

Environmental Assessment Document

Initial Environmental Examination: Nagaur Water Supply Subproject
Project Number:
August 2008

India: Rajasthan Urban Sector Development Investment Program

Prepared by Local Self Government Department

The initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

ABBREVIATION

ADB	- Asian Development Bank
CWR	- Clear Water Reservoir
DSC	- Design and Supervision Consultancy
EIA	- Environmental Impact Assessment
EA	- Executing Agency
FI	- Financial Intermediary
GLSR	- Ground Level Service Reservoir
Gol	- Government of India
GoR	- Government of Rajasthan
GSI	- Geological Survey of India
IA	- Implementing Agency
IEE	- Initial Environmental Examination
IPMC	- Investment Programme Management Consultancy
IPMU	- Investment Programme Management Unit
JNNURM	- Jawaharlal Nehru National Urban Renewal Mission
km	- kilometer
LPCD	- litre per capita per day
LPS	- litre per second
LSGD	- Local Self-Government Department
m	- meters
MFF	- Multitranchise Financing Facility
mg/L	- milligrams per liter
MLD	- million litre per day
MoEF	- Ministry of Environment and Forests
OD	- outer diameter
OHSR	- Over Head Service Reservoir
OM	- Operations Manual
PHED	- Public Health Engineering Department
PMU	- Project Management Unit
RCC	- Reinforced Cement Concrete
ROW	- Right of Way
RPCB	- Rajasthan State Pollution Control Board
RSPM	- Respirable Suspended Particulate Matter
RUIDP	- Rajasthan Urban Infrastructure Development Project
RUSDIP	- Rajasthan Urban Sector Development Investment Program
ToR	- Terms of Reference
UA	- Urban Agglomeration
UIDSSMT	- Urban Infrastructure Development Scheme for Small and Medium Towns
WTP	- Water Treatment Plant

WEIGHT AND MEASURES

lakh	–	100,000 (one hundred thousand)
crore	–	10,000,000 (ten million)

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I. INTRODUCTION

A. Purpose of the Report

1. Rajasthan Urban Sector Development Investment Program (RUSDIP) is intended to optimize social and economic development in 15 selected towns in the State, particularly district headquarters and towns with significant tourism potential. This will be achieved through investments in urban infrastructure (water supply; sewerage and sanitation; solid waste management; urban drainage; urban transport and roads), urban community upgrading (community infrastructure; livelihood promotion) and civic infrastructure (art, culture, heritage and tourism; medical services and health; fire services; and other services). RUSDIP will also provide policy reforms to strengthen urban governance, management, and support for urban infrastructure and services. The assistance will be based on the State-level framework for urban reforms, and institutional and governance reforms recommended by the Government of India (GoI) through the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT).

2. RUSDIP Phase II to be implemented over a seven year period beginning in 2008, and will be funded by a loan via the Multi-tranche Financing Facility (MFF) of the ADB. The Executing Agency (EA) is the Local Self-Government Department (LSGD) of the Government of Rajasthan (GoR); and the Implementing Agency (IA) is the Project Management Unit (PMU) of the Rajasthan Urban Infrastructure Development Project (RUIDP), which is currently in the construction stage.

3. RUSDIP will improve infrastructure through the design and implementation of a series of subprojects, each providing improvements in a particular sector (water supply, sewerage, solid waste etc) in one town. RUSDIP has been classified by ADB as environmental assessment category B (some negative impacts but less significant than category A). The impacts of subprojects according to ADB Environment Policy (2002) and Environmental Assessment Guidelines (2003).

B. Extent of the IEE Study

4. Indian law and ADB policy require that the environmental impacts of development projects are identified and assessed as part of the planning and design process, and that action is taken to reduce those impacts to acceptable levels. This is done through the environmental assessment process, which has become an integral part of lending operations and project development and implementation worldwide.

1 ADB Policy

5. ADB's Environment Policy requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for Environmental Assessment are described in Operations Manual (OM) 20: Environmental Considerations in ADB Operations. This states that ADB requires environmental assessment of all project loans, programme loans, sector loans, sector development programme loans, financial intermediation loans and private sector investment operations.

6. The nature of the assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts, and the availability of cost-effective

mitigation measures. Projects are screened for their expected environmental impacts and are assigned to one of the following categories:

- Category A: Projects that could have significant environmental impacts. An Environmental Impact Assessment (EIA) is required.
- Category B: Projects that could have some adverse environmental impacts, but of less significance than those for category A. An Initial Environmental Examination (IEE) is required to determine whether significant impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
- Category C: Projects those are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
- Category FI: Projects that involve a credit line through a financial intermediary (FI) or an equity investment in a FI. The FI must apply an environmental management system, unless all subprojects will result in insignificant impacts.

7. The Bank has categorized this program as Category B and following normal procedure for MFF loans has determined that one Environmental Examination will be conducted for each subproject, with a subproject being the infrastructure improvements in a particular sector (water supply, sewerage, etc) in one town.

2 National Law

8. The GoI EIA Notification of 2006 (replacing the EIA Notification of 1994), sets out the requirement for Environmental Assessment in India. This states that Environmental Clearance (EC) is required for specified activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorized as A or B depending on the scale of the project and the nature of its impacts.

9. Categories A projects require Environmental Clearance from the National Ministry of Environment and Forests (MoEF). The proponent is required to provide preliminary details of the project in the form of a Notification, after which an Expert Appraisal Committee (EAC) of the MoEF prepares comprehensive Terms of Reference (ToR) for the EIA study, which are finalized within 60 days. On completion of the study and review of the report by the EAC, MoEF considers the recommendation of the EAC and provides the EC if appropriate.

10. Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA). The State level EAC categorizes the project as either B1 (requiring EIA study) or B2 (no EIA study), and prepares TOR for B1 projects within 60 days. On completion of the study and review of the report by the EAC, the SEIAA issues the EC based on the EAC recommendation. The Notification also provides that any project or activity classified as category B will be treated as category A if it is located in whole or in part within 10 km from the boundary of protected areas, notified areas or inter-state or international boundaries.

11. The only type of infrastructure provided by the RUSDIP that is specified in the EIA Notification is solid waste management, where EC is required for all Common Municipal Solid

Waste Management Facilities (facilities that are shared by more than one town)¹. EC is thus not required for the water supply subproject that is the subject of this Environmental Examination.

3 Review and Approval Procedure

12. For Category B projects the Draft Environmental Status report and its summary (SIEE) are reviewed by ADB's Regional Department sector division and Environment and Social Safeguards Division, and by the Executing Agency, and additional comments may be sought from project affected people and other stakeholders. All comments are incorporated in preparing the final documents, which are reviewed by the Executing Agency and the national environmental protection agency (MoEF in this case). The EA then officially submits the IEE and SIEE reports to ADB for consideration by the Board of Directors. Completed reports are made available worldwide by ADB, via the depository library system and the ADB website.

4 Scope of Study

13. This is the IEE report for the Nagaur water supply sector. It discusses the generic environmental impacts and mitigation measures relating to the location, design, construction and operation of physical works proposed under this subproject.

II. DESCRIPTION OF THE PROJECT

A. Type, Category and Need

14. This is a water supply subproject, and has been classified by ADB as Category B, because it is not expected to have major negative environmental impacts. Under ADB procedures such projects require an IEE to identify and mitigate the impacts, and to determine whether further study or a more detailed EIA may be required. The subproject is needed because the present water supply infrastructure in Nagaur is inadequate for the needs of the growing population.

15. The provision is also unequal, with un-served areas being mainly the slums and newly-developed areas. This is one of a series of subprojects designed by the RUSDIP that are intended to raise the standards of the municipal infrastructure and services of Nagaur and the other urban centers to those expected of modern Asian towns.

B. Location, Size and Implementation Schedule

16. The subproject is located in Nagaur, the headquarters town of Nagaur District, in the central part of Rajasthan (**Figure 2.1**). Improvements in the water distribution system of approximately 86 kilometer (km) network will benefit certain parts of the town, such as slums and developing areas where a new network will be provided, and other locations where 8 overhead storage reservoirs (OHSRs), 1 no. clear water reservoir (CWR) will be built (**Figure 2.2**). Other facilities like the transmission main/rising main from Gogelgao Indira Gandhi Nahar Project (IGNP) pump house to the intermediate pump house at Harijan Basti are also considered (**Figures 2.2 and 2.3**). Photographs of the project area are attached as **Appendix 1**.

¹ According to the Rajasthan State Pollution Control Board, the MoEF intends to issue a clarification to the EIA Notification in due course, which will add all landfill facilities and Sewage Treatment Plants to the list of projects specified as requiring EC under the Notification. This has not yet been issued, so the text above indicates the correct legal position at the time of writing

C. Description of the Subproject

1 Service Delivery and Existing Water Supply Arrangement

17. The present water supply of Nagaur is wholly from the groundwater sources, extracted through tube wells located at various well-fields situated at 30 to 40 km from the town center. Out of a total number of existing 46 tube wells, water quality in 35 tube wells, located at Khajwana, Janana and Indokali well-fields, meet the Indian drinking water standards. Water extracted from rest of the tube wells located at Khen, Soliyana and Fagli well-fields have high fluoride content ranging between 5 and 7 ppm, which is above the permissible Indian drinking water standards. At present, water abstracted through these tube wells are pumped to one CWR and blended with water from the other tube wells before the supply in order to bring the quality to the acceptable limit to the extent possible.

18. The current water production from the tube wells in total is 7.9 million liters per day (MLD). The losses are reported to be high and in the order of 40%. Considering the present estimated production level, the present per capita water supply is estimated to be 43 liter per capita per day (lpcd). In addition to the inadequate production, the system suffers from old and leaking distribution lines, inequitable pressure distribution, inadequate storage, lack of metering, etc. There are currently 8 OSHRs of total capacity of 4.7 million liters (ML). There are 10,698 connections, out of which 10,464 connections are domestic. The rest are commercial and industrial. Most of the connections are metered, however only 1,150 of the total are in a functional or working order. At present, water is being disinfected through application of bleaching powder, which is rudimentary and inefficient. The existing situation warrants urgent source augmentation, rehabilitation/improvement of the existing distribution system, increase in the storage capacity, provision of metering and provision of disinfection facilities.

2 Proposed subproject including detailed scope of work

19. The Subproject will construct the downstream facilities and strengthen the existing water supply system for the town to receive and distribute the additional 22.65 MLD water supplied through the Naguar Lift Project implemented by Public Health Engineering Department (PHED). The Subproject is also expected, among other things, to reduce the unaccounted for water (UFW) by billing for the actual quantity of water supplied, since the house connections will be expanded to cover at least 90% of the town population, with either new water meters or a rehabilitated water meter. Disinfection facilities, in the form of chlorinator plants at CWRs, will also be provided and the distribution network will be expanded and strengthened to fully absorb the additional water supply from the Naguar Lift Project.

20. **Table 2.1** shows the nature and size of the various components of the subproject. There are three main elements: augmentation of the water source and supply; expansion/improvement of the distribution network; and reduction of non-revenue water (NRW). The descriptions shown in **Table 2.1** are based on the present proposals, which are expected to be substantially correct, although certain details may change as the development of the subproject progresses. Scope and components of the works consist of the construction of OHSRs, CWRs, intermediate pump houses, procurement of pumps at the CWR constructed by PHED, distribution network expansion and rehabilitation, procurement and installation of household and bulk water meters, etc., detailed as follows:

- a. Procurement of pumps: 3 pumps with 204 liters per second (lps) capacity and associated electrical equipment for the CWR. The pump house in Gogelao

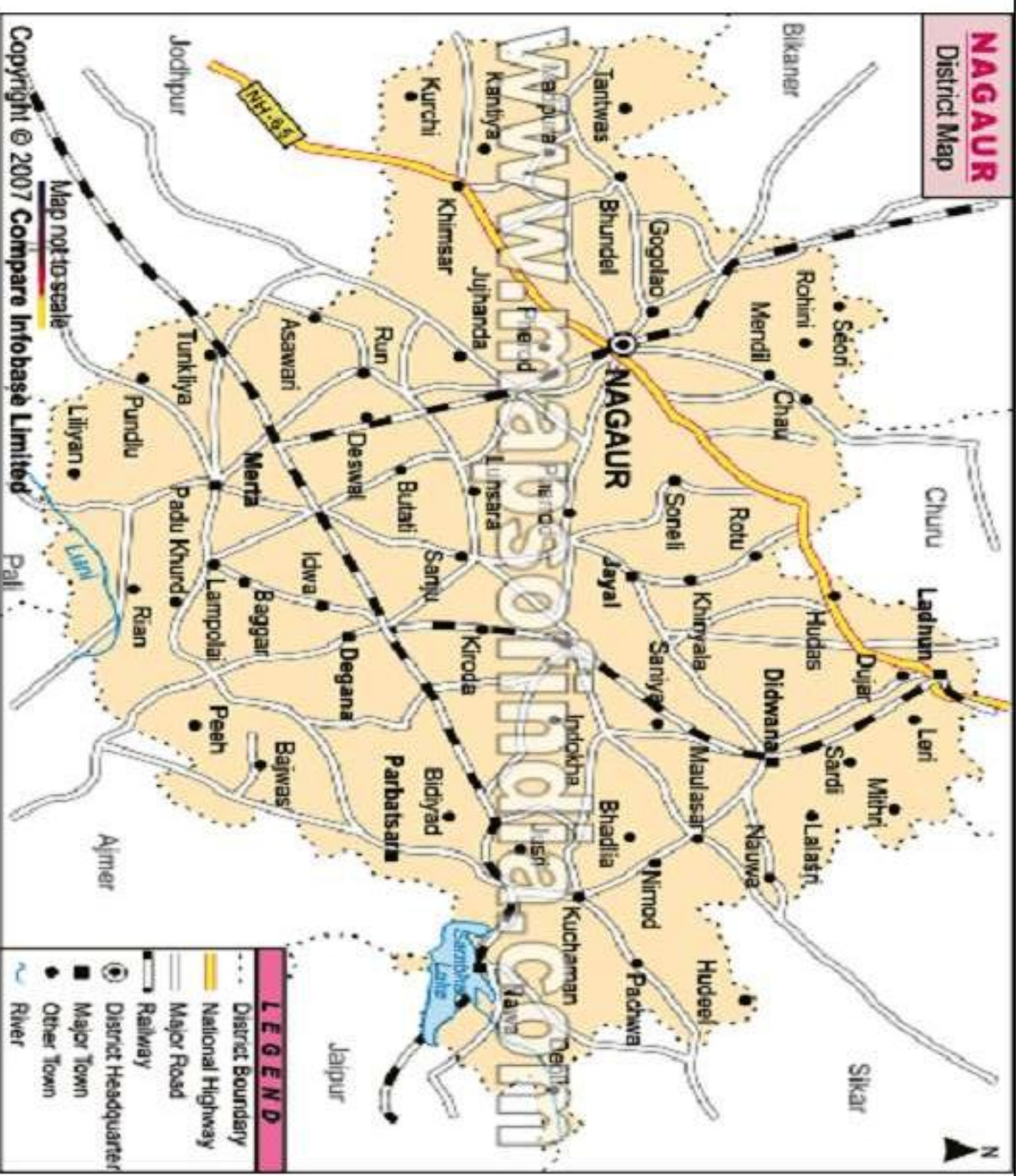
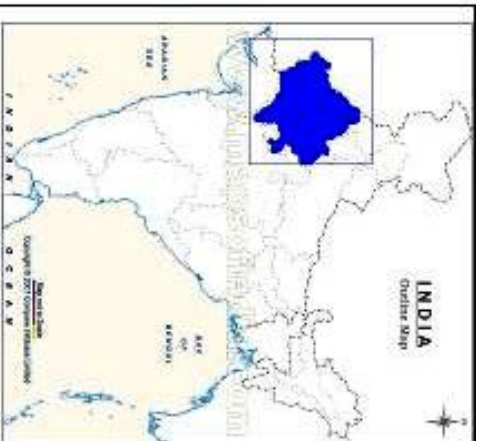
Headwater is to be constructed and installed by PHED and not included in this subproject

