space by providing improved riding surfaces and removing impedances to the flow of traffic. This improvement reduces the effort or inconvenience of travel between the origin of the traveller and the destination offering these activities. Benefits of road improvements comprise (i) reduced dust generation due to improved road surface; and (ii) optimum fuel consumption due to improved vehicle speeds.

2.6 Investment Program Alternatives

The environmental suitability of the proposed components are judged through the selected location and proposed process/technology during both the construction and operation phases. The interaction and the level of interference with the surrounding land use determine the environmental sustainability of the Investment Program components. However, the components proposed under NKUSIP are basic urban infrastructure services, most of which are location fixed providing scope for alternatives only in terms of technology, which again are limited. However, facilities such as sewage treatment plants offer variety of technologies. The following table shows environmental suitability of the selected alternatives.

Table 15: Investment Program Alternatives

Sub- Component	Suitability of Selected Alternative
Sewerage System	Sewerage systems based on gravity flow are preferred over systems with pumping of sewage. The proposed gravity system is simple in operation and requires less man power and, importantly, does not require energy. There are various options to treat the wastewater to the standards of either river discharge or for land disposal after treatment. Options like Attached Growth Aerobic or Anaerobic Systems or Suspended Growth Systems may be adopted. The availability of land for establishing a treatment plant, the cost of treatment and its operation and maintenance are prime issues considered for selecting suitable treatment options. Availability of land provides reason to adopt treatment technologies with minimal operation and maintenance costs. Based on these considerations, Activated Sludge Process have been proposed for the Hospet town at Bellagodu village.

Sub- Component	Suitability of Selected Alternative
	The location of the sewage treatment plant for Hospet is selected based on the topography to provide for gravity flow till the disposal point. Hospet presents unique geographical setting in terms of its topography and the natural resources. The town and surroundings can be classified into three categories (i) southern side of the town; (ii) northern side of the town; and (iii) Hospet town, which divides the north and the south parts. The town slopes predominantly from south to north direction. The southern peripheral area of the town, located on the higher elevation is characterized by barren lands and hilly areas with rich iron ore content where mining activities are predominant. In contrast, the northern periphery of the town presents flat terrain, characterized by fertile black cotton soil and coupled with abundant irrigation facilities. This part of the town has vast lush green agricultural fields. Hospet is situated between these two different, but economically potential natural resources; there is no wasteland available in the vicinity. **Alternative 1:** The existing STP site, which is located on the southern side of the town at a higher elevation, is currently not in working condition. This is mainly because of its location disadvantage that demands high energy requirements for sewage pumping. In addition to the high energy costs, non-availability of adequate power supply and high man power requirements for maintenance and operation of the system has rendered the existing STP unusable. The environmental consequence of high energy consumption and the spatial growth of the town towards the existing STP site provide substantial reasons for selecting an alternative option. **Alternative 2:** As the town slopes predominantly from south to north, a site in the northern side of the town was considered. Due to availability of good irrigation facilities no waste land is available and therefore a site adjacent to the existing wastewater stream in irrigated lands has been selected for establishing a STP (capacity 27 mld , area required 15.34 acres). Further, this site has proper access with an approach road and requiring no additional land acquisition. Hence, this site was found most suitable for the STP. Only irrigated land is available for sewage treatment as it is situated at lower levels. Hence, despite the higher initial capital costs, the long-term operational costs through alternative technologies provide strong reasons for acquiring the irrigated land.
Storm water drainage	Improving existing storm water drain so that storm water is properly and adequately drained without overflowing and does not lead to flooding in low lying areas.

Water Supply	The best alternative for water supply is to design the system based on gravity flow. However, due to topography and required pressure at the consumer end, the system is designed as partly gravity and partly pumping. As the existing system losses are on a higher side (30 percent), reducing the losses and improving the efficiency of the system is identified as an important component under NKUSIP. This is considered as an alternative for source development.
Roads upgradation	Roads considered for improvement are selected based on the traffic and its importance in connectivity and environmental and social issues involved. No acquisition of land/structure is involved in the road improvement. It involves no tree cutting. The width of road widening is proposed based on the availability of width at the site and it is proposed that the total road width will be varied to accommodate with in the available width.

CHAPTER - III
DESCRIPTION OF THE ENVIRONMENT

3.1 Environmental Profile of Hospet

3.1.1 Introduction

Geographically, Hospet is situated at 15^0 29' North latitude and 76^0 48' East longitude at an altitude of 467 m above Mean Sea Level. Hospet is one of the educational, administrative and trade centre of the State. The Tungabhadra Multi-purpose Dam is located 3 km from the town. A mega steel plant, the Jindal Vijayanagar Steel Plant is located 30 km from the town. Owing to the presence of iron ore reserves, intensive mining activities are carried out in the area. The agricultural development around the town is extensive due to the presence of the Tungabhadra Dam.

3.1.2 Physiography

The town is located beside a hill rock and the topography of town is generally plain and slopes towards north. The geological formations and surrounding areas of Hospet are of anchean origin occurring in elongated bands of Dharwar formations, which is a source for rich mineral wealth. The economic minerals associated with this formation are Manganese, Iron ore, Gold, Copper, Mica etc. The Hospet and surrounding areas are well known for their un-tapped resources. The estimated iron ore in the Sandur and Hospet belt is about 1,500 million tons with 65 to 70 percent of iron ore content.

3.1.3 Seismology

As per the seismic zoning map of India, the Hospet town falls under the Zone II, which is the lowest earth quake risk zone in India. This zone is termed as "low damage risk zone".

3.1.4 Climatic Conditions

Hospet falls under arid region of the state of Karnataka. The climate of the town is characterised by dry weather during major parts of the year and very hot summer temperatures are experienced during the periods of March to May. The climate is generally dry and the mercury level goes as high as 43^0C during April and May and the minimum temperature will be around 15^0C during the months of December and January. The mean maximum temperature during the months of March to May is above 39 ^{0}C. The following table shows the mean temperature values, As there was no meteorological observatory located at Hospet, the data presented here is of the observatory located at Bellary, around60 km east of Hospet. This data is considered as representative data as both the towns are located in the same physiographical zone and also they are closely located.

Table 16: Mean Maximum and Mean Minimum Temperature (in ^{o}C)

Month	Long term normal (30 Years) – Mean				2004 (Actual) – Mean	
	Daily Max	Daily Min	Highest in a month	Lowest in a month	Max daily	Min Daily
Jan	30.8	17.2	33.3	14.5	32.3	17.5
Feb	33.9	19.6	36.7	16.4	35.7	19.2
Mar	37.4	22.7	39.8	18.5	39.7	22.7
April	39.0	25.5	41.4	22.2	39.5	26.0
May	38.1	25.6	41.1	21.6	36.3	25.2
June	34.0	24.6	38.0	21.5	34.5	24.5
July	31.4	24.0	34.7	21.9	33.5	24.6
Aug	31.3	23.5	34.0	21.8	32.7	24.3
Sep	31.7	23.0	34.8	20.9	32.2	23.7
Oct	31.5	22.3	34.2	19.4	32.1	22.3
Nov	30.2	19.6	32.7	16.2	--	--
Dec	29.5	17.2	31.9	14.4	--	--

Source: Meteorological Centre, Bangalore

The town receives Southwest monsoon during the period of June to September and the period between the months of October and November can be termed as post monsoon months. The relative humidity varies from 22 to 65 percent, and is generally higher during the southwest monsoon season ranging from 52 to 70 percent. The town experiences scanty rainfall and the long term annual average rainfall is 530 mm. The rainfall is confined and about 60 percent of the annual rainfall is received during the months of June to September. The maximum rainfall is registered during the month of August.

The region is continuously experiencing below normal rainfall during the last four year. The actual rainfall recorded in the year 2002 was 306 mm while in 2003 it was 190 mm. **Table - 17** shows the climatologically details of Hospet town. Following wind roses shows, the wind blows predominantly from west during June to September while from November to March the predominant wind direction east. Most of the winds occur in the range of 12-19 kmph, however during the June winds of more than 19 kmph also occur.

Table 17: Climatological Characteristics of Hospet

Month	Long term normal (30 Years) – Mean				2004 – Actual		
	RH Max	RH Min	Wind Speed	Total Rainfall	Mean RH 0830 Hrs	Mean RH 1730 Hrs	Total Rainfall
	%	*%*	*Kmph*	*Mm*	*%*	*%*	*Mm*
Jan	72	38	4.9	0.4	69	39	0.0
Feb	60	31	5.6	0.7	53	31	0.0
Mar	53	27	5.9	3.3	48	25	0.0
April	56	30	6.7	25.4	57	35	71.0
May	64	37	10.3	63	71	47	34.0
June	71	53	13.4	52.2	70	53	40.0
July	76	62	14.1	55.6	71	55	1.8
Aug	76	61	13.5	50.7	67	54	0.7
Sep	77	57	11.1	124.4	77	61	60.0
Oct	75	56	5.6	109.8	77	63	5.0
Nov	72	50	4.8	30	--	--	--
Dec	74	45	4.4	13.7	--	--	--

Source: Meteorological Centre, Bangalore

Fig 1: Wind Rose Diagram of Hospet (0830 Hrs and 1730 Hrs**)**

0830 HRS 1730 HRS

Source: Meteorological Centre Bangalore (Based on the observation data of 1969–87, Bellary)

3.1.5 Surface Water

The River Tungabhadra, one of the important rivers in the South India, flows south to north along the western side of Hospet at around 3 km from the town and takes a turn towards east forming the northern boundary of the Bellary District at about 5 km from the town. The river rises in the Western Ghats in Karnataka and flows through the states of Karnataka and Andhra Pradesh for a length of around 530 km, before joining the River Krishna. Tungabhadra dam, constructed across the river at Hospet, is the main source of water supply in the region. As the Tungabhadra dam is located in proximity, four main canals, the High Level Canal (HLC), Low Level Canal (LLC), Power Canal and Raya Canal, flow through the town.