- b. Construction of the rising mains: 6 km of 600 mm diameter (dia) pipes, from the Gogelao pump house to an intermediate pump house at the Harijan Basti. The transmission main is 3.3 km of 600/500 mm dia pipes branching before intermediate pump house, to the existing CWR at PHED campus;
- c. Construction of an intermediate pump house at Harijan Basti: installation of 4 pumps with 90 lps capacity and 45 m pressure head, and rehabilitation of the existing intermediate pump house at PHED compound;
- d. Construction and rehabilitation of the water supply distribution system/ network for the town – 86 km of pipelines with of diameter 150mm to 500mm;
- e. Construction of 8 OHSRs of total capacity 5.35 ML at various locations in town;
- f. Construction of a CWR of 1.6 ML capacity;
- g. Procurement and installation of 10,500 new household water meters and rehabilitation of 5,200 existing household water meters; and
- h. Procurement and installation of 32 bulk water meters at all supply points.

21. Water will be brought from the Golegao CWR, to be constructed by PHED, through a rising main of 600 mm dia and a length of about 6km, and will feed the proposed CWR at the Harijan Basti. Before connecting to this CWR, a branch of the rising main is proposed to feed the existing CWR at the PHED campus (through a 500mm dia pipe for a length of 3.3km). From the CWR the water will be pumped to various OHSRs to be constructed around town, from where it will be distributed to the households through the rehabilitated or newly constructed distribution network. 100 % consumer metering will be carried out for the design population for year 2011. The bulk meters will be provided at all supply points to measure the quantity of water supply and to enable system monitoring. The change in pumping equipment will increase the efficiency of the system and reduce the proportionate operation and maintenance (O&M) cost. The existing 35 tube wells will also be used in the system to meet the gap between the demand and the available surface water. Water from the tube wells yielding water with high fluoride content will be blended with surface water to meet the potable water quality standard as per the Indian drinking water standards.

22. A schematic of the proposed water supply system and the proposed layout are shown in **Figures 2.2 and 2.3**, respectively. Environmental features and layout for the proposed water supply system in Nagaur is plotted in Survey of India Toposheet (**Figure 2.4**).

23. The subproject is designed for a net water supply of 135 lpcd at the household end, for a design population for year 2041, and with physical or system losses maintained at 20% after the completion of the project. All civil works and pipe sizing are designed to meet the projected population needs by 2041, while all mechanical and electrical equipment are designed for projected population requirement by year 2026.

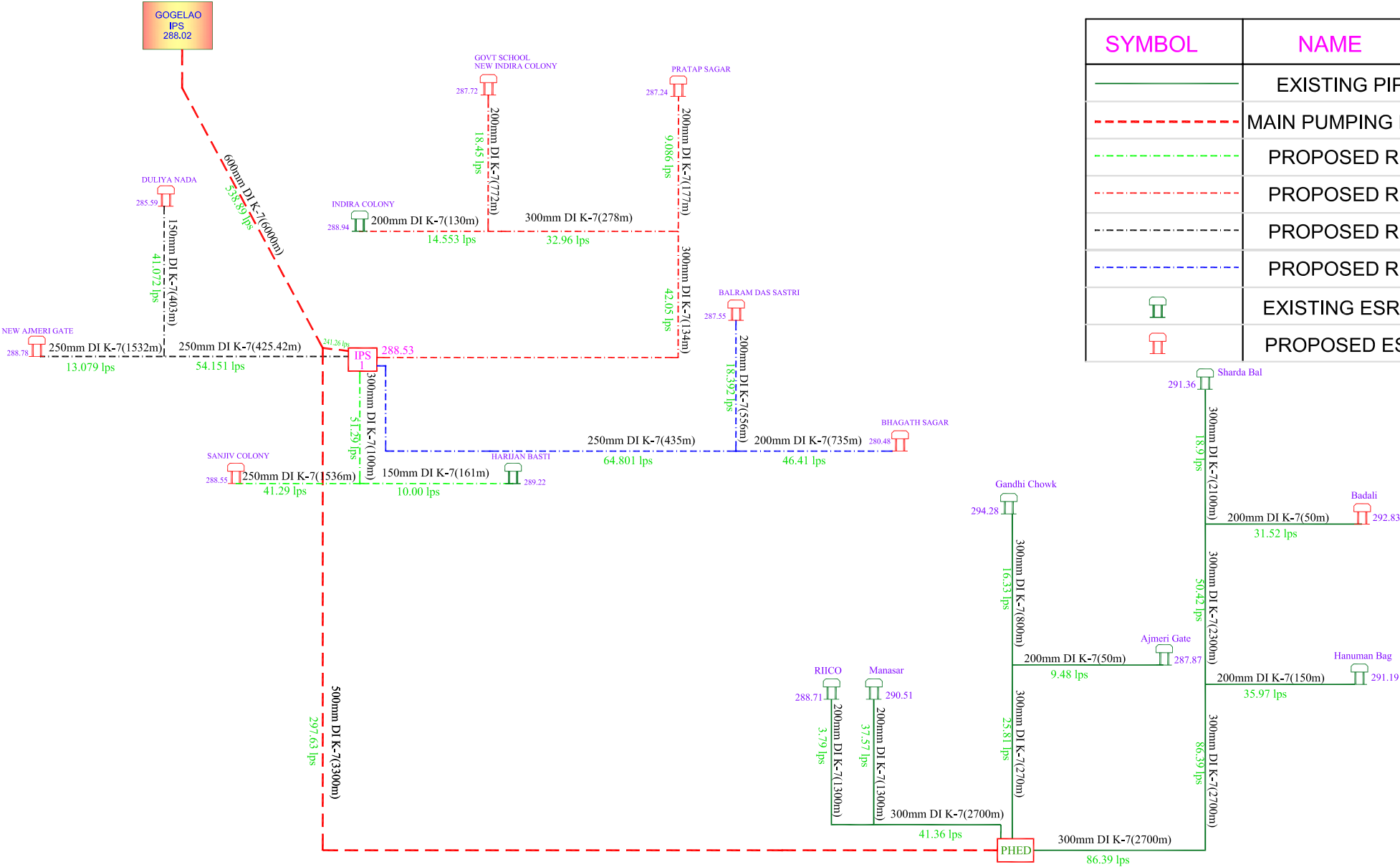


Rajasthan Urban Sector Development Investment Program ADB TA 4814-IND	Govt of Rajasthan Asian Development Bank
Nagaur Regional Map	

FLOW DIAGRAM OF NAGAU WATER SUPPLY

LEGEND

SYMBOL	NAME
	EXISTING PIPE
	MAIN PUMPING MAIN
	PROPOSED RM1
	PROPOSED RM2
	PROPOSED RM3
	PROPOSED RM4
	EXISTING ESR
	PROPOSED ESR