It may be noted that this quality data is provided for over all understanding of the river quality and does not represent water quality near the town. None of the river monitoring stations is located in proximity. The monitoring stations at Honnali and Harlahalli are located far up stream of the Tungabhadra dam and Ullanur is located far down stream. **Table -18** shows the water quality characteristics of Tungabhadra River.

Table 18: Tungabhadra River Water Quality, 2003

Parameter	Unit	CPCB Standards for	Honnali Bridge			Haralahalli Bridge			Ullanur		
		Range	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Temperature	^{o} C	-	26	30	27	28	31	29	26	31	28
pH	-	6 - 9	7.3	8.9	7.9	7.2	8.8	8.1	8.3	9.6	8.6
Conductivity	mmohs/cm	-	84	360	207	73	500	285	25	117	76
D.O.	mg/l	> 4.0	7.0	7.6	7.2	7.0	10.5	8.2	6.4	7.3	6.7
B.O.D.	mg/l	< 3	0.4	2.3	1.6	2.8	5.1	3.8	1.0	5.2	2.3
C.O.D.	mg/l	-	22.0	22.0	22.0	52.0	52.0	52.0	37.0	37.0	37.0
Feacal coliform	MPN/ 100 ml	-	-	-	-	28	140	90	500	1333	852
Total coliform	MPN/ 100 ml t	500 - 5000	200	900	438	300	2400	1403	667	6000	2815
Nitrite	mg/l	-	0.004	2.12	1.06	0.01	0.100	0.05	0.001	0.027	0.007
Nitrate	mg/l	-	0.147	2.30	1.07	0.58	12.24	4.12	0.11	5.670	1.019

Source: Central Pollution Control Board (CPCB) - http://www.wbphed.gov.in/guidelinevalues.html

The CPCB classified the Tungabhadra river quality as 'C', which explain the pollution of river to an extent. The designated best use for the 'C' class water is indicated as "drinking water source after conventional treatment and disinfection". The presence of coliform, BOD and Nitrites shows the entry of wastewater into the river course. Hospet may be one of the potential sources of municipal wastewater entering the river.

However, as indicated previously, it is unlikely that the wastewater from Hospet would enter the river. The existing nala (stream), which carries most of the wastewater from Hospet, flows from south to north and travels about 5 km to reach the river. As the nala flows through the agricultural fields, wastewater is used for irrigation. The existing nala course is encroached upon for cultivation, and only during the monsoon the river course is visible. The agricultural fields are covered with irrigation canals and wastewater generally joins these canals and is used for irrigation purpose. It is noted that only during the monsoons stream runs full and joins the river downstream. Considering the quantity of wastewater of the town, high self purifying capacity due to heavy flows in monsoon and importantly the distant location of river, the possibility of impairment of river from the wastewater flows of Hospet can be ruled out.

3.1.6 Groundwater

Though major water supply for the town is from surface water sources, sizable population also depends on groundwater resources. The CMC supplies water from 20 bore wells to the areas not covered by the piped water supply and also these bore wells function as supplementary source to areas, which face water shortage. About 0.23 MLD of water is supplied from groundwater sources. In addition, 16 bore wells, fitted with hand pumps, are also in use. **Table -19** indicates the fluctuation in the depth of water table at Hospet. Based on the monitored readings of 2002-2004, it is observed that the water table depth is shallow and varies between 1.71 and 3.24 m. Though the rainfall during 2002-2004 was below normal, there were no major fluctuations recorded in the groundwater depth. This may be attributed to the groundwater recharges from vast irrigated lands around the town.

Table 19: Groundwater Levels in Hospet

Month	Depth of Water Table (in M)		
	2002	2003	2004
January	2.43	3.1	2.7
February	2.33	2.85	2.7
March	2.45	2.5	--
April	2.7	2.96	3.04
May	2.75	3.13	--
June	3.02	3.24	2.88
July	2.33	3.08	2.55
August	2.37	2.32	2.38
September	2.43	2.84	2.12
October	1.71	2.02	2.07
November	2.65	2.44	2.58
December	2.7	2.82	2.72

Source: Department of Mines & Geology

Table - 20 indicates the groundwater characteristics in the area. Most of the monitored parameters are exceeding the desirable limit specified under IS 10500 - 1991 for drinking water usage. However, the values are under permissible limit, which is the threshold limit in the case of non-availability of alterative source.

Table 20: Groundwater Characteristics in Hospet

Parameter	July 2003*	November 2003*
pH	8.4	7.5
Total Hardness	220	400
TDS	325	1092
CO3	4.48	0
HCO3	203.4	464
Cl	NA	264
SO4	25	110.5
NO3	5.3	90.2
Ca	32	64
Mg	34	58.3
Na	45.6	250
K	0.3	1.3
F	0.9	0.75
Fe	0.11	0.13

Source: Department of Geology and Mines

* all units are mg/l except pH

3.1.7 Air Quality

Hospet is known for a one of the mineral rich town in Bellary district. There are several mining and industrial activity carried out in and around the hospet town which result in emission of air pollutant in the atmosphere in quantity well within the permissible limit prescribed by Central Pollution Control Board. The data collected for Bellary district from Central Pollution Control Board website shows total suspended particulate matter is in the range of 130.44 to 140.22 microgram per cum metre.

3.1.8 Flora and Fauna

There are no forest areas in and around the town and there are no sensitive environmental features such as National Parks, Wetlands, and Biosphere Reserves in the Bellary District. No endangered/protected species of either flora or fauna are found in the town and their surroundings.

3.1.9 Socio Economic Characteristics

Demography: Hospet population has grown tremendously from 114,329 in 1991 to163,284 in 2001 indicating a decadal growth rate of 42.83 percent. The increase in the population can be attributed to the presence of large number of small scale industries, trade and commerce activities and the tourism related activities, which are providing good opportunities for employment generation. However, significant share of population growth is because of delimitation of CMC limits during 1991-2001 for addition of new areas. The City Municipal Council (CMC) jurisdiction extends to 35 wards covering an area of 50.92 sq. Km

The gross population density of the town as per the 2001 population is 3,200 persons/sq. km. The Kanchagarper areas, J.P.Nagar area, Patel Nagar, Nehru Colony, Chitawadigi area, Jabal areas of the town are thickly populated when compared to the fringe areas of the town. The sex ratio (2001) in Hospet was 957, which is lower than the district figure of 969 and higher than the state urban average of 940. The town has recorded a literacy rate of 65 percent, which is higher than the Bellary district literacy rate of 49.4 percent but lower than the State urban average of 72 percent. The male literacy rate (72 percent) is much higher than the female literacy rate (57 percent).

Economic Base: Owing to its natural resource base coupled with good irrigation facilities the Hospet town is the focal point for agricultural, industrial and trade and commerce activities. The town has a sound industrial based development (mineral and agricultural based) as well agricultural development. Principal crops cultivated in the area are paddy, sugar cane and cotton; rice and cotton are exported in large scale from this region. Mineral resources such as Ion ore, Manganese, Lead ore, Quartz and ornamental stones are available in large quantity in Hospet taluka. The estimated iron ore in the Sandur and Hospet belt is about 1,500 million tons with 65 to 70 percent of iron content.

Poverty: Urban slum dwellers in Hospet constitute 18.6 percent of the town's population. KSCB indicates that 30,399 persons reside in the town's slums. BPL (below poverty line) survey conducted under GoK's Nirmala Jyothi Scheme in the year 2003 identified 61,422 PL population in Hospet town. According to this survey, about 38 percent of the town population live below the poverty line. The total BPL families residing in Hospet town is 13,052; this accounts for about 42 percent of the total families in the town.

3.1.10 Historic and Cultural Places

The Hospet and surroundings has rich history dating to back 14th Century AD. History indicates that the Vijayanagar King Krishnadevaraya built Hospet between 1509 and 1520 AD and developed Hampi, 13 km from Hospet, as the capital of Vijayanagar Empire. Hampi is an important historical town and is a World Heritage (UNESCO) site. Later, the Sultan of Bijapur, King Hyder Ali of Mysore and Nizam of Hyderabad ruled this region.

However, there are no important monuments/historical sites in Hospet; these are confined to Hampi. None of the sub-project components are located in proximity of these sites.

3.2 Environmental Settings of Investment Program Component Sites

Hospet presents unique geographical setting in terms of its topography and the natural resources. The town and surroundings can be classified into three categories (i) southern side of the town; (ii) northern side of the town; and (iii) Hospet town, which divides the north and the south parts. The town slopes predominantly from south to north direction. The southern peripheral area of the town, located on the higher elevation is characterized by barren lands and hilly areas with rich iron ore content where mining activities are predominant. In contrast, the northern periphery of the town presents flat terrain, characterized by fertile black cotton soil and coupled with abundant irrigation facilities. This part of the town has vast lush green agricultural fields. Hospet is situated between these two different, but economically potential natural resources; there is no wasteland available in the vicinity.

The selection of sites for proposed infrastructure components such as sewage treatment plant site require considerable land, and is governed by these natural settings. The Sewage Treatment Plant (STP) site is identified in the northern side of the city due to its topographic advantage; due to non-availability of wasteland, an agricultural land is identified for establishing the STP.

3.2.1 Sewage Treatment Plant

The location of the STP site is vital from environmental considerations, as most of the impacts are site specific. The location of the sewage treatment plant is selected based on the topography to provide for gravity flow till the disposal point. The existing STP site, which is located on the southern side of the town at higher elevation, is rejected considering the high energy requirements and operational problems in sewage pumping. Also the city has been expanded in this direction bringing the developmental activity closer to the site. In view of all these issues, site for STP is thus selected in the northern side of the town in irrigated lands. This is the only location suitable for STP due to its topographic advantage. Further, this site has proper approach road and easily accessible requiring no additional land acquisition for approach roads. Salient features of the proposed STP site are presented below.

(i) The site is located at Belagodu Village onthe northern side of the town around 2 km from the existing wet well at Ranipet. An approach road to Basavandurga Village passes adjacent to the site; the existing wastewater stream of the town flows through the site. The site falls under the revenue village of Belagodu. The treated effluent from the STP is to be discharged into this natural channel that eventually joins Tungabhadra River at about 4 kmfrom the site. However, at present the untreated wastewater is used for irrigation and therefore it is proposed to provide the treated water for irrigation purpose.

(ii) Site to be acquired for the STP is agricultural land and spreads over an area of 15.34Acres. The land is predominantly under sugarcane and paddy cultivation.

(iii) The topography of the site is flat and is characterized by black cotton soil.

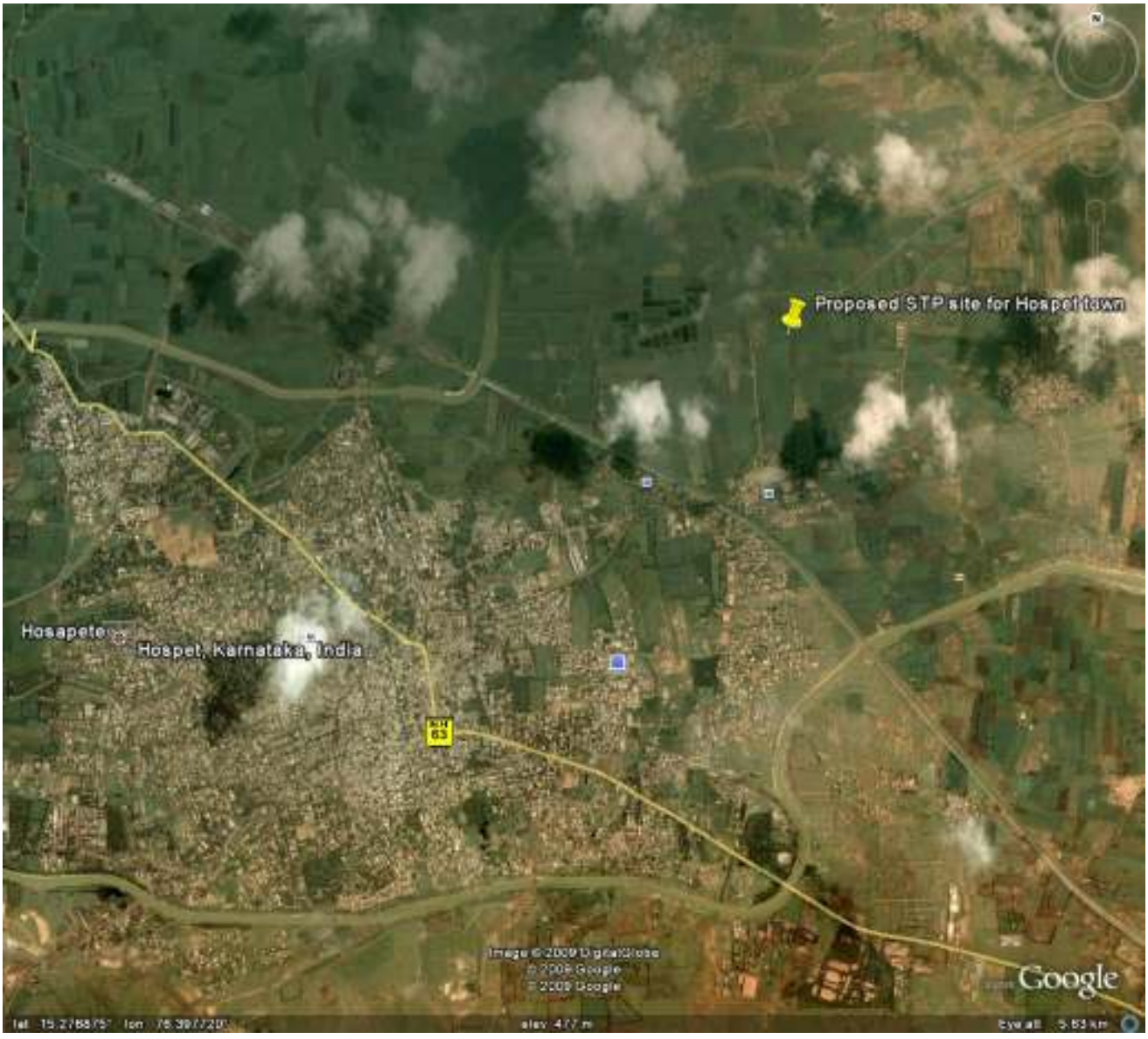
(iv) The depth of groundwater is shallow in the region.

(v) Due to availability of good irrigation facilities and fertile lands, water intensive crops such as sugarcane and paddy are cultivated in the area.

(vi) A tiny settlement, Belagodu, is situated at around 500 m west of the site. There are around 10 - 15 huts and thatched houses in the settlement. The main occupation is agriculture with most of them working as agricultural labourers.

(viii) Basavanadurga Village is situated on the northern side of the site. The peripheral houses of the village are situated at around 500 m from the site. This area is sparsely developed. The total population of the village is around 1,500; agriculture is the main occupation. However, main village is located far from the site.

Map : 5 Proposed STP site and surrounding



Photos shows proposed site of treatment plant.

3.2.2 Urban Drainage Upgradation

The roadside drains proposed for improvement cover over the entire town area. The primary drains proposed for rehabilitation for a length of 2 km are built structures, which are currently heavily silted and chocked with solid waste. The bed and walls of these drains are in poor condition.

3.2.3 Water Supply Rehabilitation

The proposed improvement to the water treatment plant and replacement of raw Water main from Power Canal to the First Stage Treatment Plant does not entail environmental issues. The expansion of water distribution network to the presently uncovered areas is proposed. The network will be laid in the areas along the roads, there is no acquisition of land will be involved and cutting of tress will be minimized. Water audit and leak detection

studies are essential for minimising losses and to improve the existing water supply system.

3.2.4 Urban Roads Upgradation

Roads are proposed for improvement in Hospet shall be Sugar Factory Road starts in the middle of the town and runs towards outskirts of the town. The other road (Road 16) traverses in the residential and commercial areas of the main town. In road improvement projects, most of the environmental issues are pertaining to the land use and the location of sensitive areas along the road corridor. The proposed improvements do not involve any land acquisition or disturbance to built structures and there will not be any cutting of tress. However, there may be inconvenience during the construction period, which again mainly depends on the land use and sensitive locations along the corridor alignment.

The site environment summarized is drawn from road inventory survey, social and environment survey conducted as part of the Investment Program. The following table shows the details of land uses and sensitive locations along the road alignment.

Table 21: Land Use Characteristics along the Road Investment Programs

Name of the Road	Land Use (%)		
	Residential	Commercial	Others
Sugar Factory Road	80	15	5
Link from Road 1 to Road 16	60	35	5

Chapter - IV

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential environmental impacts of the proposed infrastructure components are presented in this section. Mitigation measures to minimize/mitigate negative impacts, if any, are recommended along with the agency responsible for implementation. Monitoring actions to be conducted during the implementation phase is also recommended to reduce the impact.

Screening of potential environmental impacts is categorized into four categories considering Investment Program phases: location impacts and design impacts (pre construction phase), construction phase impacts and operations and maintenance phase impacts.

(i) Location impacts include impacts associated with site selection, and include loss of on-site biophysical array and encroachment either directly or indirectly on adjacent environments. It also includes impacts on people who will lose their livelihood or any other structures by the development of that site.

(ii) Design impacts include impacts arising from project design, including technology used, scale of operation/throughput, waste production, discharge specifications, pollution sources and ancillary services.