LAYOUT FOR PROPOSED WATER SUPPLY AT NAGAUR

FROM IGNP CANAL,
13.5 KM FROM GOGELAO

CWR 3 MILLION GALLON (APPROX. 14 ML
CAPACITY UNDER CONSTRUCTION WITH PHED

PUMP HOUSE UNDER CONSTRUCTION
WITH PHED

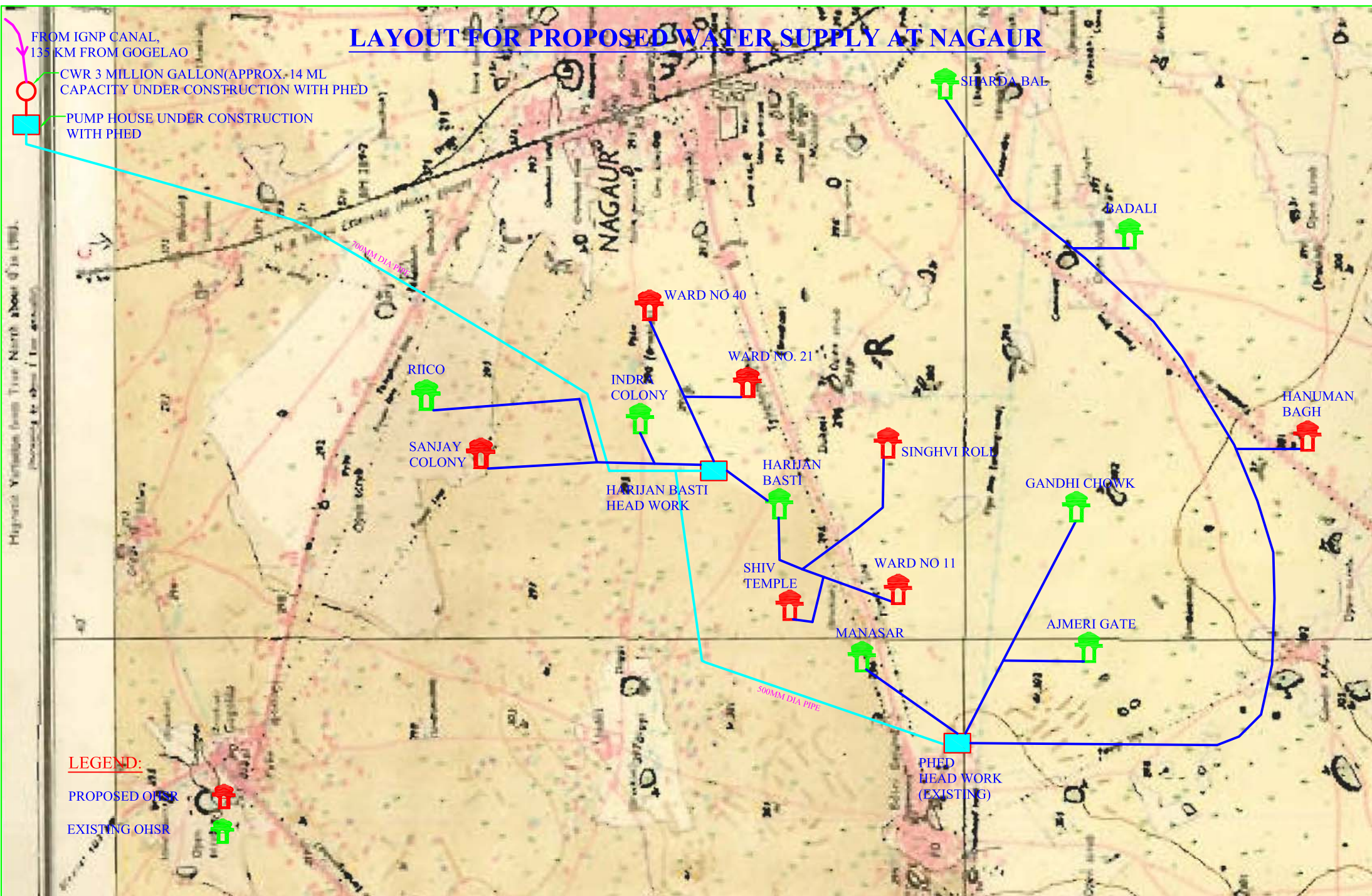
700MM DIA PIPE

500MM DIA PIPE

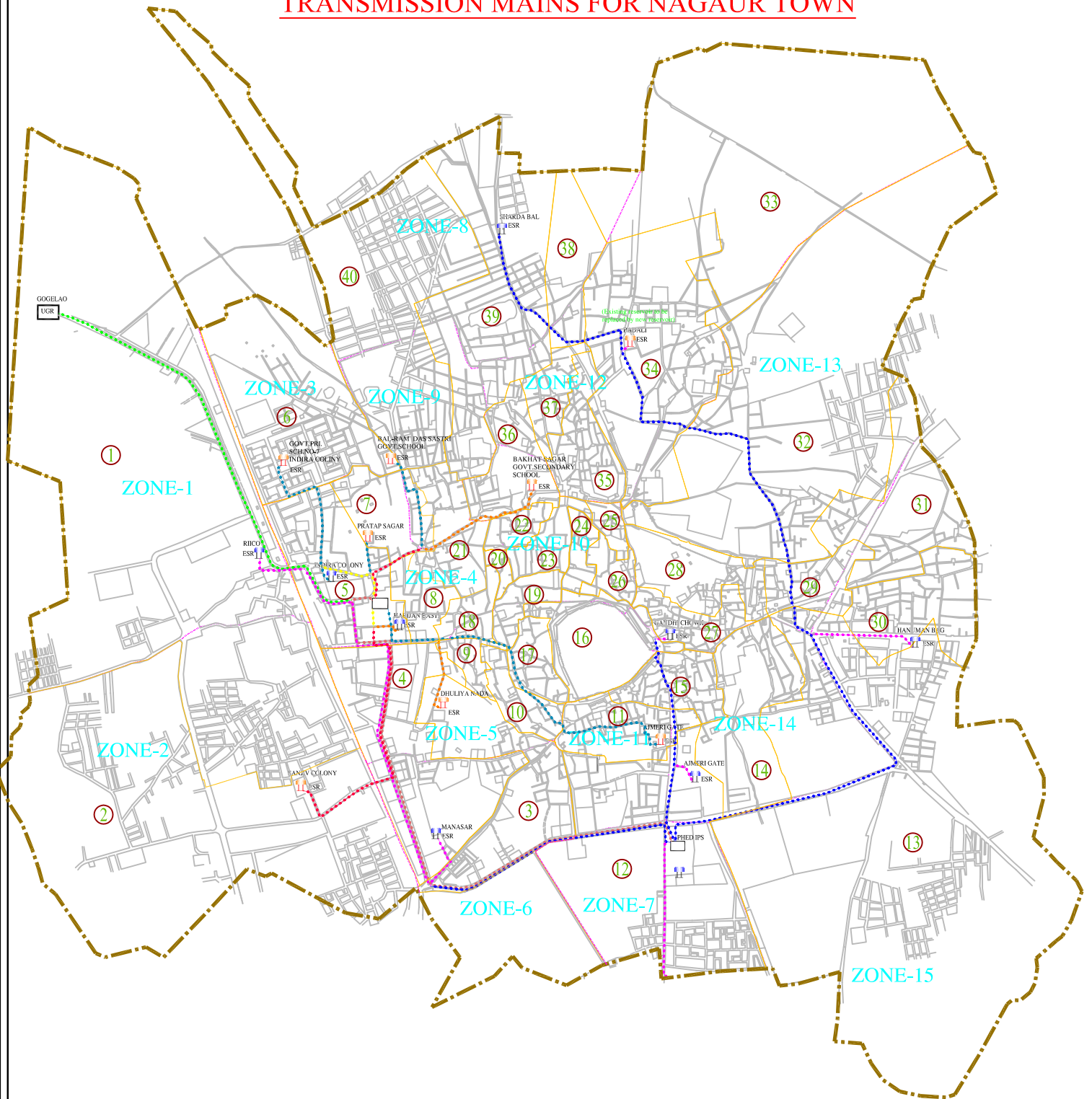
LEGEND:

PROPOSED OHSR

EXISTING OHSR



EXISTING,PROPOSED ESR LOCATION & TRANSMISSION MAINS FOR NAGOUR TOWN



LEGEND

PROPOSED PIPE DIA	
-----	PIPE DIA 600mm
-----	PIPE DIA 500mm
-----	PIPE DIA 300mm
-----	PIPE DIA 250mm
-----	PIPE DIA 200mm
-----	PIPE DIA 150mm

EXISTING PIPE DIA	
-----	PIPE DIA 200 mm
-----	PIPE DIA 300 mm

LEGEND

SYMBOL	NAME
-----	MUNICIPAL BOUNDARY
-----	ZONE BOUNDARY
-----	RAILWAY TRACK
-----	ROAD
	EXISTING ESR
	PROPOSED ESR

Table 2.1: Improvements in Water Supply Infrastructure Proposed in Nagaur

Infrastructure	Function	Description	Location
1. Source and Supply Augmentation			
Transmission Main/Rising main	From pump house to Intermediate pump house	Transmission Main/Rising main from Gogelgao IGNP pump house to IP at Harijan Basti Construction of the rising mains, of 6 km in total length, from the Gogelao pump house to an intermediate pump house at the Harijan Basti - of 600 mm dia of 6 km and transmission main of 500 mm dia for a length of 3.3 Km, branching before intermediate pump house, to the existing CWR at PHED campus;	From Gogelao to Nagaur town
Pumps and electrical components	Pump for Gogelao pump house- completion of PHED work	Pumps and electrical components for Gogelao Pump House (3 nos. of 204 LPS, 39 m Head) under deposit work to PHED.	At Gogelao Pump House
2. Expansion of Distribution Network			
Distribution mains	Supply water to newly developed area	150mm- 500mm - of about 86 km	New developed colonies --- Indira colony New Ajmeri gate, New Indira colony, Sanjiv colony, Pratap sagar, Balram Das Sastri, Bhagath Sagar and Budali
Overhead Reservoirs (OHSR)	Increase water supply to regulate water supply	8 nos. of overhead reservoirs totaling 5.35 ML(3 of 10 lacs liters, 3 of 5 lacs liters and 1 of 6 lacs liter and 1 of 2.5 lacs liter)	At Indira colony, New Ajmeri gate, New Indira colony, Sanjiv colony, Pratap sagar, Balram Das Sastri, Bhagath Sagar and Budali
Clear Water Reservoirs (CWR)	Storage of treated water for pumping to OHSRs	1 CWR of 1.6 ML capacity	At Harijan Basti
Chlorination Plants	To supply bacteria free water to customer	1 no.	At Harijan Basti
Pump replacement/ new pump house	Improve water supply and Pressure	Construction of Intermediate Pumping Station at Harijan Basti and rehabilitation of IP at existing Head Work of PHED	At Harijan Basti
Pumping main feeders	Supply of water to various OHSRs	From pump houses to various OHSRs including valves, fittings and excavations	
3. Meters and House Connections			
Repair of house connections	Repair leaks and increase the amount and pressure of water reaching consumers	Provision of 10,500 new house service connections of 25 mm dia and repair of 5,200 nos. serviceable meters for old connections.	As per the requirement and decided by the PHED
Bulk flow meters	Monitor water flow in the improved network	Electromagnetic flow meter Provision of 32 nos. Bulk flow meters of 200 mm dia.	Indokali Khajwana Janana Khen Old Head Work Proposed Head Work.

III. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

1. Location

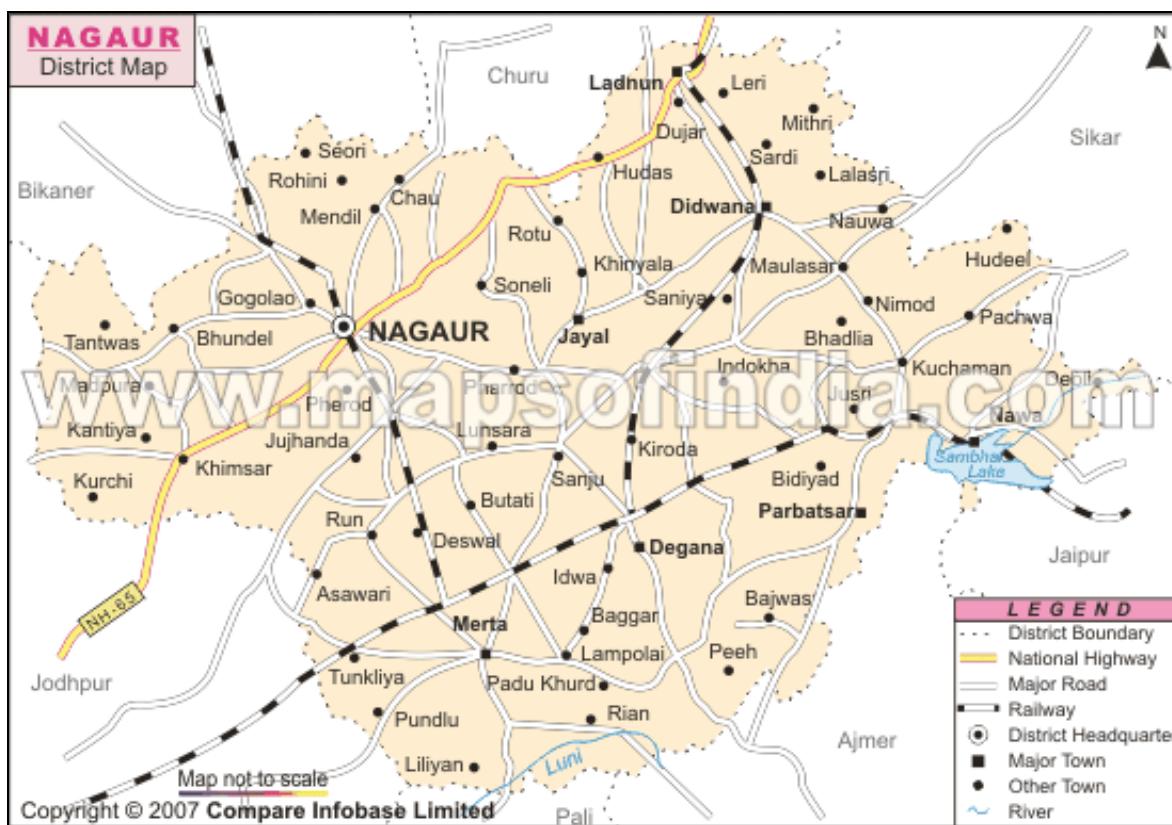
24. The Urban Agglomeration (UA) of Nagaur district is located about 300 km from Jaipur. It is surrounded by Jaipur, Ajmer, Jodhpur, Bikaner, Churu, and Sikar districts. The total area of the town is 37.81 sq km. Nagaur town is the administrative headquarter of the district. Its geographical spread is a good combine of plain, hills, sand mounds and as such it is a part of the great Indian Thar Desert.

25. For the purpose of administration, the district is divided into nine administrative sub-division, viz., Nagaur, Merta, Jayal, Degana, Deedwana, Ladnun, Makarana, Nawa and Parbatsar. There are ten tehsils under the sub-division² viz., Nagaur, Merta, Jayal, Degana, Deedwana, Ladnun, Makarana, Nawa, Parbatsar and Khivansar.

26. The present district of Nagaur finds a place in the heart of the Rajasthan state. If we draw a cross over the map of Rajasthan the centre of this cross is bound to fall in the district of Nagaur. Before the merger of the states, Nagaur was a part of the erstwhile Jodhpur State. It is about 135 km from Jodhpur, 112 km from Bikaner and 300 km from Jaipur. The nearest Airport is at Jodhpur (137 km). District map of Nagaur is shown in **Figure 3.1**.

² A *tehsil* consists of a city or town that serves as its headquarters, possibly additional towns, and a number of villages. As an entity of local government, it exercises certain fiscal and administrative power over the villages and municipalities within its jurisdiction. It is the ultimate executive agency for land records and related administrative matters. Its chief official is called the *tehsildar* or *talukdar*.

Figure 3.1: District Map of Nagaur



2. Topography, Natural Hazard, and Drought

27. **Topography:** Nagaur is the district headquarters. It is located at latitude ($26^{\circ}25'$ to $27^{\circ}40'$ and $23^{\circ}3'$ to $30^{\circ}12'$) north and longitude ($73^{\circ}18'$ to $75^{\circ}15'$ and $69^{\circ}30'$ to $78^{\circ}17'$) east, at a height of about 327m above the mean sea level.

28. **Natural Hazards:** Nagaur town lies in low damage risk zone II. The area is less prone to earthquakes as it is located on comparatively stable geological plains based on evaluation of the available earthquake zone information. **Figure 3.2** depicts the earthquake zones of Rajasthan. **Figure 3.3** shows natural hazard zones of the Nagaur district.

29. **Drought:** Low rainfall coupled with erratic behavior of the monsoon in the State makes Rajasthan the most vulnerable to drought. Based on discussions with PHED officials the water table in the town continuously decreases by 2 to 3 meter on an annual basis combined with significant drawdown conditions.

Figure 3.2: Earthquake Zones of Rajasthan

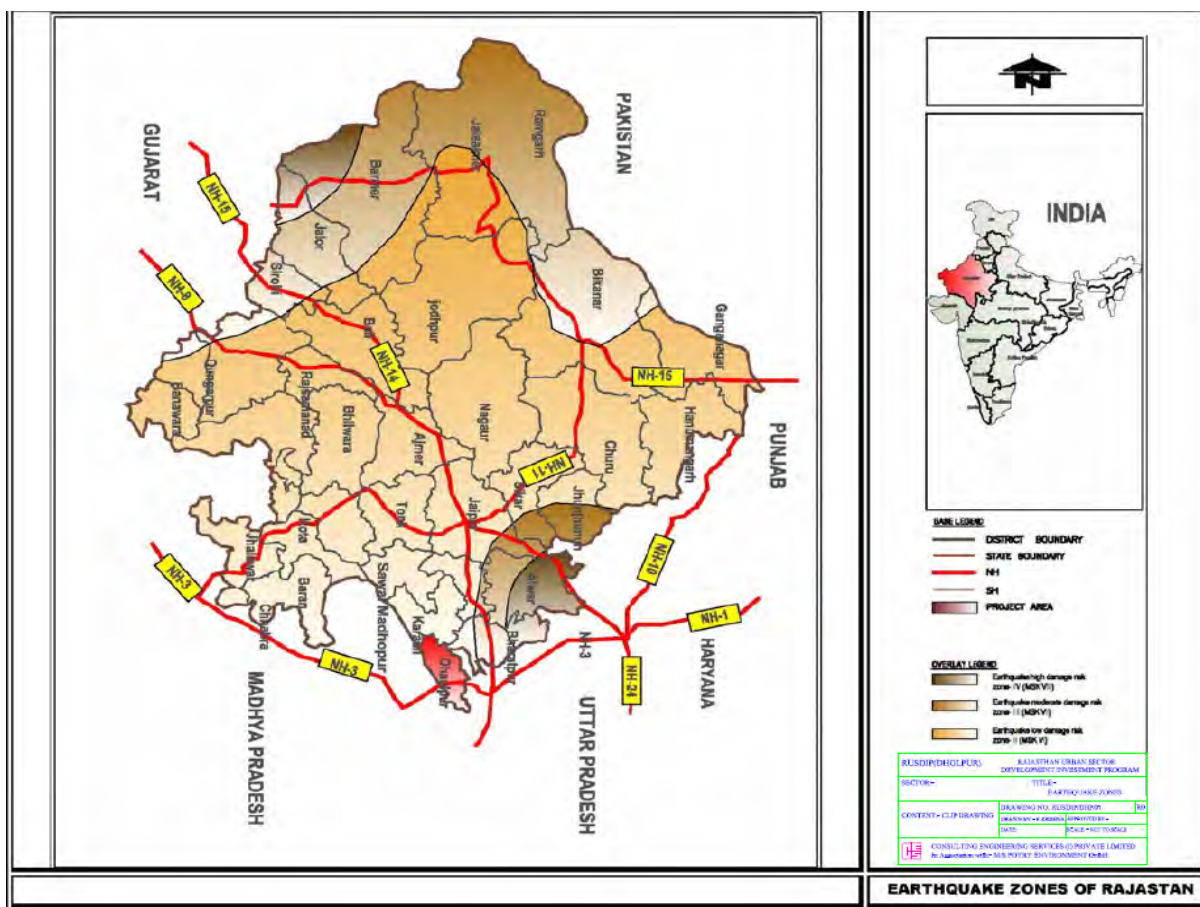
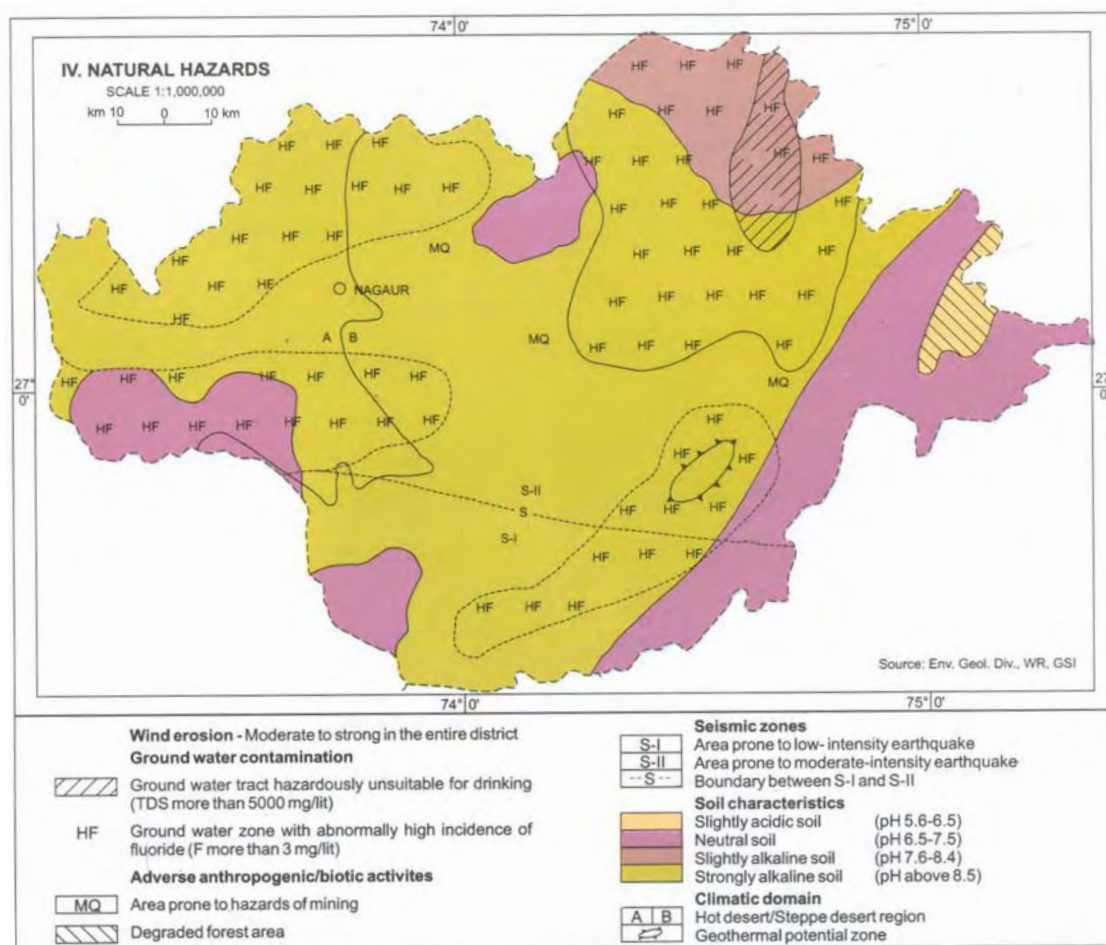


Figure 3.3: Natural Hazard map of Nagaur (GSI Resource map)

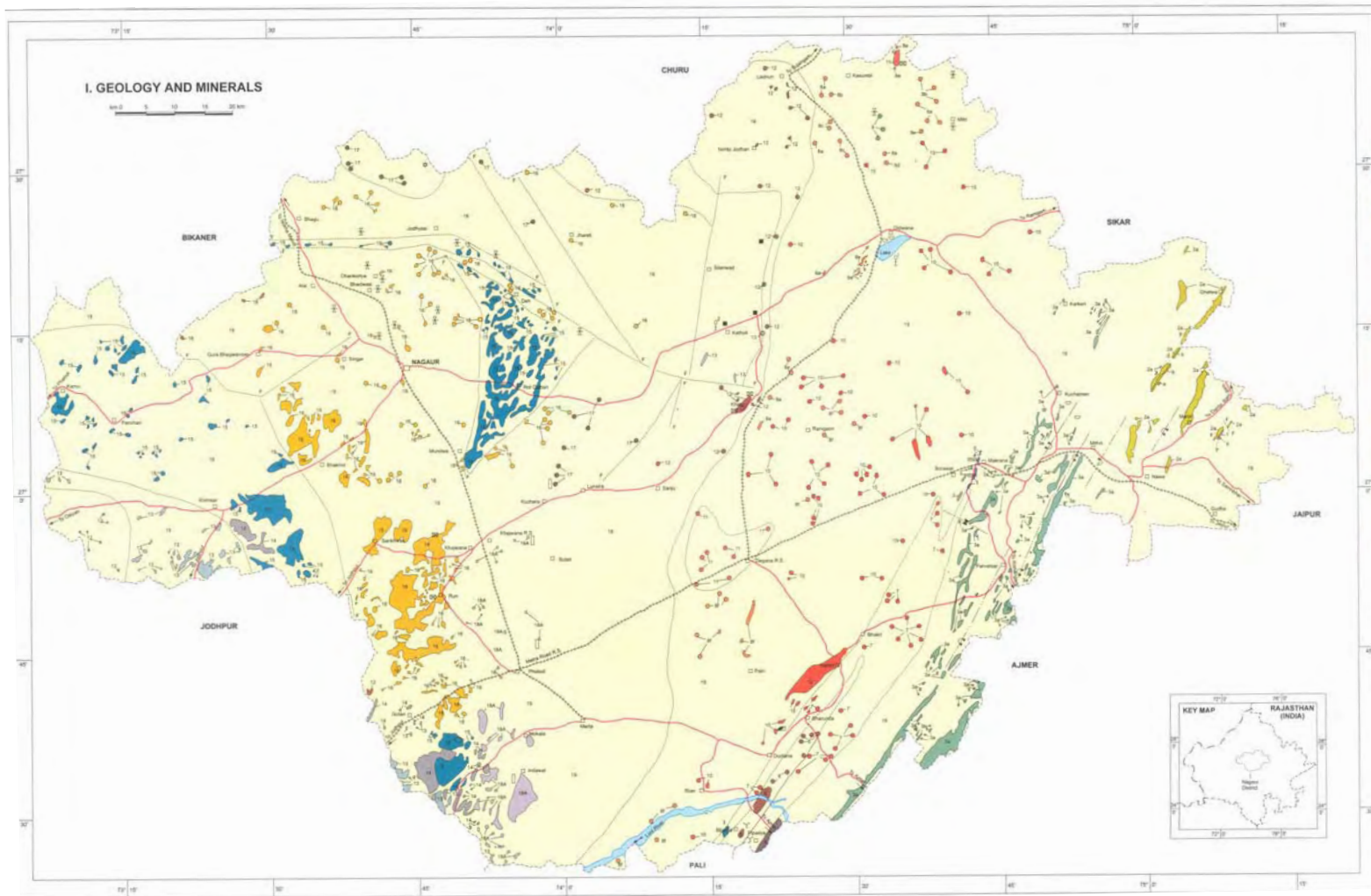


3. Geology, Geomorphology, Mineral Resources and Soil

30. The district forms a part of the Great Thar desert and is covered mainly by Aeolian sands masking the hard rocks. The various rock types of the district belong to the Delhi Super Group, the Erinpura Granite, the Malani igneous Suite and the Marwar Super Group and the palana formation. The rocks of the Alwar group are well exposed in the Eastern part of the district and comprise arkose, grit, and schist. The rocks of the Delhi Super Group have been intruded by the Sendra.

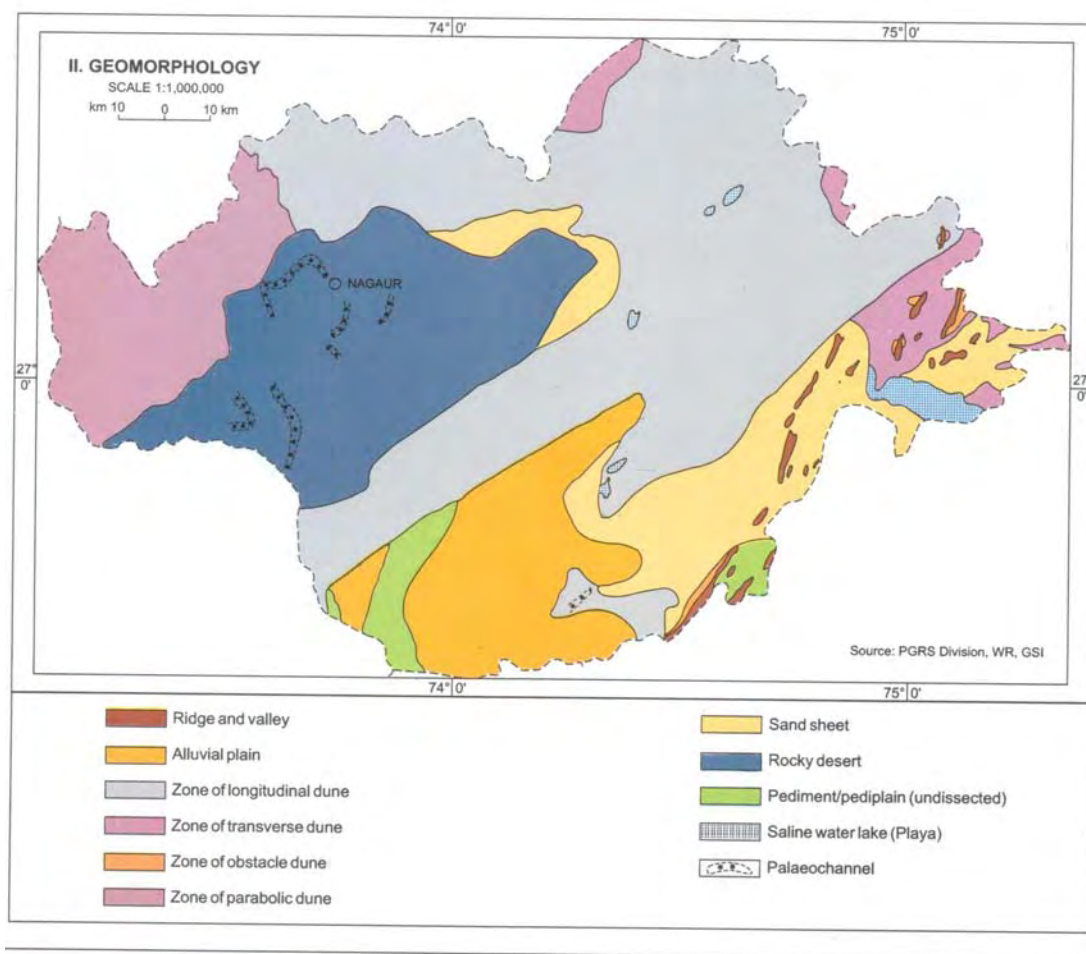
31. **Mineral Resources:** Thick gypseous beds of the district provide reserves of about 953 million tons from Dhankoria, Bhadwasi, and Nagaur deposits. Extensive deposits of China clay are found in Khajwana area. Lignite occurrences have been reported from around Metra Road Railway station. Geology and mineral map of the district is shown in **Figure 3.4** and geomorphological map of the district is depicted in **Figure 3.5**.

Figure 3.4: Geology And Mineral Map Of Nagaur District



Source: GSI Resource Map

Figure 3.5: Geomorphology and Geohydrology of Nagaur district



Source: GSI Resource Map

32. **Soil characteristics:** Soil of the region falls within low rainfall zone of 300- 500 mm. The soils are sandy loam, shallow depth red soils in depressions. **Table 3.1** shows nutrient level in the Nagaur soil including area coverage of saline and sodic soil. The nutrient status of the Nagaur soil is graded as medium to high level.