(iii) Construction impacts include impacts caused by site clearing, earthworks, machinery, vehicles and workers. Construction site impacts include erosion, dust, noise, traffic congestion and waste production.

(iv) O & M impacts include impacts arising from the operation and maintenance activities of the infrastructure facility. These include routine management of operational waste streams, and occupational health and safety issues.

Screening of environmental impacts has been based on the impact magnitude (negligible/moderate/severe – in the order of increasing degree) and impact duration (temporary/permanent). **Table -22** shows the screening of impacts; N/T represents the lowest impact while S/P represents the highest impact. Numerator represents the Degree of Impact and denominator represents the Duration of impact.

Table 22: Screening of Impacts -

Duration of Impact	Magnitude (Degree of Impact)		
	Negligible(N)	*Moderate(M)*	*Severe(S)*
Temporary(T)	N/T	M/T	S/T
Permanent (P)	N/P	M/P	S/P

The following tables shows the potential environmental impacts of the sub-project components proposed for Hospet.**Table 23** presents the impacts of sewerage system up gradation; **Table 24** indicates water supply system impacts; **Table 25** provides impacts of urban drainage up gradation, and **Table 26** presents impacts of road up gradation measures.

Table 23: Environmental Impacts and Mitigation Measures of the Sewerage System

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
Location impacts				
Loss of land/lively hood due to development of STP	**N/P** The site selected for STP is irrigated agricultural land. The total area to be acquired for the construction of STP is 15.34 Acres. The land owners are predominantly small and marginal farmers.. There are no structures situated in this land.	Addressed in RP	ULB shall prepare and Undertake RP implementation; the CMC may seek assistance from Investment Program Consultants and NGOs.	Part of RP cost
Contamination of Groundwater resources due to leaching of leachates from Sewage treatment plant units (Activated Sludge Process).	**M/P** Though site specific data is not available at this stage, in general and as per site investigation in this part of Hospet ground water table is shallow. Hence there may be considerable impact on ground water resources.	No percolation of sewage/ treated water from the treatment units since the STP units will be constructed with the water tight RCC structure. Hence, sewage / treated water leachate will be minimum.	CMC Hospet	Part of design costs
Loss of amenity and odour nuisance to neighbours	**N/P** Due to sludge drying bed, the odour nuisance may be significant. Nuisance to farmers, agricultural labourers, inhabitants of Belagodu Village on the south-western side and Basavandurga Village on the northern side. These villages are located at 500 m. Reduction in land values is not envisaged because of availability of treated water for irrigation.	Development of physical separation and visual Screen around the facility will address this impact. A buffer zone in the form of landscaping and earthwork shall be created around the STP. Air dispersion modelling at detailed design stage. Due care will be taken developing landscape as per pollution control norms	CMC Hospet	Part of design costs

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
Design Impacts				
Discharge of partially treated sewage will have potential to pollute the agricultural fields.	**M/P** The treatment process chosen is simple and does not involve any complexities in design, construction or operation, thus ensures the treatment efficiency with least supervision.	The sewage retention period shall be fixed considering seasonal climatic variations. The effluent from the STP shall be confirmed to the following standards of discharge: • BOD < 30 mg/l • pH – 5.5 – 9.0 • Suspended solids < 100 mg/l The treated sewage is proposed to be used for irrigation/ plantation. Also, it will be suggested to sell this treated water to near by sugar industry to generate revenue for CMC.	CMC Hospet	N/a.
Nuisance due to leakage/ overflowing of sewers.	**N/P**	Regular maintenance will nullify the impact. Usage of appropriate maintenance equipment would substantially reduce the maintenance time.	CMC Hospet	N/a.
Nuisance due to mosquito breeding and bad odours from STP	**M/P** Habitation is located at 500 m. Predominant wind direction is from west and northwest, hence nuisance may be minimum, however, this may be significant during the winters, during which easterly and south easterly winds prevail.	Development of physical separation and visual screen around the facility will also address this impact. A buffer zone in the form of landscaping and earthwork shall be created around the STP. To avoid/reduce mosquito breeding, the banks ponds shall be kept clear of grasses and bushes, etc.	CMC Hospet	Part of design costs

Pollution due to improper sludge disposal methods.	**M/P** Desludging of sludge drying bed may be carried out once in a every 2 or 3 days, depending on the sludge generation Quantity of sludge generation will be considerable. Contaminated work area may cause health hazards.	Safe sludge handling methods shall be employed. Personal protection equipment such as gloves, boots, shall be provided to the workers. Sludge shall be dried in drying beds before its disposal inlow-lying areas or shall be used as manure. A sludge management plan shall be prepared and enclosed as a part of contract agreement to execute the work.	CMC Hospet	Part of O & M costs Preparation of sludge management plan (consultant time: one person week)

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
Construction Impacts				
Impacts to livelihood	**M/T** The laying of sewerage line will disturb the day to day activities of public such as shops, residence and also leads to un safety condition to them.	Maintain assess to business (shops) people by providing planks/ makeshift pathways, etc. While laying sewers through narrow streets and thick commercial establishments, the work will be planned to complete in short duration and care will be taken to avoid excavation of the entire road stretch in these areas.	Head Contractor/CMC Hospet	Preparation and implementation of site management plan.
Nuisance due to dust and noise; road blocking due to laying of sewer network; and, increased traffic flow due to vehicle movement for construction activities.	**M/T** The construction activities include significant quantities of earthwork. Dust generation may be significant as the dry weather condition prevails in the town. The proposed rehabilitation and laying of new sewers cover almost all the areas of the town. The impact of construction activities on the densely population areas of Kanchagarper, J.P.Nagar, Patel Nagar, Nehru Colony and Chitawadigi area may be considerable.	Construction material shall be stockpiled. Adequate arrangements for traffic diversions including erection of proper sign boards. Dust generation must be arrested by water spraying. Ensure usage of standard equipment to reduce the noise nuisance. Equipment shall comply with the noise levels of construction equipment laid out by the CPCB. High noise generating activities including material unloading shall be avoided during nights. The surrounding people shall be informed, especially in densely populated area, of nature and schedule of the high noise generating activities, if any A construction site management plan shall be prepared. Poor performance of the contractor may potentially exacerbate these impacts and therefore qualified contractors to be appointed. The contracted work includes the implementation of construction site management plan, which will address these issues.	Head Contractor/CMC Hospet	Preparation and implementation on of site management plan (preparation : consultant time: one person week; implementation on:1 day per fortnight of construction management time)
O & M Impacts				
Odor nuisance	**M/P** Habitation is located at 500 m from the site.	Buffer zone in the form of landscaping and earthwork shall be created and well maintained around the site.	CMC Hospet	Part of O & M costs

Potential pollution of agricultural fields	**N/P** As the STP is designed for stream discharge standards, the impact may be minimal. However, the overloading of STP may exaggerate these problems.	When system gets over-loaded, adding oxidation agents and plant foods such as sodium nitrate must simulate the algae growth. The effluent discharge shall confirm to the following standards: • BOD < 30 mg/l • pH – 5.5 – 9.0 • Suspended solids < 100 mg/l	CMC Hospet	Part of O & M costs

Impact Description	**Significance of the Impact**	**Mitigation Measures**	**Implementation Responsibility**	**Preliminary Costing**
Pollution and health hazards due to improper sludge disposal methods	**M/P** Quantity of sludge generation will be considerable. Contaminated work area may cause health hazards.	Safe sludge handling methods shall be employed - Personal protection equipment such as gloves, boots, shall be provided. Sludge shall be dried in drying beds before its disposal. This sludge may be used as manure for non- food crops or land filled. Sludge management plan shall be implemented.	CMC Hospet	Part of O & M costs
Mixing of non-municipal wastewater may interfere with the treatment process.	**N/P** Possibility of mixing of industrial effluent is very low as there are no industries in the sewerage zones with problematic discharges.	Wastewater from industries shall not be allowed to enter the sewers. In case of discharges into sewers the effluent shall confirm to the CPCB/KSPCB standards: • BOD < 350 mg/l • pH – 5.5 – 9.0 • Suspended solids < 600 mg/l • Arsenic(as As). <0.2 • Mercury (As Hg), mg/l, max.0.01 • Lead (as Pb) mg/l, max 1.0 • Cadmium (as Cd) mg/l, max 1.0 • Copper (as Cu)mg/l, max. 3.0 • Zinc (as Zn) mg/l, max. 15 • Nickel (as Ni) mg/l, max.3.0	KSPCB	N/a.

Impacts due to illegal tapping of sewage for irrigation purpose from trunk sewers: .	**M/P** Trunk sewers traverse agricultural fields. Illegal tapping was observed. Probable contamination of agricultural lands and groundwater; potential hazards due to entering of contaminants into food chain. Impact on the working condition of the STP due to reduced inflow	illegal tapping of sewage from the sewer lines shall not be allowed. Regular maintenance and constant check would reduce the problem.	CMC Hospet	Part of O & M costs
Nuisance and pollution of ground/surface water due to overflowing/choking of sewers.	**M/P** Irrigation canals traverse the town and the groundwater depth is shallow in the northern part of the town	Regular maintenance will nullify the impact	CMC Hospet	Part of O & M costs

Table 24: Environmental Impacts and Mitigation Measures of Water Supply Rehabilitation

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
Location impacts				
Since the location of rehabilitation Work will be at existing facilities, and the existing environment is not a sensitive environment, no location- specific impacts are envisaged.	N/a.	N/a.	N/a.	N/a.
Design Impacts				
Since the location of rehabilitation work will be at existing facilities, and the existing environment is a built environment, no design-specific impacts are envisaged.	N/a.	N/a.	N/a.	N/a.
Pollution and health risks due to improper handling and disposal of sludge from water treatment plants	**M/P** WTP sludge may contain harmful substances including the alum sludge.	Safe sludge handling methods shall be employed - Personal protection equipment such as gloves, boots, shall be provided. Sludge shall be dried in drying beds before its disposal. This sludge may be land filled.	Hospet CMC	Part of O & M costs Preparation of sludge management plan (time: 1 person per week)
Construction Impacts				

Impacts to livelihood Road blocking due to laying of water supply network and increased traffic flow due to vehicle movement for construction activities; inconvenience to the local community.	**M/T** The laying of water line will disturb the day to day activities of public such as shops, residence and also leads to un safety condition to them. **N/T** Proposed network will be laid in the presently unserved fringe and extension areas. As these areas are not densely populated impacts due to construction activities may not be significant.	Maintain assess to business (shops) people by providing planks/ makeshift pathways, etc. While laying water line through narrow streets and thick commercial establishments, the work will be planned to complete in short duration and care will be taken to avoid excavation of the entire road stretch in these areas.	Head Contractor/CMC Hospet Head Contractor/CMC	Preparation and implementation of site management plan. Part of construction costs
Dust and noise from construction activities.	**M/T** Due to dry climatic condition the dust generation may be considerable. No major noise generating activities envisaged	The practices such as spraying of water to arrest dust shall be employed.	Head Contractor/CMC	Part of construction costs
Operation Impacts				
Recurrence of blockage and leakage problems.	**M/T** The existing system losses are around 52 %.	The leak detection and water auditing surveys shall be conducted. The leak restoration time shall be minimized.	Hospet CMC	Included in the Investment Program cost
Pollution and health risks due to improper handling and disposal of sludge from WTP	**M/T**	Implement the mitigation measures as in the Sludge Management Plan.	Hospet CMC	Part of O & M costs

Table 25: Environmental Impacts and Mitigation Measures of Drainage Upgradation

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
Location Impacts				
No location impacts are envisaged as the proposed activities are carried out with in the existing set-up.	N/a.	N/a.	N/a.	N/a.
Design Impacts	N/a.	N/a.		
No loss or encroachment of cultural or historical properties is envisaged.	N/a.	N/a.	CMC Hospet	N/a.
Construction Impacts				
Exposure of workers to contaminated soil during disilting and excavations.	**M/T** It is highly unlikely that the soil contains any heavy metals; however, considering the entering of domestic wastewater including sewage enters the open drains, this impact may be considerable.	Occupational Safety Plan shall be Prepared. This includes: (i) provision of personal protection equipment such as gloves, boots, (ii) Manual handling of waste shall be avoided as far as possible; and (iii) Training of workers on safe handling of sludge.	Head contractor	Part of construction costs
Disturbance to traffic due to storage of construction material/waste and material transport vehicles and other equipment.	**M/T**	Construction material shall be stockpiled to minimize traffic blockages.	Head contractor	N/a.
Nuisance due to noise	**N/T** Due to traffic movement and vehicles carrying construction materials.	Transportation of construction material shall be carried out during day time.	Head contractor	N/a.
Dust nuisance.	**M/T** Due to dry weather conditions of the Hospet, the dust generated due to the construction activity may be significant.	Dust suppression activities such as water sprinkling shall be employed.	Head contractor	Part of construction costs
Impacts due to disposal of contaminated Silt	**N/T**	N/a.	N/a.	N/a.
Pollution and silt loading of water bodies	**N/T**	N/a.	N/a.	N/a.
Public and worker safety	**N/T**	N/a.	N/a.	N/a.

Operation Impacts				
Silting and pollution of water bodies due to non-clearance of construction work site.	**M/T**	Ensure clearing of debris/waste and materials from the drainage bed and from the banks before pressing into operation.	CMC Hospet	N/a.

Table 26: Environmental Impacts and Mitigation Measures of Roads Upgradation

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
Location Impacts				
No location impacts are envisaged as the Proposed activities do not encroach into any sensitive land uses nor it involves any land acquisition.	N/a.	N/a.	N/a.	N/a.
Design Impacts				
Acquisition of land/structure is not envisaged. No trees will be cut as part of the Investment.	N/a.	N/a.	N/a.	N/a.
Construction Impacts				
Disturbance to informal commercial activities during construction.	**N/T** A detailed survey will be conducted at the design stage to identify hawkers and vendors.	Temporary relocation of hawkers and vendors; followed by reinstatement of original premises when the work is completed	CMC Hospet	As part of RP costs
Disturbance due to construction activities Road block and increase in traffic on the alternative routes and traffic congestion	**N/T** Low levels of traffic was observed on the proposed roads.	N/a	N/a	N/a
Nuisance due to noise.	**M/T** Proposed roads pass through residential areas.	Noise limits for construction equipments such as compactors, rollers shall not exceed 75 dB(A), as specified by CPCB. High noise generating activities, if any, shall not be carried out during the nights.	Head Contractor	N/a.

Dust nuisance.	**M/T** Proposed roads pass through residential areas. Due to dry weather condition dust nuisance may be considerable	Dust suppression activities such as water sprinkling shall be employed.	Head Contractor	Part of construction costs
Public and worker safety	**N/T**	Provide caution and signboards. Personal protection equipment such as gloves, boots, shall be provided to the workers.	Head Contractor /CMC	Part of construction costs

Chapter V

INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN

5.1 Institutional Requirements

Nodal Executing Agency (EA): Karnataka Urban Infrastructure Development & Finance Corporation (KUIDFC) is the nodal executing agency (EA) responsible for implementing NKUSIP. Investment Program implementation activities will be monitored by KUIDFC through a separate Investment Program Management Unit (IPMU), which will be set-up within KUIDFC. The Managing Director/KUIDFC will head the IPMU and will be assisted by an Executive Director to oversee the Investment Program progress. A team of senior technical, administrative and financial officials will assist the Executive Director in controlling and monitoring project implementation activities. KUIDFC will establish IPMU offices at four locations (in Bellary, Dharwad, Belgaum and Gulbarga) in the Investment Program area. All Investment Program decisions will be made by the Executive Director who shall operate from the IPMU, Dharwad; only interactions with GoK, GoI and ADB shall be conducted through the KUIDFC office at Bangalore.

Implementing Agency (IA). Implementation Agencies (IA) will oversee sub-project component implementation at the sub-project towns, where the Investment Program ULB will implement sub-project components. The responsibilities of the IA shall include (i) carrying out detailed surveys, investigations and engineering designs of individual infrastructure components; (ii) tendering, evaluating bids and awarding works, contract administration, supervision and quality control; (iii) measuring works carried out by the contractors and certifying payments; (iv) conducting public awareness campaigns and participation programs, (v) carrying out environmental assessments; and (vi) preparing monthly reports. The Investment Program Consultants (PC) will assist the Investment Program ULB in all the aforesaid activities; in the case of other IAS, the PC shall proof check designs and quality check construction quality.

` Thus, the responsibility fulfilling environmental requirements of GoI/GoK (for the project-components of STP,) and conducting required level of environmental assessment as per ADB guidelines lies with the borrowing ULB. The Investment Program Consultants will assist the ULB in this regard. The IEE/EIA reports prepared by ULB will be reviewed by the IPMU as per the ADB's Environmental Guidelines and forwarded to ADB for review and approval. In case of IEE reports, the ADB could delegate approval of IEE reports fully to the IPMU after reviewing the first two reports. However, all the EIA reports shall be sent to ADB for approval.

The mitigation measures identified through IEE/EIA are incorporated into the project cycle. Mitigation measures, which are implemented by the Contractor, shall form part of the Contract Documents. The other mitigation measures are undertaken by the ULB (itself or in assistance with Investment Program Consultants) as specified in the IEE.