Table 3.1: Fertility Status – Major Nutrients and Problematic Soils of Nagaur District

Item	Nutrient			Saline Soil (hectares)	Sodic or Alkali (hectares)
	N	P	K		
Status	L	M	H	3315	10,658

(Source: Vital Agricultural Statistics 2004-05, Directorate of Agriculture, Rajasthan)

4. Climate

33. Nagaur has a dry climate with a hot summer. Sand storms are common in summer. The climate of the district is conspicuous by extreme dryness, large variations of temperature &

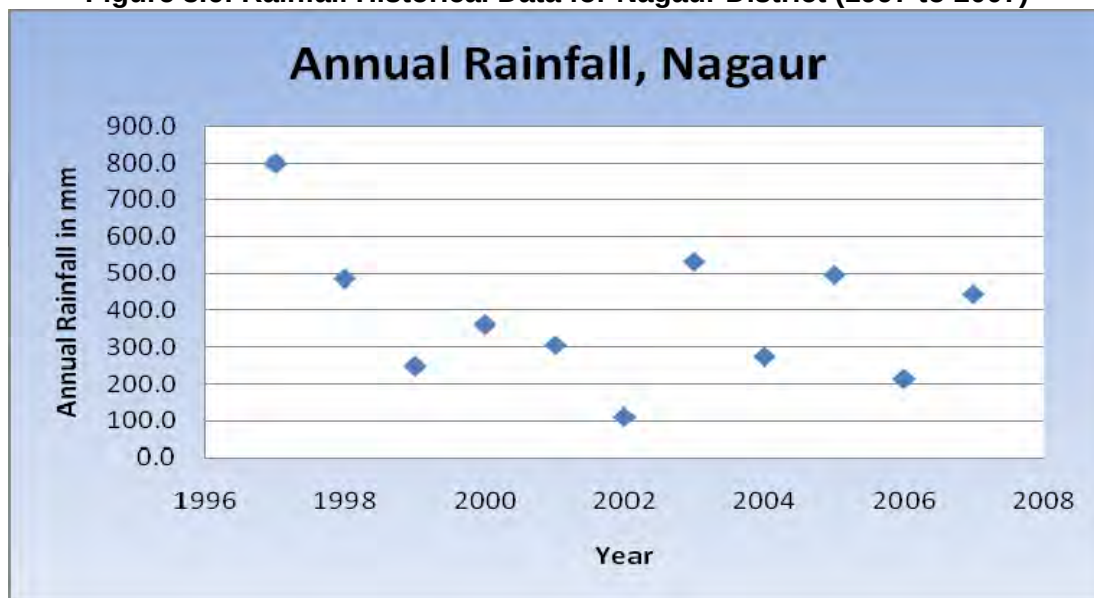
highly variable rainfall. The mercury keeps on rising intensely from March till June. These are the hottest months. The maximum temperature recorded in district is 47⁰ C with 0⁰ C as the lowest recorded temperature. The average temperature of the district is 23.5⁰ C. The winter season extends from mid November to till the beginning of March. Rainy season is of a short during from July to mid September. There are ten rain gauge stations, namely - Nagaur, Khinvsar, Didwana, Merta, Parbatsar, Makarana, Nawa, Jayal, Degana, and Ladnun in the district.

34. The rainfall over Nagaur is scanty and is concentrated over four month i.e. from June to September. The rains are erratic and so is the distribution of the rainfall. However agriculture and the animal wealth are dependent on rains to large extent. Seasonal Rainfall data for the recent year (2005-2006) is shown in **Table 3.2**. **Figure 3.6** shows yearly variation (1997-2007) of rainfall at Nagaur. The average rainfall in the district is 36.16 cm. The average humidity is 52%.

Table 3.2: Rainfall Data for Nagaur (2005 to 2006)

Months	Rainfall (mm)
June	69
July	290
August	0
September	115
October	0
November	0
December	0
January	0
February	0
March	0
April	0
May	0
Monsoon Rainfall	474
Non monsoon rainfall	0
Annual Rainfall	474

Source: Irrigation Department, Govt. of Rajasthan

Figure 3.6: Rainfall Historical Data for Nagaur District (1997 to 2007)

Source: Deputy Director hydrology water resources ID and R, Jaipur

5. Air Quality

35. Vehicular traffic is the only significant source of pollution in Nagaur. As there are no major industries located in Nagaur, the district is not subjected to ambient air quality monitoring by Rajasthan State Pollution Control Board (RPCB). The nearest monitoring station is located at Jaipur (287 km from Nagaur).. The ambient air quality data is shown in **Table 3.3**.

Table 3.3: Ambient Air Quality in Jaipur (Annual Average, 2004; units in $\mu\text{g}/\text{m}^3$)

Monitoring Station	Land use	SOx $\mu\text{g}/\text{m}^3$	NOx $\mu\text{g}/\text{m}^3$	RPSM $\mu\text{g}/\text{m}^3$	SPM $\mu\text{g}/\text{m}^3$
Jaipur Residential, Rural and others area	Residential	5.57	29.9	106	302
<i>NAAQ Standard</i>	<i>Residential</i>	60	60	60	140
Jaipur Industrial area	Industrial	22.69	9.32	131	300
<i>NAAQ Standard</i>	<i>Industrial</i>	80	80	120	360

RPSM: Respirable Suspended Particulate Matter; SPM: Suspended Particulate Matter

Source: Annual Report 2005-2006 Rajasthan State Pollution Control Board

6. Surface Water

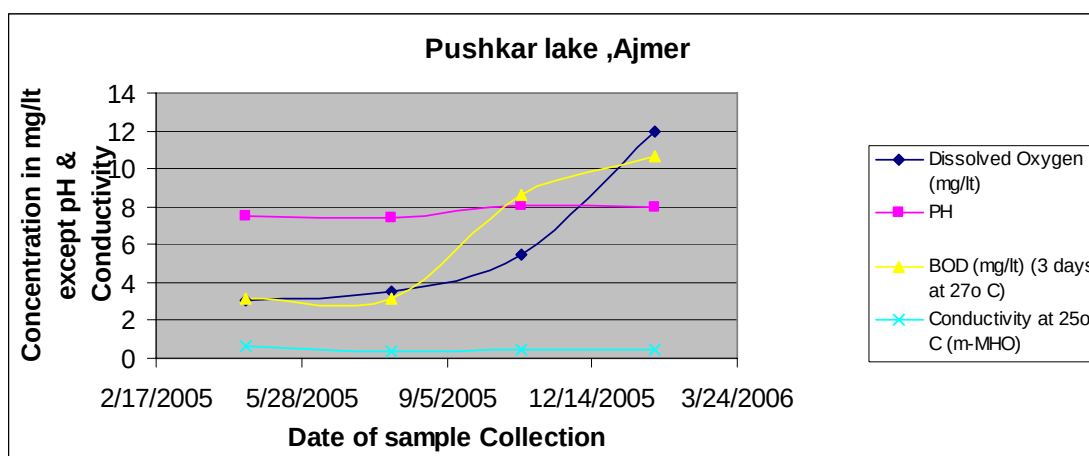
36. River Luni is a non-perennial river, it rises near Pushkar in Ajmer district and after passing over the western slopes of the Aravali, it crosses Nagaur district in the south and flows through it towards the west for nearly 37 km. before entering into Pali

37. There is no water quality monitoring station at Nagaur. The Pushkar Lake located at Ajmer (160 km from Nagaur) is the nearest water quality monitoring station. The monitoring has been carried out by RPCB at that Lake. The data on DO, pH, BOD and electrical conductivity is given in **Table 3.4**. **Figure 3.7** shows variation of water quality at that lake.

Table 3.4: Water Quality Data of Pushkar Lake, Ajmer

Location	Parameters				
	Date of Sample Collection	Dissolved Oxygen (mg/lit)	P ^H	BOD (mg/lit) (3 days at 27° C)	Conductivity at 25° C (m-MHO)
Pushkar, 160 km from Nagaur	4/20/2005	3.04	7.48	3.19	0.61
	7/29/2005	3.53	7.4	3.11	0.38
	10/26/2005	5.46	8.02	8.58	0.42
	1/26/2006	12	8	10.7	0.45

Source: Annual Report 2005-2006 Rajasthan State Pollution Control Board

Figure 3.7: Variation of Water Quality Parameters in Lake Water

7. Geohydrology and Groundwater

38. There are number of National Hydrographic monitoring stations of Central Ground Water Board in and around Nagaur. Fluctuation of ground water level is shown in **Table 3.5**. In most of the cases ground water table ranged between 20 to 60 m below ground level.

Table 3.5: Number and Percentage of National Hydrograph Network Station (Nagaur) with Water Fluctuation Range

Period	No of wells analysed	Range		0-2 m		2-5 m		5-10m		10-20m		20-60m		>60 m	
		Min	Max	No	%	No	%	No	%	No	%	No	%	No	%
Jan-06	27	5.37	63.5	0	0	0	0	2	7.41	4	14.81	19	70.37	2	7.41
Nov-05	28	5.27	62.25	0	0	0	0	3	10.34	3	10.34	21	72.41	2	6.9
Aug-05	29	5.44	62.25	0	0	0	0	3	10.34	3	10.34	21	72.41	2	6.9
May-05	35	6.02	61.96	0	0	0	0	2	5.714	4	11.43	27	77.14	2	5.71

Source: Ground water year book 2005-06 Rajasthan, Central Ground Water Board, Jaipur (2007)

39. The Central Ground Water Board carried out chemical testing of tube well water seasonally. The average concentrations of major constituents are shown in **Table 3.6**. Geohydrological map of the district is shown in **Figure 3.8**.

40. As per PHED, the entire Nagaur town is considered dark zone from groundwater exploitation point of view. As far as groundwater condition is concerned, the total dissolved solids (TDS) level is in the range of 1,160 to 2,345 parts per million (ppm), Nitrate between 31 to 87 (ppm) and fluoride between 2.85 to 4.79 ppm.

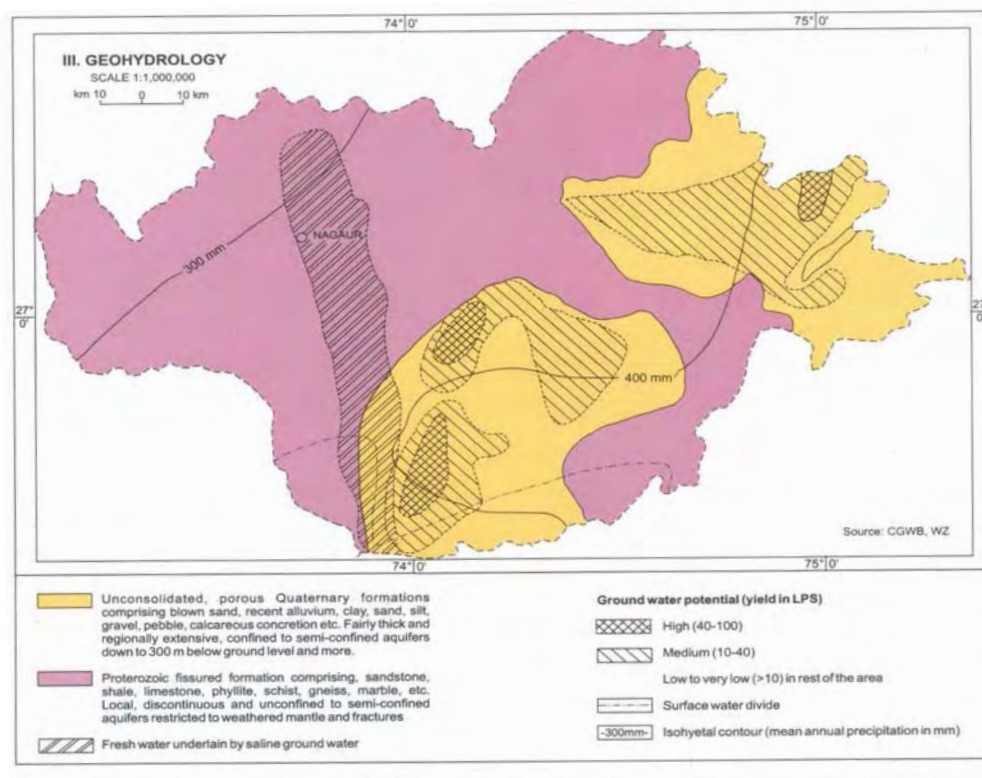
Table 3.6: Ground Water Quality In and Around Nagaur

Parameters	Maximum Level	Minimum Level	Standard of Drinking water (IS: 10500: 1991)	
			Desirable limit (mg/l)	Maximum Permissible limit (mg/l)
pH	8.56	7.85		
EC (micro-mhos/cm at 25 °C)	11410	390		
Cl (mg/l)	3195	33	250	1000
SO ₄ (mg/l)	2650	4	200	400 (if Mg does not exceeds 30 ppm)
NO ₃ (mg/l)	601	12	-	100
PO ₄ (mg/l)	0.65	0.11		
Total Hardness(mg/l)	2100	40	300	600
Ca(mg/l)	456	8	75	200
Mg(mg/l)	788	5	30	100
Na(mg/l)	2530	8	-	-
K(mg/l)	294	1	-	-
F(mg/l)	11	0.38	1.0	1.5
Fe(mg/l)	1.5	0	0.3	1.0
SiO ₂ (mg/l)	56	0		
TDS (mg/l)	7417	254	500	2000

Note: Total – 40 nos. samples

Source: Ground water year book 2005-06 Rajasthan, Central Ground Water Board, Jaipur (2007)

Figure 3.8: Geohydrological Map of Nagaur District (Source: GSI resource map)



B Ecological Resources

41. **Flora:** The flora of the district is not rich owing to its geographical situation and scanty rainfall. The south-eastern areas including a part of the northern tehsils of Ladnun and Didwana are much greener than the northwest region of district. Khejri trees are commonly found in the district. The leaves are used as fodder. It also gives gum. Apart from commercial value, this tree is considered holy. The tree also plays an important role in checking soil erosion. The other common species found in the district are babul, neem, shisham, peepal, rohira, kalsi, dhangoor, akara, rohira and shisham trees provide timber & is used for making furniture. Dhangoor is generally used for making cots. A common shrub-phog provides building material from its roots & twigs. Common grass found in the district include bargers, bhambar etc.