Table 27: Institutional Roles and Responsibilities

Investment Program Phase	Activity	Details	Responsible Agency
Pre construction phase	Investment Program Categorization	Reviewing the REA and assigning project category (Ea/Eb/Ec) based on NKUSIP Environmental Assessment Guidelines and ADB Guidelines	IPMU
	Conducting EA	Conducting IEE/EIA based on the project categorization Conducting Public Consultation and information disclosure Preparation of SIEE/SEIA	Investment Program Consultants
	Investment Program	Fulfilling GoK/GoI requirement such as clearances from other Government	ULB
	Review of EIA/IEE	Reviewing the EIA/IEE and SEIA/SIEE Reports to ensure compliance of the report as per ADB Guidelines and approval of the same	IPMU
	Disclosure of SEIA/SIEE	Information disclosure -SIEE/SEIA reports should be made available to the public, and on request IEE/EIA also made available.	ULB
	Incorporation of mitigation measures into Investment	Incorporation of necessary mitigation measures identified in IEE/EIA in project design and in contract documents.	Investment Program Consultants
	Review of design	Review of design and contractual documents for compliance of mitigation measures	IPMU
Construction Phase	Implementation of mitigation	Implementation of necessary mitigation measures	Contractor
	Monitoring	Environmental monitoring as specified in monitoring plan during construction stage; monitoring of implementation of mitigation measures	Investment Program Consultants
	Preparation of progress reports	Preparation of monthly progress reports to be submitted to IPMU including a section on implementation of the mitigation measures	ULB in assistance of PC
	Review of progress	IPMU to review the progress reports, consolidate and send to ADB	IPMU

Investment Program Phase	Activity	Details	Responsible Agency
Operation Stage	Environmental Monitoring	Conducting environmental monitoring, as specified in the environmental monitoring plan.	ULB
	Compliance Monitoring	Compliance monitoring to review the environmental performance of sub- project component, if required and as specified in Monitoring	KSPCB

5.2 Training Needs

As described in the above table the IPMU will involve in monitoring the Investment Program implementation while the ULB will implement the Investment Program. It is therefore important that these agencies and particularly the officials involved in the Investment Program to have understanding of the ADBs environmental assessment procedures and also of environmental issues of various urban infrastructure components. As far as implementation of mitigation measures on site is concerned the Contractor will be involved. Hence, it is important to orient the contractors and supervisory staff towards the implementation of mitigation measures and their consequences. Hence, considering the existing capabilities of the agencies involved in NKUSIP, the following training program is suggested. The following table presents the suggested training program.

Table 28: Training Needs (2009 – 2015)

Description	Contents	Schedule	Participants
Program 1 Orientation Program / Workshop for and Implementing Agency and Executing Agency	**Module 1 – Orientation** • Investment Program Cycle of NKUSIP • ADBs Environmental Assessment Guidelines • EA requirements of NKUSIP • Indian Environmental Laws & Regulations relating to urban infrastructure project • Environmental impacts of urban infrastructure projects **Module 2 Environmental Assessment Process** • Project categorization as per ADB • IEE/EIA process, Formats and Reports • Identification of Environmental Impacts • Identification Mitigation Measures • Formulation of Environmental Management Plan • Implementation and Monitoring • Summary EIA/IEEs • Review of EIA/IEE reports to comply with ADB requirements • Incorporation of mitigating measures in the project design and contracts	2 days	• IPMU officials involved in the project • ULB officials involved in project implementation

Program - 2 Orientation Program / Workshop for Contractors and Supervisory staff	**Module 1 Implementation of Mitigation Measures** • Environmental issues related urban infrastructure projects during construction • Implementation of mitigation measures • Monitoring of implementation	1 day	• Contractors involved in NKUSIP • Supervisory staff of ULB
Program - 3 Experience Sharing	**Module – Experiences and Best Practices** • Experiences on implementation in terms of environmental concerns of implemented projects • Best Practices followed	1 day (every alternative year from the start of project, i.e. 2009)	• IPMU officials • ULB officials • Local NGOs

5.3 Environmental Monitoring Plans

The following tables indicate the recommended environmental monitoring programs for sub-project components in Hospet. The monitoring program has been developed based on the impacts identified on various environmental parameters in the earlier section.

Table 29: Environmental Monitoring Plan for Sewerage System

Mitigation Measures	Parameters to be Monitored	Location	Measurement	Frequency	Responsibility	Preliminary Costing
Preconstruction Stage						
Preparation of the Resettlement Plan (RP) in accordance with all applicable Acts/Guidelines including ADB's IR Policy.	RP documentation and progress of implementation	N/a.	Verification of RP documentation consistent with the Resettlement Framework, GoI, GoK and the ADB Guidelines. Monitoring based on RP/RF	One-off verification of designs Once during implementation and once just after implementatio	IPMU Apex NGO will assist the IPMU in monitoring	IPMU staff time as required
All location and design related mitigation measures. The measures are to mitigate the following through appropriate design of process and layout. (i) Groundwater contamination (ii) loss of amenity and nuisance due to badodours and mosquitoes (iii) sludge disposal and (iv) air dispersion modelling	Incorporation of mitigation measures in the design including air dispersion modeling for STP site.	N/a.	Verification of project design documentation	One-off inspection of designs	IPMU	N/a. Design checking
Construction Stage						
All construction related Mitigation measures: construction site management plan to control the dust and noise nuisance, and road blocks.	Incorporation of mitigation measures in the contract documents	N/a.	Verification of Contract Documents before signing the contract	One-off inspection of Contract Document	IPMU	N/a

Implementation of Construction site management plan providing access to businesses during pipe lying, etc. (i) noise & dust nuisance at site, (ii)Traffic Maintenance	Nuisance due to generation of dust and noise and also disturbance to traffic.	at the sewer laying sites and surroundings	Monitoring of air quality and noise is not required. Ensure the implementation of mitigation measures (usage of standard equipment complying with CPCB	Weekly	CMC Hospet with the assistance of Investment Program Consultants	Part of consultancy cost

Mitigation Measures	**Parameters to be Monitored**	**Location**	**Measurement**	**Frequency**	**Responsibility**	**Preliminary Costing**
Maintenance			Noise Standards for Construction Equipments); assess the situation through visual inspection and interviews with local people			
Operation Stage						
Check for contamination of groundwater/ agricultural fields due to discharge of untreated/partially treated STP effluent.	Groundwater quality	Well located at the Belagodu settlement	Changes in water quality	Prior to STP operation; thereafter, Quarterly (four seasons)	CMC Hospet	Part of O & M cost
	Influent wastewater quality	Inlet of STP	Analyze the wastewater characteristics including heavy metals such as Mercury (As Hg), Lead (as Pb) Cadmium (as Cd), Total chromium(as Cr), Copper (as Cu), Zinc (asZn) and Nickel (as Ni)	Monthly as part of plant operation	CMC Hospet	Part of O & M cost
	Treated wastewater quality at outlet discharge point of STP	Outlet of STP	Analyze the characteristics to comply with the PCB disposalstandards. These include: • BOD < 30 mg/l • pH – 5.5 – 9.0 • SS < 100 mg/l	Monthly as part of plant operation Seasonal (four seasons) as third party monitoring.	CMC Hospet KSPCB	Part of O & M cost

Implementation of the Sludge Management Plan - Check for health hazards due sludge handling	Health status of STP staff	N/a	Health check up for STP staff	Yearly once	CMC Hospet	Part of O & M cost

Table 30: Environmental Monitoring Plan for Water Supply works

Mitigation Measures	Parameters to be Monitored	Location	Measurement	Frequency	Responsibility	Preliminary Costing
Preconstruction Stage						
All related mitigation measures. The measures are to mitigate the following (i) sludge related impacts (ii) construction related impacts such as dust nuisance.	Incorporation of mitigation measures in the contract documents Sludge management plan	N/a. N/a.	Verification of contract documents Verification of plan	One-off verification before signing the contract One-off inspection	IPMU IPMU	IPMU staff time as required IPMU staff time as required

Construction Stage All construction related Mitigation measures: construction site management plan to control the dust and noise nuisance, and road blocks. Implementation of Construction site management plan providing access to businesses during pipe lying, etc. (i) noise & dust nuisance at site, (ii)Traffic Maintain ace	Dust nuisance Incorporation of mitigation measures in the contract documents Nuisance due to generation of dust and noise and also disturbance to traffic.	At the distribution network and transmissio n main replacement sites N/a at the water laying sites and surroundings	Monitoring of air quality is not required. Ensure the implementation of mitigation measures such as spraying of water; assess the situation through visual inspection and interviews with local people Verification of Contract Documents before signing the contract Monitoring of air quality and noise is not required. Ensure the implementation of mitigation measures (usage of standard equipment complying with CPCB	Weekly One-off inspection of Contract Document weekly	CMC Hospet with the assistance of Investment Program Consultants IPMU CMC Hospet with the assistance of Investment Program Consultants	Part of construction costs N/a Part of consultancy cost
Operation stage						
Check for blockage and leakage problems; reducing the water losses	Effectiveness of leak detection and water auditing in reducing the losses	N/a	Percentage of water losses	Yearly twice (once during normal season and once during lean season)	CMC Hospet	Part of O & M costs
Implementation of the Sludge Management Plan - Check for health hazards due to sludge handling.	Health status of WTP staff involved in sludge handling	N/a	Health check for WTP staff	Yearly once	ULB	Part of O & M costs

Table 31: Environmental Monitoring Plan for Drainage Upgradation

Mitigation Measures	Parameters to be Monitored	Location	Measurement	Frequency	Responsibility	Preliminary Costing
Construction Stage						
Check for dust nuisance	Incorporation of mitigation measures in the contract	N/a.	Inspection of contract documents	One-off inspection before signing the contract	IPMU	IPMU staff time as require d
	Dust nuisance	Construction work sites of primary drains; Hampi nala, Jamambunath nala	Ensure the implementation of mitigation measures such as spraying of water; assess the situation through visual inspection and interviews with local people.	Weekly	CMC Hospet with the assistance of Investment Program Consultants	Part of constructio n costs
Operation stage						
No significant Impacts envisage	N/a.	N/a.	N/a.	N/a.	N/a.	N/a.

Table 32: Environmental Monitoring Plan for Roads Upgradation

Investment Program Phase	Mitigation Measures	Parameters to be Monitored	Location	Measurement	Frequency	Responsibility	Preliminary Costing
Preconstruction Stage. (No significant impacts envisaged)	N/a.	N/a.	N/a.	N/a.	N/a.	N/a.	N/a.
Construction Stage	Check for dust nuisance	Incorporation of mitigation measures in the contract documents	N/a.	Inspection of contract Documents	One-off inspection of before signing the contract	IPMU	IPMU staff time as required

		Dust and noise nuisance	Work sites of road improvements with in the town	Monitoring of air quality and noise is not required. Ensure the implementation of mitigation measures (usage of standard equipment complying to Noise levels of CPCB, spraying of water to arrest dust); assess the situation through visual inspection and interviews with local people	Weekly	CMC Hospet with the assistance of Investment Program Consultants	Part of construction costs
Operation stage No significant impacts envisaged	N/a.	N/a.	N/a.	N/a.	N/a.	N/a.	N/a.

57

Chapter VI

PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

6.1 Overview

A number of consultation meetings were held during the process of the project preparation exercise. Participants include: the Commissioner, AEE, AE, CMC, Hospet town. Also meeting have been conducted with Councillors, NGOs, local public, project affected persons. These consultations were conducted at various levels (such as project level sub project level, component level etc.)

Public consultation involved focus group discussion. The people residing along the project activity areas were consulted during site visits and due discussion were made regarding the proposals. It was observed that people are willing to extend their co operation as the proposed activities are supposed to enhance the living standard of the public. The public comments and the mitigation measures are presented in **Table – 33.**

Public consultation involved focus group discussion. The people residing along the project activity areas were consulted during site visits and due discussion were made regarding the proposals. It was observed that people are willing to extend their co operation as the proposed activities are supposed to enhance the living standard of the public. The public expressed their concern regarding the disturbance in public activities due to construction works such as generation of dust, noise due to construction machineries, traffic diversion, and breakage of existing services. Public also expresses their concern over generation of odour and nuisance which anticipated after completion of STP and also requested to officials taking care and ensuring minimising these impact. Public demanded for advance notice before construction and proper warning signs along the construction area to avoid accidents and inconvenience. It was demanded for a strong operation and maintains ace system in place for there proposed sewer network for its best functioning to have the maximum health and aesthetic benefits.

	
Public consultation in Belagodu village	**Public consultation in Hospet town**

Table 33 Public Comments & Mitigation measures

Sl No.	Comments from local public	Proposed mitigation
(A)	**Pipe line works**	
	The public expressed their concern regarding the disturbance in public activities due to construction works such as generation of dust, noise due to construction machineries, traffic diversion, and breakage of existing services.	➢ Dust generation shall be arrested by water spraying. ➢ Ensure usage of standard equipment to reduce the noise nuisance. Equipment shall comply with the noise levels of construction equipment laid out by the CPCB. High noise generating activities including material unloading shall be avoided during nights. The surrounding people shall be informed, especially in densely populated area, of nature and schedule of the high noise generating activities, if any. ➢ Adequate arrangements for traffic diversions including erection of proper sign boards. ➢ Highly Qualified contractor will be engaged to execute the work in proper way and specific conditions shall be imposed in the contract to take safety measures.
(B)	**Sewage Treatment Plant (STP)**	
	At STP site, public expresses their concern regarding the generation of bad odour, mosquito nuisance during the operation of STP and also requested to officials taking care and ensuring minimising these impact.	➢ Due to sludge drying bed, the odour nuisance may be arising. The sludge collecting from the Aeration tank will be squeezed in the mechanical equipment and wet sludge will be send to sludge drying bed. The dried sludge will be disposed as manure in closed vehicle. A buffer zone in the form of landscaping and earthwork shall be created around the STP to avoid odour nuisance. ➢ To avoid/reduce mosquito breeding, the banks ponds shall be kept clear of grasses and bushes, etc. ➢ Apart from this, it will be ensured to minimize the environmental impacts due to construction of STP by following proper methods/ mitigation measures.

Public demanded for advance notice before construction and proper warning signs along the construction area to avoid accidents and inconvenience. It was demanded for a strong operation and maintains ace system in place for there proposed sewer network for its best functioning to have the maximum health and aesthetic benefits.

Chapter - VII

FINDING AND RECOMMENDATION

7.1. Findings

Based on the screening of environmental impacts, all the proposed sub-project components in Hospet are found to be environmentally acceptable and therefore able to proceed to the implementation phase. In most cases, particular environmental issues identified are those that are typical for the type of component, and a range of proven mitigation strategies exist to address them. **Table 33** indicates the environmental consideration of the proposed infrastructure components.

Table 33: Environmental Issues of Proposed Infrastructure Components

Infrastructure Component	Environmental Impact Issue	Environmental Mitigations
Sewage treatment plant and sewerage upgradation	• Land acquisition, loss of livelihood and dislocation • Contamination of groundwater resources • Protection of surrounding areas from odour nuisance • Sludge handling and disposal • Air dispersion modelling for odour • Construction and operation impacts	Preparation of Resettlement Plan and Implementation Since the sewage treatment plant is constructed with RCC structure, the possibility of leakage will be very minimal. Hence, the ground water contamination will not be envisaged in this project.
Drainage upgradation	• Sludge handling and disposal • Construction impacts	Appropriate mitigation measures as suggested
Water Supply Rehabilitation	• No significant issues • Construction and operation impacts	Appropriate mitigation measures as suggested
Upgradation of roads	• No significant issues • Construction and operation impacts	Appropriate mitigation measures as suggested

. As described above, most impacts are relevant to typical construction and operation. The important sets of mitigation measures, which are relevant to most of the components, include preparation of activity plans using appropriate mitigation measures identified in the earlier sections. These activity plans include:

- Construction Site Management Plan (to address construction impacts);

- Sludge Management and Disposal Plan (to address sludge handling and disposal impacts at the STP and WTP).
- Occupational Safety Plan (to address the health related impacts of the STP workers ans sanitary workers)

These activity plans should be prepared by the ULB associated by Investment Program Consultants as compendium of the relevant mitigation measures identified in earlier section. They should form part of the contractual arrangements with construction contractors, or directly implemented by the CMC as facility operator, as required 'Work Practices'.

7.2 Recommendations

It is recommended that the IPMU should be involved in monitoring the implementation of those components that are critical to acceptable environmental performance of the component. Owing to the location of proposed facilities and geographical setting of the town/region as a whole, no major impacts envisaged from any of the proposed sub-components projects in Hospet. In view of this importance, the PMU is delegated with the monitoring responsibility of the design stage to ensure the environmental sustainability of the NKUSIP.

Chapter VIII

VIII. CONCLUSIONS

The proposed components should proceed through to design and implementation, subject to mitigation measures and monitoring programs identified in the IEE which will be updated detailed during detailed design stage. Owning to the nature and scale of the proposed components in Hospet, it may be emphasized that the present IEE, which identifies potential impacts and suggests appropriate mitigation measures, is sufficient enough to safeguard the environment. There are no significant adverse impacts, which are irreversible or may lead to considerable loss/destruction of environment, envisaged. All the impacts are simple and moreover proven mitigation measures exists to minimize/mitigate the same. Hence, no further study such as an EIA is required.

AAPENDIX 1: Rapid Environmental Assessment (REA) Checklist | **SEWAGE TREATMENT**

Instructions:

- This checklist is to be prepared to support the environmental classification of project. it to be attached to the environmental categorization from that it is to be prepared and submitted to the Chief Compliance officer of the Regional and sustainable Development Department.
- This checklist id to be completed with the assistance of an Environment Specialist in a Regional Department
- This checklist focuses on environmental issue and concerns. To ensure that the social dimensions are adequately considered. Refer also to ADB checklist and handbooks on (i) involuntary resettlement (ii) indigenous peoples planning (iii) poverty reduction (iv) participation and (v() gender and development.
- Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remark" section to discuss any anticipated mitigation measures.

Country / project Title: India / North Karnataka Urban Sector Investment Program.