42. **Fauna:** Wild Animals such as chinkaras and black bucks which are rarely seen in this area are protected species under the Rajasthan Wild Animals and Birds Protection Act (1951). Among the small game, only titars are found. Other fauna of the district consists of deer, hare, jackal, pig, wild cat and birds. The common birds fluttering in the district include peencha, bulbul, sugan chiri, and mor (peacocks).

43. The district of Nagaur is poor in forest resources. The total area under including hills, is reported to be 240.92 sq km, which is 1.3 percent of total geographical area of the district. Scanty rainfall and other geographical constraints account for this. The western part of the district is divided of natural vegetation cover except for low herbs and grass which grows on low sand dunes. However, the south-eastern part of the district and part of the northern tehsil of

Ladnun and Didwana have much greater greenery as compared to north-west part of the district.

44. Near project site there is no forest area exists. No endangered species of flora and fauna are noted near subproject.

C Economic Development

45. In olden times, there were minor manufacturers having a market in the neighboring areas while for the rest of the trades there were hereditary artisans like carpenters, blacksmiths, potters, goldsmiths and other artisans to meet the local demands. Even after independence, Nagaur district has been practically industrially backward on account of the lack of exploitation of natural resources and under developed infrastructural facilities. Now the industrial climate is changing and a number of incentives and concessions are being offered to prospective entrepreneurs and they are looking forward to establish their units in the district.

46. The prosperity of Nagaur reached its zenith in 17th century when the atmosphere of peace and security prevailed and the caravans passed through. Consequently, the business of wool, silk, opium and spices flourished. The merchants moved away to the British India and onwards to Kolkata and other business centers in central India. They earned a lot of money using their unique business acumen and decided to raise the palatial houses for their families in Nagaur.

47. With the coming of railways, the area near railway station was developed and many public buildings were constructed. The development of the town got an impetus during post independence period, where a number of government offices, buildings, residential colonies, Mandi yard and RIICO industrial area were developed. Most of the developments have taken place in the south-west, west and north-west direction. In some of the areas in the east and north-east unplanned colonies have been developed in haphazard manner, even outside the Municipal limit. These developments have exerted enormous pressure over the town infrastructure and as a result a number of problems such as housing, slums, traffic congestion, and deficiency in municipal services have emerged.

48. Power Status of the Area: There is no power generation unit at Nagaur. The consumption of electricity by different sectors is shown in **Table** below.

Table 3.7: Consumption of Electricity in Million Kwh (2003-04)

District	Domestic	Non-Domestic (Commercial)	Industr ial	Public Lighting	Public Water Works	District	Domestic
			Small	Medium	Large		
Naguar	86.322	18.463	23.83	39.966	31.50	1.947	47.836

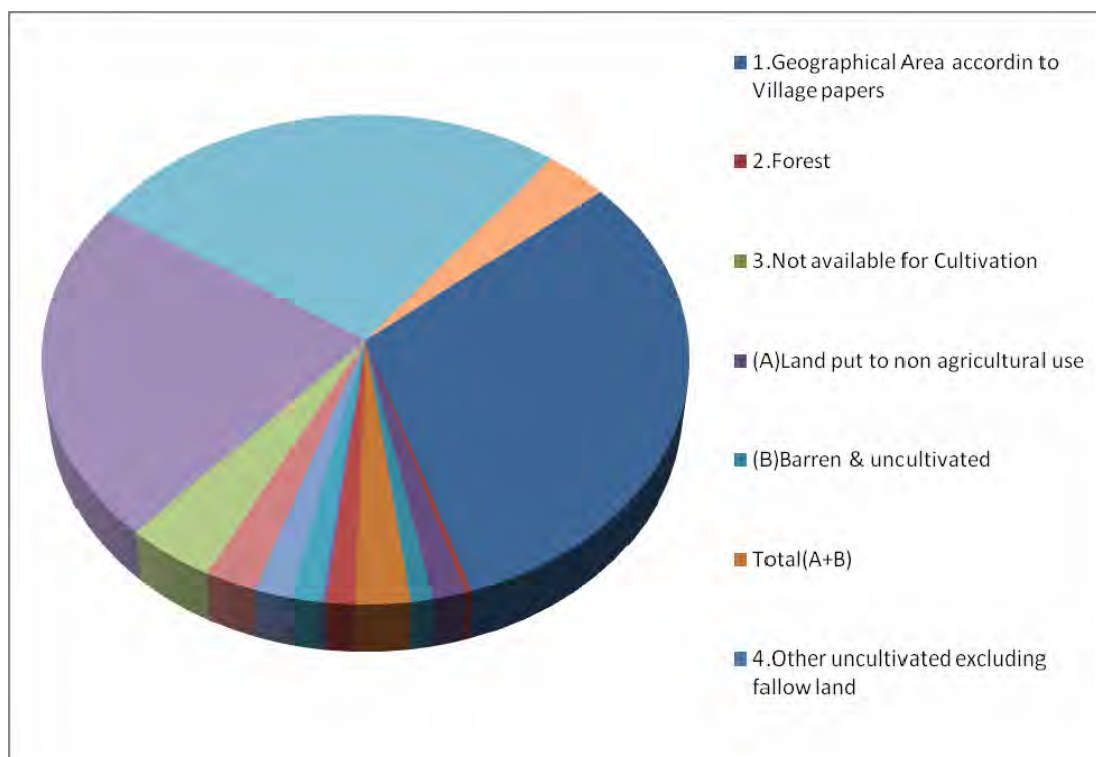
1. Land use

49. Land use of the Nagaur district is shown in **Table 3.8** and in **Figure 3.9**.

Table 3.8: Land use of Nagaur district

Nagaur	Area (ha)	Percentage
1.Geographical Area	1,764,380	
2.Forest	17,989	1.01
3.Not available for Cultivation		0
(A)Land put to non agricultural use	86,454	4.89
(B)Barren & uncultivated	59,009	3.34
Total(A+B)	145,463	
4.Other uncultivated excluding fallow land		
(C)Permanent pasture & other grazing land	71,601	4.05
(D)Land under misc. tree crops & groves not included in net area sown	28	0.001
(E)Culturable waste	11,984	0.67
Total(C+D+E)	83,613	
5.Fallow land		0
(F)Old fallow land	97,408	5.52
(G)Current fallow land	136,527	7.73
Total(F+G)	233,935	
6.Net area sown	1,283,380	72.73
7.Total cropped area	1,477,904	83.76
8.Area sown more than once	194,524	11.02

Source: Statistical abstract Rajasthan 2004

Figure 3.9: Land use of Nagaur district

50. Environmental features in and around the proposed water pipeline is shown in **Appendix 2**. Along the pipelines trees, sensitive areas, offices, commercial areas are exist. But those will be not affected during laying of pipelines.

2. Commerce, Industry and Agriculture

51. Large & Medium Scale Industries: Industrial units with a fixed capital investment of Rs. 5 crores and above are categorized as large scale industries. There are seven large and medium scale industries which exist in Nagaur district.

Table 3.9: List of Existing Large & Medium Scale Industries

	Name of the Unit	Product Name
1	J.K. White Cement Works, Gotan	White Cement
2	Maheshwari Marble & Granites India Ltd. Bidiyad	Marble Slabs
3	Saboo Sodium Chlorides Ltd. Govindi-Marwar	Refined Iodised Salt
4	Sarvottam Industries Ltd. Merta Road	Edible Oil & Cakes
5	Nihon Nirman Ltd. Gotan	White Cement

52. Small Scale Industry: Inspired by the incentives of the Government, the growth of small scale industries in the district is fast. The total industrial units, registered in the District Industries Centre upto March, 2000 were 12849. The major units covered by this sector are mainly food based industries, agriculture based industries etc. Some of these units are old & traditional

industries while there has been coming up in recent years either as demand or resources based industries.

Table 3.10: Details of Registered SSI Unit in District Nagaur

S. No.	Type of Industries	SSI Unit			Artisan Unit		
		No.	Invest (in lacs)	Employment	No.	Invest (in lacs)	Employment
1	Agro Based	2301	5944.79	13450	162	16.74	539
2	Forest Based	317	191.15	1189	1868	15.50	2692
3	Mineral Based	2138	6221.06	13538	422	115.07	882
4	Cloth Based	677	245.78	1482	2787	62.50	4180
5	Engineering Based	1545	2234.63	7817	302	5.18	471
6	Chemical Based	221	811.36	1123	6	1.04	13
7	Animal Based	9	4.30	26	3036	103.53	4463
8	Other	1295	1022.36	3757	5	0.50	11
	Total	8503	16675.43	42382	8588	320.06	13251

53. Khadi & Village Industries: The Khadi and Village Industries of the district include leather, tanning & manufacture of leather goods, weaving of cloths, woolen carpets, soap, furniture, rope making etc. Besides, the traditional blacksmiths, carpenters and potters etc. are also available in the most of the parts of the district. The development of village industries has an important place in the development plan of the state. These have been getting impetus through incentives, mainly in the form of loans being provided by Rajasthan Khadi Gramudyog Board, Rajasthan Financial Corporation, etc.

54. Hand-tools Industry: If Rajasthan State is in the helm of handicrafts over the world, Nagaur claims its superiority in hand-tools. Hand-tools Industry has flourished in & around Nagaur over the years. The industry peers into the past dating back 600 years. It is worth-seeing how iron is moulded & made use of for different sections of the society. About 300 types of hand-tools are manufactured catering to the requirements from gold-smiths to aeroplane engineers. Though the iron industry has undergone drastic changes, the hand-tools industry remained unchallenged and unmatched. The demand of these hand made tools always witnessed growing trend. Hand Tools Design, Development & Training Centre (HTDDTC) is engaged in motivating more units to come up.

55. Salt industry: Nagaur district is also an important salt producing area, Nawa and Deedwana tehsils being the major salt producing zones. Moreover, the Sambhar area (although forming part of the Jaipur district) is quite close to the salt belt of the Nagaur district. The industries based on common salt area local resources could sustain other industrial plants.

56. Gypsum based industries: Nagaur district is very rich in gypsum deposits with Nagaur, Bhadwasi, Bhadana and Manglod as particularly the best Gypsum bearing areas in the district. The reserves were estimated to be 952 MT with 81% content and above by the Geographical Survey of India. A substantial part of the gypsum produced here has been supplied to the Sindri fertilizer factory in Bihar. It has also found its way to Haryana, after primary grinding. An

industrial complex in Nagaur, based on gypsum, along with ancillaries could be a major employment provider for the local population.

57. Limestone-based Industries: Best grade lime stone is found at Gotan, Mundwa, Kathoti and Ambali in the Nagaur district. Limestone is also available in the Nagaur district in abundant quantity & the quality is reasonably good. Large reserves amounting to about 33 MT of high grade lime stone are found near Gotan. The deposit near Mundwa contains a reserve of about 1.19 MT of high grade lime stone.

58. Wolframite Tungesten: Wolfram (Wolframite) deposits are found in the Renwat hill at Degana. In this mineral, the tungstate of iron and manganese, occurs, in the veins or lodes of granite and phillites especially. Tungsten is specially suitable for use in the production of alloy steels and high speed cutting steels which retain hardness even when they are red hot. However for small quantities generally low grade materials have been mined. A reserve of the order of 3,400 tones has been established. Other minerals available in Nagaur district including sandstone. It is available almost every where in the district, but the best grades are available at Khatu in Deedwana tehsil where as many as 150 quarries already exists. Fairly good deposits of white clay are found of near the village of Suradhana, Khajawana, Mundwa, Dhadhariya Khurd and at a number of other places in Merta Tehsil.

59. Industrial Areas: In Nagaur district, Rajasthan State Industrial Development & Investment Corporation Ltd. (RIICO) has developed industrial areas & are located at Nagaur, Merta, Makarana. The district also has three industrial area of District Industrial Centre (DIC).

60. In and around the Nagaur town area 70 to 80% of lands used for agricultural purpose. Crop production statistics as depicted in **Table 3.11** indicates much more crop production in Kharif season in compared to Rabi season.

Table 3.11: Crop Production in Around Nagaur district

Type of Crops	Under Rabi Crops 2003-04 (Prod in Tonnes)	Under Kharif Crops 2003-04 (Prod in Tonnes)
Cereals	226,465	700,976
Pulses	37,958	225,412
Food Grains	264,423	926,388
Oilseeds	115,718	16,375
Others	44,262	100,232
Total	424,403	1,042,995

Source: Vital Agricultural statistics 2004-05, Directorate of Agriculture and Statistics, Govt. of Rajasthan

3. Infrastructure

61. Water Supply: Nagaur town, being the district headquarter and with having a population of 93,915 as per census 2001, has been fully covered under Urban Water Supply Scheme. Presently, this scheme is run and maintained with assistance of 45 tube wells as water source. It is also important to note here that even a single tube well with safe and adequate quantity of water is not available in Nagaur town, hence for drinking water for the entire population of the town is fully dependent on external sources, located at villages of Janana, Khajwana, Indokali and Khen of Tehsil Mundwa, with distances of 32 km from the Nagaur. Out of 45 tube wells, water quality in 35 nos. which are located at Khajwana and Janana & Indokali are more or less safe - passes the Indian drinking water standards except few parameter like TDS, whereas the 10 remaining tube wells at Khen, Soliyana & Fagli have excessive fluoride content from 5 to 7 ppm, hence in absence of 100% safe & with sufficient water quantities at Khajwana, Indokali & Janana, Nagaur town is served with water after diluting of both the quality of water by mixing to each other at a interval of 48 hrs. Total production from all these sources presently is 7.9 MLD and present service level is 43 lpcd as compared to that of basic requirement of 135 lpcd.

62. Nagaur town is divided into 48 zones, out of which 28 zones are supplied water by direct boosting and remaining 20 are through service reservoirs. There are 10 service reservoirs (SRs) storing approximately 4.1 ML. Water is supplied through 9,914 water connections and the total length of the distribution network length is 165 km. Addition of 4 new SRs is required to distribute drinking water to the new emerged and developed slums, and colonies surrounding Nagaur town. Since existing distribution system is old, insufficient, and deteriorating, replacement is necessary. While extension of the existing system for new slums and colonies would require in additional pipelines. The existing system is shown in Table below.

Existing system	Location
Over Head Service reservoirs	Shurda Bal, Hanuman bag, Manasar, RIICO, Gandhi Chwak, Ajmeri gate, Hraijan basti, Indira colony, PHED campus
Distribution system	Shurda Bal, Hanuman bag, Manasar, RIICO, Gandhi Chwak, Ajmeri gate, Hraijan basti, Indira colony

63. Sewerage System: Nagaur town does not have underground sewerage system. The municipal drains are mostly open and overflowing into *nallas* causing problem in rainy season. The water flows that flows to the drain is dirty as it receives flow from toilets and sullage causing unsanitary condition.

64. **Sanitation:** Only 70 % of the households reportedly has septic tanks and soaks well for sewerage disposal. The remaining accounted for cases of open defecation which is an unacceptable and unhygienic practice. The raw settled sewage from septic tank is periodically flushed out by sanitary workers of the Municipal Board and discharge to open spaces, agricultural lands in an indiscriminate manner. Slum areas were also not equipped with requisite sanitation resulting in open defecation.

65. **Drainage:** In Nagaur town itself no natural drainage system exists to drain away the rainwater or wastewater from the town. Presently there exists a minimal network of storm water drains in the town. The existing network of (roadside) storm water drains in Nagaur has been identified under broad categories as follows.

Table: 3.12: Type of Drains and Existing Length in Nagaur Town

Type of Drain	Existing Length (m)
Box Drain	1000
Conduit Drain	-
Closed Pucca Drain	2000
Open Pucca Drain	500
Kutchra Drain	5000
Others	2000

66. **Irrigation Canals:** Canals have been constructed through almost all the dry valleys , making the lands around them very productive . The important canal systems are the Gang canal system , the Bhakra canal system, the west Yamuna canal system, and the Indira Gandhi canal system. Nagaur will tap water supply from the Indira Gandhi Canal. Indira Gandhi Nahar Project (IGNP) is one of the most gigantic projects in the world aiming to dedesertify and transform desert waste land into agriculturally productive area. The project objectives include drought proofing, providing drinking water, improvement of environment, afforestation, employment, rehabilitation, development and projection of animal wealth and increasing agricultural produce. The project construction commenced in the year 1958. Though the project is only partially complete it has shown remarkable success.

67. Indira Gandhi Nahar Project was designed to utilise 9,367 Mm³/yr of the total 10,608 Mm³/yr allocated to Rajasthan from the surplus waters of the Ravi and Beas rivers – Which is applicable to Nagaur and provide more information.

68. **Industrial Effluents:** Industries exist in Nagaur, which is outside the town area and effluent disposed scattered in local nallahs. As reported by the local MC, the responsibility of effluent disposal is under Industry's own and could not be connected to the proposed sewer network. The individual industry should treat their effluent to bring it to the required standard before final disposal.

69. **Solid Waste:** Municipal Moard's jurisdiction is spread over an area of 37.81 sq km. 52 tons of solid waste is collected daily. In addition to household (domestic) solid waste, the main waste generation sources in the town are vegetable and fruit markets, commercial and institutional establishments including hotels and eateries, construction activities, and other tourism related activities.

70. The MSW generated in the Nagaur town (including slum area) mainly consist of domestic refuses, waste from commercial area, Vegetable-Fruit market, bio-medical waste, waste from Hotels and Restaurants, Industries etc. The waste collection system being followed is quite primitive, individual households/units throw the garbage on road side/open drains close to their houses and the sweepers collect the garbage in the form of small heaps on road sides. Similarly the open drains are also cleaned periodically and the sludge is heaped adjacent to the drain where it is left for 2-3 days to get dried and lifted. Tractor trolleys then lift these dumps the heaped garbage once or twice a day. The MSW generated is transported to garbage dumping site. The MB has engaged one loader and three tractors and four private tractors for collecting and transporting the solid waste material. The waste material is lifted by loaders and put on trolley for transportation to disposal site. Roads in Nagaur town are very narrow, which is the main hindrance to carry solid waste material through tractors. It is very necessary to develop infrastructure i.e. adequate equipment like wheelbarrows, dumper placer, containers, dumper placers, machines, and storage devices for collection, transportation and disposal. There are 3 waste dumping sites, 3 nos. transfer station in operation. Transfer stations are located on an average 2 km from the disposal site.

4. Transportation

71. **Table 3.13** provides a breakdown of road surface composition in Physical growth of the town has resulted in a corresponding increase in vehicular traffic greater than that of the town's population growth due to improving economic status of the town.

Table 3.13: Road Surface Composition

Surface Type	Total (km)
Concrete	30
Bituminous	108
WBM	18

Source: PWD Nagaur

72. Overall road network of the district is given in **Table 3.14**.

Table 3.14: Road Network of Nagaur

S.No.	Category of Road	Length in Kms.
1	National Highway (N.H. No. 65 & 89)	321.00
2	B.T. Road	6100.00
3	Metal Road	105.00
4	Gravel Road	452.00
5	Kuchcha Road	99.00
	Total	7077.00

D. Social and Cultural Resources

1. Demography

73. Nagaur district is comprised of 1,570 Revenue Estates (villages), out of which Merta, Deedwana, Makarana, Parbatsar and Kuchaman are the major towns of the district. The total area of the district is 17,718 sq. km., out of which 17,448.5 sq. km is rural and 269.5 sq. km is urban. As per the 2001 census, the population of the district is 27,75,058 (4,77,337 urban and 22,97,721 rural population) which is 4.91% of the total population of the State. The density of population in the district is 157, as against 165 of Rajasthan as a whole. 12,87,921 persons of the district are literate, out of which 10,21,314 are rural and 2,66,607 are urban, which makes it 58.26% of the total population. Out of this literate population 75.33% are males and 40.45% are females. Working population of the district is 39%. Projected population of the Nagaur town is shown in **Table 3.15**. Nagaur Municipal area comprises 40 wards. Ward-wise population is shown in **Table 3.16**.

Table 3.15: Projected Population

Year	Population (no.)	Percentage Increase
2001	93,915	
2011	123,580	31.58
2021	162,954	31.86
2031	215,004	31.94
2041	283,877	32.03

Table 3.16: Ward wise Population (2006)

Ward No.	Population 2006
1	3330
2	3756
3	2860
4	2363
5	2303
6	2208
7	2099
8	2141
9	2344
10	4548
11	2128
12	2421
13	1951
14	1929
15	2092
16	2165
17	1718
18	2008
19	2266
20	1886

Ward No.	Population 2006
21	1875
22	1656
23	2220
24	3427
25	3847
26	4990
27	2738
28	4167
29	1991
30	2968
31	3850
32	2117
33	2485
34	2999
35	3110
36	2080
37	2480
38	2807
39	2460
40	2063

2. Health and Educational Facilities

74. There are good educational facilities in Nagaur district, which serve both townspeople and inhabitants of surrounding villages and towns in the hinterland. There are 2733 primary schools, 252 secondary and higher secondary schools, plus 6 general degree colleges, 4 professional colleges including industrial training institutes (ITI). **Table 3.17** shows education facility in the district.

Table 3.17: Educational facility of Nagaur District

	(Nos)
Colleges	5
Professional colleges	4
Higher Secondary and Secondary Schools	252
Primary and middle schools	2733

Source: Official website of Nagaur district

75. There is 1 district hospital, 1 TB hospital and 1 leprosy hospital in the Nagaur town. **Table 3.18** and **Table 3.19** shows detail of medical facility of Nagaur town and entire district respectively.

Table 3.18: Medical facility at Nagaur urban area

S.No.	Facilities	Number
1	Hospital	1
2	TB Hospital	1
3	Mother and Child Care Centre	1
4	Leprosy Hospital.	1
5	Total	4

Source: District Statistical Hand Book 2005

Table 3.19: Medical facility at Nagaur district

Description	Nos.
Hospitals / Dispensaries	11
Primary Health Centers	96
Sub Health Centers	605
Beds	1458
Community Health Centers	17
Block Primary Health Centers	11
Medical Relief Society	105
Ayurvedic Hospitals / Dispensaries	154
Homeopathic Hospitals	3
Yunani Hospitals	4
Allopathic Hospitals	2

Source: Official website of district

3. History, Culture and Tourism

76. Nagaur has moderate tourist inflows with main attractions being Nagaur Fort, Tarkeen Dargah , Jain Temple in Glass, Saiji Ka Tanka, Khinvasar fort, Dadhimati temple, Meera Bai Temple. – include more information from <http://www.nagaur.nic.in/> because we need to establish that although there are many historical, cultural and tourist palaces in Nagaur, these places will not be impacted.

IV. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: LOCATION AND DESIGN

77. ADB Environmental Assessment Guidelines require that an IEE should evaluate impacts due to the location, design, construction and operation of the project. Construction and operation are the two activities in which the project interacts physically with the environment, so they are the two activities during which the environmental impacts occur. In assessing the effects of these processes therefore, all potential impacts of the project are identified, and mitigation is devised for any negative impacts.

78. In many environmental assessments, there are certain effects that, although they will occur during either the construction or operation stage, should be considered as impacts

primarily of the location or design of the project, as they would not occur if an alternative location or design was chosen. For example, if a groundwater aquifer was depleted by excessive abstraction this would be an impact of both the location and design, because groundwater may not be depleted if the design had used surface water to augment the supply, and the specific aquifer would not have been depleted if the well field was located elsewhere.

79. However in the case, it is being considered that there are no impacts that can said to result from either the design or location of this subproject. This is because:

- Most of the individual elements of the subproject are relatively small and involve straightforward construction and operation, so impacts will be mainly localised and not greatly significant;
- Most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving trenching and other excavation. However the routine nature of the impacts means that most can be easily mitigated;
- In one of the major areas in which there could be significant impacts (archaeology), those impacts are clearly a result of the construction process rather than the project design or location, as they would not occur if this did not involve trenching or other ground disturbance.

80. At present water supply of Nagaur is wholly from the ground water sources, extracted through tube wells located at various well-fields situated at 30 – 40 km from the city center. Water from the tube wells yielding water with high fluoride content will be blended with surface water to meet the potable water quality standard as per the Indian standard. With the availability of water from Indira Gandhi canal (IGNP) the ground water sources will be withdrawn.

V. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: INFRASTRUCTURE CONSTRUCTION

A. Screening out Areas of No Significant Impact

81. From the descriptions given in Section III, it is clear that implementation of the project will affect quite long tracts of land both inside and outside the town where the distribution main, transmission main, and network extensions will be constructed, and also a series of specific locations for OSHRs and some of which are quite large CWRs. Design project report has been prepared and is under review

82. However it is not expected that the construction work will cause major negative impacts. This is mainly because:

- Pipelines will be mainly located on unused ground alongside existing roads and can be constructed without causing major disruption to road users and adjacent houses, shops and other businesses;

- New facilities (OSHRs, CWRs, pump houses, etc.) within and outside the town will be located on government-owned land that is not occupied or used for any other purpose;
- Most pipeline construction will be conducted by small teams working on short lengths at a time so most impacts will be localized and short in duration;
- The overall construction programme will be relatively short for a project of this nature, and is expected to be completed in 2.5 years.

83. As a result there are several aspects of the environment that are not expected to be affected by the construction process and these can be screened out of the assessment at this stage as required by ADB procedure. These are shown in **Table 5.1**, with an explanation of the reasoning in each case.

Table 5.1: Fields in Which Construction Is Not Expected To Have Significant Impacts

Field	Rationale
Climate	Short-term production of dust is the only effect on atmosphere
Geology and seismology	Excavation will not be large enough to affect these features
Fisheries & aquatic biology	No rivers or lakes will be affected by the construction work
Wildlife and rare or endangered species	There is no wildlife or rare or endangered species in the town or on the government owned areas outside the town on which facilities will be built
Coastal resources	Nagaur is not located in a coastal area
Population and communities	Construction will not affect population numbers, location or composition But after finalization of alignment the actual impact can be assessed

84. These environmental factors have thus been screened out presently but will be analysed again before starting of construction work.

85. Rapid Environmental Impact Assessment checklist is given in **Appendix 3**.

B. Source and Supply Augmentation

1. Construction method

86. As explained above, augmentation of the water source and supply will involve construction of 6 km transmission/raising main.

2. Physical Resources

87. Excavation for transmission main will generate waste soil and stone. There will therefore be physical changes at the construction sites. However, the waste soil and stone be will be dumped in a government-approved area without causing further physical impacts (on air quality, topography, soil quality, etc) at the point of disposal. The work will probably be conducted in the dry season, so there is a lot of potential for the creation of dust.

88. Action will therefore be needed to reduce physical impacts at both the construction and disposal sites, by controlling dust and reducing the amount of material to be dumped. The Contractor should therefore be required to:

- Contacting the town authorities to arrange for the use of this material where possible, such as in construction projects, to raise the level of land prior to construction of roads or buildings, or to fill previously excavated areas; and
- Preventing the generation of dust (which could affect surrounding agricultural land and crops) by removing waste materials as soon as it is excavated, by loading directly onto trucks, and covering with tarpaulins to prevent dust during transportation..

89. Another physical impact that is often associated with large-scale excavation is the effect on drainage and the local water table if groundwater and surface water collects in the voids. However, this should not be a problem in this case, given the low rainfall and deep water table in this area, and the fact that the Contractor will almost certainly plan excavation work to avoid the monsoon season.

3. Ecological Resources

90. There are no protected areas or locations of any ecological interest at or near any of the sites affected by these works, so it is unlikely that the construction process will have any ecological impacts. The only concern would be if trees were removed unnecessarily. To avoid this, the Contractor should be required to plant and maintain three new trees for every one that is removed.