Sector Division Urban Development

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Screening Questions	Yes	No	Remarks
B. Project Siting Is the project area			
▪ Densely populated		√	
▪ Heavy with development activities	√		
▪ Adjacent to or within any environmentally sensitive area			
▪ Cultural heritage site		√	
▪ Protected area		√	

▪ Wetland		√	
▪ Mangrove		√	
▪ Estuarine		√	
▪ Buffer zone of protected area		√	
▪ Special area for protecting biodiversity		√	
▪ Bay		√	
A. Potential Environmental Impact Will the project cause…..		`	
▪ Impairment of historical / cultural monuments / areas and loss/ damage to the sites?		√	
▪ Interference with other utilities and blockage of access to buildings nuisance to neighboring areas due to noise, smell and influx of insects rodents etc?	√		During construction stage traffic and human activities may affected temporarily due to generation of dust and noise from mechanical equipments. Adequate measure will be taken by skirling of water to minimize dust and traffic management plan with sign board. Machinery with standard reputed make adopted that will itself taker care of noise.
▪ Dislocation or involuntary resettlement of people?		√	No any dislocation or involuntary resettlement envisaged in a project.
▪ Impairment of downstream water quality due to in adequate sewage treatment or release of untreated sewage?	√		The proposed activated sludge process system is designed to meet the discharge norms of inland surface water as suggested by Central Pollution Control Board. It is suggested that proposed system will be properly maintained to ensure efficiency of treatment.
▪ Overflows and flooding of neighboring properties with raw sewage. ?	√		Periodic maintenance of sewer lines has been suggested in the EMP to avoid overflowing and

			flooding of neighboring properties.
▪ Environmental pollution due to inadequate sludge disposal or industrial waste discharge illegally disposed in sewer.?	√		Sludge disposal will be carried out in frequently say once in a 2 to 3 days. Sludge disposal will be restricted in a confined space to avoid surface and soil pollution.
▪ Noise and vibration due to blasting and other civil works?	√		Construction machineries used in a construction will be standard reputed made comply with noise level standard prescribed by pollution control board.
▪ Discharge of hazardous material into sewers, resulting in damage to sewer system and danger to workers ?	√		It is suggested in EMP that Hospet CMC has to ensure that no hazardous waste will be illegally discharged in to sewer lines.
▪ Inadequate buffer zone around pumping and treatment plats to alleviate noise and other possible nuisances, and protect facilities?	√		Buffer zone with screen and landscaping is suggested to provide proper shielding such that operation of STP will not have nuisance to surrounding.
▪ Social conflicts between construction workers from other areas and community workers?		√	The local labour force will be utilized by the contractor for construction activities and hence there are no possibilities for social conflict regarding employment opportunities during construction phase.
▪ Road blocking and temporary flooding due to land excavation during the rainy season?	√		Road blocking and traffic re routing has been envisaged during construction stage of sewer lines. Temporary flooding is not anticipated as there is no deep excavation or filling of low laying area envisaged in the project.
▪ Noise and dust construction activities?	√		Construction machineries will be reputed make which will itself take care of noise

			moreover these machineries will be comply with standards stipulated by Central pollution Control board. Water sprinkling program will be suggested to ensure minimize of dust generated.
▪ Traffic disturbances due to construction material transport and waste?	√		Traffic management with re routine of traffic during construction period is required to avoid conflict of public transport with construction material.
▪ Temporary silt runoff due to construction?	√		The construction waste water will be channeled such that it will have sufficient time to settle the solid and do not deteriorate water quality of discharging courses.
▪ Hazards to public health due to overflow flooding and ground water pollution due to failure of sewage system?	√		Regular maintenance of sewer line has been suggested to avoid overflow of sewer li9ne and related impact on public health due to pollution. Chances of failure sewage system will be less and in extreme case care will be taken by diverting sewage in nearby nalas and rectified defects quickly to take system in working.
▪ Deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?	√		Sludge from sludge drying bed will be removed at regular interval to avoid re – suspension in the treated water and there by deteriorating treated water quality. Direct discharge of untreated sewage water is not anticipated.
▪ Contamination of surface and ground water due to sludge disposal on land?	√		Sludge will be disposed of in a confined area the sludge disposal area should be properly lined with geosynthetic

			lining such that it will not leach to the nearby water courses / and pollute environment.
▪ Health and safety hazards to workers from toxic gases and hazardous material which may be contained in sewage flow and exposures to pathogens in sewage and sludge?	√		Mixing of hazardous / industrial effluent with sewage may result in sewer and STP which should be avoided through proper law and enforcement. The sewer cleaning and STP workers should be provided protective measures such as boots masks etc. to avoid exposure to pathogens in sewage and sludge.

APPENDIX 2: Rapid Environmental Assessment (REA) Checklist

WATER SUPPLY

Instructions:

- This checklist is to be prepared to support the environmental classification of project. It to be attached to the environmental categorization from that it is to be prepared and submitted to the Chief Compliance officer of the Regional and sustainable Development Department.
- This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department
- This checklist focuses on environmental issue and concerns. To ensure that the social dimensions are adequately considered, refer also to ADB checklist and handbooks on (i) involuntary resettlement (ii) indigenous peoples planning (iii) poverty reduction (iv) participation and (v() gender and development.
- Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remark" section to

Country / project Title: India / North Karnataka Urban Sector Investment Program.

Sector Division Urban Development

……

Screening Questions	Yes	No	Remarks
B. Project Siting Is the project area			
▪ Densely populated		√	
▪ Heavy with development activities	√		
▪ Adjacent to or within any environmentally sensitive area			
▪ Cultural heritage site		√	
▪ Protected area		√	
▪ Wetland		√	
▪ Mangrove		√	
▪ Estuarine		√	
▪ Buffer zone of protected area		√	
▪ Special area for protecting biodiversity		√	
▪ Bay		√	
B. Potential Environmental Impact Will the project cause…..		`	
▪ Pollution of raw water supply from upstream waste water discharge from communities, industries, agriculture and soil erosion runoff.		√	No such communities, industries discharge envisage since the intake point comes nearer to the Tungabhadra reservoir.
▪ Impairment of historical / cultural monuments / areas and loss / damage to the site		√	
▪ Hazard of land subsidence caused by excessive ground water pumping		√	There is no ground water exploitation for proposed water supply improvements for Hospet CMC

▪ Social conflict arising from displacement of communities		√	
▪ Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	Since the water is drawing from Tungabhadra sub canals, there will not be any water scarcity at any point of time.
▪ Unsatisfactory raw water sup[ply (e.g. excessive pathogens or mineral constituents ?		√	The existing raw water supply is supposed to continue.
▪ Delivery of unsafe water to distribution system		√	
▪ Inadequate protection of intake works or wells leading to pollution of water supply?		√	The exiting intake well along the down stream canal of Tungabhadra is in good condition, so there are no possibilities of pollution due to inadequate protection of intake works or wells.
▪ Over pumping of ground water, leading to Stalinization and ground subsidence?		√	There is no ground water exploitation required for the proposed improvements in water supply.
▪ Excessive algal growth in storage reservoir?	√		Hospet CMC has to ensure that the storage reservoir will be cleaned regularly to avoid excessive algal growth.
▪ Increase in production of sewage beyond capabilities of community facilities?		√	The proposal involves ensuring regular supply of 100 lpcd for the public which neither will nor result in excess sewage production. The proposed STP for the city is designed to meet the sewage generated with 100 lpcd.
▪ Inadequate disposal of sludge from water treatment plants?		√	There is no such proposal of altering design and facilities in water treatment plant. It is prime duty of Hospet CMC to ensure that the sludge is removed from

			water treatment plants regularly to meet standard of treated water.
▪ Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisance and protect facilities	√		Sufficient buffer zone / noise barrier is to be developed around pumping station to alleviate noise.
▪ Impairments associated with transmission lines and access roads?	√		Temporary impairments are anticipated along the new transmission lines routes during construction stage .No new access are proposed.
▪ Health Hazard arising from inadequate design of facilitate for receiving , storing, and handling of chlorine and other hazardous chemicals		√	Proposed project seen to be not have any proposal for altering design / facilities in water treatment plant.
▪ Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?		√	Hospet CMC has to ensure that proper safety practices are ensured for workers in water treatment plant.
▪ Dislocation or involuntary resettlement of people		√	There is no resettlement of people for project implementation.
▪ Social conflict between construction workers from other areas and community workers?		√	Local labour will be utilized in maximum number by contractor so possibility of social conflict regarding employment opportunities will be less during construction stage
▪ Noise and dust from construction activities	√		Measures will be taken in initial stage of project by deploying standard reputed make machinery with comply of stipulated noise standard to ensure noise with in limit and practice of frequent water spraying will be adopted to minimize dust.

▪ Increased road traffic due to interference of construction activities?	√		The construction material transport will increase traffic within city. Proper traffic management will have to be implemented to avoid conflict between public transport and construction material transport.
▪ Continuing soil erosion / silt runoff from construction operation	√		Construction debris and excess soil generated at construction site should be properly disposed to avoid erosion.
▪ Delivery of unsafe water due to poor o & m treatment process (especially mud accumulation in filter) and inadequate chlorination due to lack of adequate monitoring of chlorine residual in distribution system		√	Hospet CMC has to ensure efficiency of operation of water treatment plant.
▪ Accidental leakage of chlorine gas?		√	
▪ Excess abstraction of water affecting downstream water users		√	
▪ Competing uses of water		√	
▪ Increased sewage flow due to increased water supply	√		The proposal is for ensuring regular water supply of 100 lpcd for the public which will result in increased sewage generation. The propose STP for the city is designed too meet the sewage generated with 100 lpcd.
▪ Increased volume of sullage (wastewater from cooking and washing) and sludge from waste water treatment plant	√		The proposed STP for the city is designed to meet the sullage generated due to project. Hospet CMC has to ensure that the sludge generated in STP is disposed off with safe disposal practices.