4. Economic Development

91. The transmission main will be located on government owned land, so there should be no need to acquire land from private owners, which might affect the income and assets of owners and tenants. There should also be no effects on other features with economic implications (such as infrastructure, industry and commerce), as there are none of these facilities on these sites.

92. There could however be significant disruption of traffic, business and other activities, if trucks carrying waste material were allowed to enter Nagaur town or other built-up areas. The transportation of waste will be implemented by the Contractor in liaison with the town authorities, and the following additional precautions should thus be adopted to avoid these impacts:

- Planning transportation routes so that heavy vehicles do not enter Nagaur Town or other built-up areas and do not use narrow local roads, except near delivery sites; and
- Scheduling the transportation of waste to avoid peak traffic periods.

5. Social and Cultural Resources

93. Rajasthan is an area with a rich and varied cultural heritage that includes many forts and palaces from the Rajput and Mughal periods, and large numbers of temples and other religious sites, so there is a risk that any work involving ground disturbance could uncover and damage

archaeological and historical remains. Given that the locations proposed for these facilities are uninhabited and show no obvious signs of having been used to any extent in the past, then it could be that there is a low risk of such impacts at these sites. Nevertheless this should be ascertained by consulting the appropriate authorities, and appropriate steps should be taken according to the nature of the risk. This should involve:

- Consulting historical and archaeological authorities at both national and state level to obtain an expert assessment of the archaeological potential of all proposed sites;
- Selecting alternative sites for any work proposed in areas of medium or high risk;
- Including state and local archaeological, cultural and historical authorities and interest groups in consultation forums as project stakeholders so that their expertise can be made available to the project; and
- Developing a protocol for use by the Contractor in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved. This should involve:
 - Having excavation observed by a person with archaeological field training;
 - Stopping work immediately to allow further investigation if any finds are suspected;
 - Calling in the state archaeological authority if a find is suspected, and taking any action they require ensuring its removal or protection in situ.

94. There are no modern-day social and cultural resources (such as schools and hospitals) on or near these sites, and no areas that are used for religious or other purposes, so there is no risk of other impacts on such community assets.

95. Finally, there could be some short-term socio-economic benefits from the construction work if local people are able to gain employment in the construction workforce. To ensure that such gains are directed towards communities most directly affected by this part of the scheme, the Contractor should be required to employ at least 50% of this labour force from communities within a radius of say 2 km from each site, if sufficient people are available.

C. Network improvement

1. Construction method

96. Expansion of the distribution network will involve laying of approximately 86 km distribution network, construction of 8 OHSRs, construction of 1 CWR and chlorinator, and construction of intermediate pumping station. Reduction of non-revenue water will involve replacement of non-functional water meters in addition to new meters, repair of house connections, and installation of new bulk meters on rising main and distribution main from SR.

97. These all involve the same kinds of construction and will produce similar effects on the environment, so their impacts are considered together.

98. It is expected that the distribution mains will be buried in trenches adjacent to roads, in the un-used area within the ROW, at the edge of the tarmac. However the distribution mains will be located in roads and streets in the town, where in some places this area is occupied by drains or the edges of shops and houses etc, so to avoid damage to property some trenches may be dug into the edge of the road.

99. Trenches will be dug using a backhoe digger, supplemented by manual digging where necessary. Excavated soil will be placed alongside, and the pipes (brought to site on trucks and stored on unused land nearby) will be placed in the trench by hand or using a small rig for the larger DI pipes. Pipes will be joined by hand, after which sand from local quarries will be shoveled into the trench beneath and around the pipe for support and protection. Soil will then be replaced manually on top of the pipe and compacted by a vibrating compressor. Where trenches are dug into an existing roadway, the bitumen or concrete surface will be broken by hand-held pneumatic drills, after which the trench will be excavated by backhoe, and the appropriate surface will be reapplied on completion.

100. Pipes are normally covered by 1.2 m of soil, and a clearance of 100 mm is left between the pipe and each side of the trench to allow backfilling. Trenches will be smaller for the distribution main (minimum of 1.4 m deep and 0.4 m wide). Old pipes will be replaced by new one after taken out old pipe by digging.

101. New pipes and connections to the distribution main will be provided to house connections, and these will run to individual dwellings in small hand-dug trenches, or on the surface. New consumer meters will be located outside houses, attached to a wall or set onto the ground. In slum areas water will be provided via communal taps from where people will collect their water.

102. The OSHRs and CWR will be built on government land at various locations in the town. The foundations for the OSHRs will be excavated by backhoe, with soil being loaded onto trucks for disposal. Aggregate and concrete will be tipped into each void to create the foundations and floor, after which metal reinforcing rods will be added to create the outline of the walls of the Ground reservoir and the vertical supporting pillars of the OSHR. Sections of reinforcing will then be encased in wooden shuttering and concrete will be poured in, and this process will be repeated to gradually create each structure from reinforced cement concrete (RCC), including the tank of the OHSR and the above-ground portion of the Ground reservoir. Surfaces will be smoothed and finished where necessary by hand.

103. Small brick rooms will be built to house the chlorination plant. The foundation will be dug and aggregate and concrete poured in to create the floors, after which the brick walls and roof materials will be added by hand. Chlorine cylinders and other equipment (including flow-meters) will be brought in on trucks and offloaded and attached by hand. A small cavity for the chlorination sump and trenches for pipe-work will also be dug, and the sump will constructed from concrete and brick.

2. Physical Resources

104. Although replacement of parts at the pump house should not have noticeable environmental effects, the remainder of this component involves some quite large-scale excavation, so physical impacts could be significant and will need to be mitigated.

105. This work is similar to the source augmentation component in that construction will involve quite extensive excavation, although in this case it will be spread over various locations, many of which are in the town, so the nature and significance of the impacts could be different.

106. If average trench dimension 1.25 x 0.6 m for the approx. 86 km distribution main, then trench construction will excavate around 64,500 cubic meter (m^3) of material. After construction, approximately 7% of the trench will be occupied by the pipe, 15% by backfilled sand, and 78% by excavated soil replaced on top and side of the pipe. This means that around 9,675 m^3 of sand will be brought to site, 50,310 m^3 of soil will be retained for replacement in the trench, and 14,190 m^3 of waste material will be left over. Additional smaller quantities of waste will be produced by the other excavation work, in particular the ground storage reservoirs. It adds a further to the total waste produced by this subproject, and in this case the impact of dust will be more significant because much of the work will be conducted in inhabited areas. It will thus be very important to limit physical impacts by finding beneficial uses for waste material as recommended above, and to apply additional precautions to limit the production and spread of dust. The Contractor should therefore be required to:

- Contact the town authorities to find beneficial uses for waste material, in construction projects, to raise the level of land prior to construction of roads or buildings, or to fill previously excavated areas, such as brickworks;
- Prevent the generation of dust by removing waste soil as soon as it is excavated;
- Plan the work carefully so that sand is only brought to site when it is needed;
- Cover or damp down sand and soil retained on site to reduce dust in windy weather; and
- Use tarpaulins to cover loose material during transportation to and from the site.

107. The other important physical impact associated with excavation (effects on surface and groundwater drainage) should again be negated by the low rainfall and very low water table in this area, and the fact that the Contractor will almost certainly conduct the excavation work in the dry season.

108. Physical impacts will also be reduced by the method of working, whereby the network will probably be constructed by small teams working on short lengths at a time, so that impacts will be mainly localized and short in duration. Physical impacts are also mainly temporary as trenches will be refilled and compacted after pipes are installed, and any disturbed road surfaces will be repaired. Because of these factors and the mitigation measures proposed above, impacts on the physical environment are not expected to be of major significance.

3. Ecological Resources

109. There are no significant ecological resources in the town (protected areas or rare or important species or habitats), so the network improvements should have no ecological impacts. Roadside trees should not be removed unnecessarily to build the trenches, and to mitigate any such losses the Contractor should be required to plant and maintain three new trees (of the same species) for each one that is removed.

4. Economic Development

110. Most of this work will be conducted on government owned land in the ROW of roads, where there is no need to acquire land from private owners. It may be necessary however to acquire small amounts of land in places along the transmission main route to avoid bends in the road and allow the pipeline to follow a more direct path. If this is the case, the government will purchase land through the mechanism of the Land Acquisition Act (1894), where prices are established on the basis of recent transactions. ADB policy on Involuntary Resettlement requires that the owners and users of acquired land do not suffer economically as a result of the project, and a separate Resettlement Plan and Resettlement Framework have been prepared to examine these and related issues. This establishes that no more than 10% of the land of any owner or occupant should be acquired, and that in addition to the price of the land, farmers should be compensated for any standing crops or trees they lose.

111. Although most of the work will not require land acquisition it could still have economic impacts, if the presence of trenches, excavated material, workers and machinery discourage customers from visiting shops and businesses, which lose income as a result. These losses should be short in duration as most of the pipeline work should last for only a few days at any one site. Nevertheless, the loss of income could still be significant for small traders and other businesses that exist on low profit margins. These impacts should therefore be mitigated by:

- Locating all new facilities at least 100 m from houses, shops or any other premises used by people, thus establishing a buffer zone to reduce effects of noise, dust and the visual appearance of the site;
- Compensating shopkeepers and other affected businesses for lost income;
- Leaving spaces for access between mounds of excavated soil, and providing footbridges so that pedestrians can cross open trenches;
- Increasing the workforce in these areas to ensure that work is completed quickly; and
- Consulting affected businesspeople and informing them in advance when work will occur.

112. Excavation work could damage existing infrastructure located alongside roads, such as storm drains where present, and the sewer network inside the fort area. It will be particularly important to avoid damaging existing water pipes as these are mainly manufactured from Asbestos Cement (AC), which can be carcinogenic if inhaled, so there are serious health risks for both workers and citizens (see below). It will be important therefore to avoid these impacts by:

- Obtaining details from the Municipal Board of the nature and location of all infrastructure, and planning pipeline routes (in and outside the town) to avoid any conflict; and
- Integrating construction of the various Nagaur subprojects (in particular water supply and sewerage) so that:

- Different infrastructure is located on opposite sides of the road where feasible; and
- Roads and inhabitants are not subject to repeated disturbance by trenching in the same area at different times for different purposes.

113. Transport is another type of infrastructure that will be affected by some of the work, particularly construction of pipelines in the narrower streets where there is not enough space for excavated soil to be piled off the road. The road itself may also be excavated in places where there is no available land to locate pipelines alongside. Traffic will therefore be disrupted, and in some very narrow streets the whole road may need to be closed for short periods. The Contractor should therefore plan this work in conjunction with the town authorities and the police force, so that work can be carried out during periods when traffic is known to be lighter, and alternative routes and diversions can be provided where necessary. The Contractor should also increase the workforce in areas such as this, so that the work is completed in the shortest possible time.

114. It is inevitable that there will be an increase in the number of heavy vehicles in the town (particularly trucks removing waste material for disposal), and this could disrupt traffic and other activities, as well as damage fragile buildings if vibration is excessive. These impacts will therefore need to be mitigated by:

- Careful planning of transportation routes with the municipal authorities to avoid sensitive areas as far as possible, including narrow streets, congested roads, important or fragile buildings and key sites of religious, cultural or tourism importance;
- Scheduling the transportation of waste to avoid peak traffic periods, the main tourism season, and other important times.

5. Social and Cultural Resources

115. As was the case for the source and supply augmentation works, there is a significant risk that the network improvements, which involve further extensive disturbance of the ground surface, could damage undiscovered remains, or even unknown sites. The risks are in fact very much higher in this case, as most of the work will be conducted in Nagaur town, which has been inhabited for a long period, and where there is therefore a greater risk of artefacts being discovered. The preventative measures need to be employed and strictly enforced. These are:

- Consulting national and state historical and archaeological authorities to assess the archaeological potential of all construction sites;
- Selecting alternative routes or sites to avoid any areas of medium or high risk;
- Including state and local archaeological, cultural and historical authorities and interest groups as project stakeholders to benefit from their expertise;
- Developing a protocol for use in conducting all excavation, to recognise, protect and conserve any chance finds (see Section IV.B.5 for details).

116. The network improvements will also disturb some more modern-day social and cultural resources, such as schools, hospitals, temples, and also sites that are of tourism importance. Impacts could include noise, dust, and interrupted access for pedestrians and vehicles, and if pneumatic drills are used to break the surface of roads, there could be a risk of damage from vibration. Given the historical importance of Nagaur and particularly the historical evidence, any such damage or disruption could be highly significant, so very careful mitigation will be needed to protect these resources and to enable usage by local people and visitors to continue throughout the construction work. This will be achieved through several of the measures recommended above, including:

- Consulting the town authorities to identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- Limiting dust by removing waste soil quickly, bringing sand to site only when necessary, covering and watering stockpiles, and covering soil and sand when carried on trucks;
- Increasing the workforce in sensitive areas to complete the work quickly;
- Providing wooden bridges for pedestrians and metal sheets for vehicles to allow access across open trenches where required (including access to houses);
- Using modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions, and ensuring they are maintained to manufacturers' specifications.

117. In addition the Executing Agency and Contractor should:

- Consult municipal authorities, custodians of important buildings, cultural and tourism authorities, and affected communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

118. A different but no less significant impact is the effect on people and communities if water supplies are closed down for extended periods when work is conducted on the network. This would be inconvenient in the short term, and there could be health risks if the water supply was unavailable for several successive days or longer. It will therefore be important to take the necessary measures to avoid such a situation. This will require:

- Detailed planning of the construction program to keep the cessation of water supplies to the minimum possible (in both area and duration);
- Provision of alternative potable water to affected households and businesses for the duration of the shut-down;
- Liaison with affected persons to inform them of any cessation in advance, and to ensure that they are provided with an alternative supply.

119. There is invariably a safety risk when substantial construction such as this is conducted in an urban area, and precautions will thus be needed to ensure the safety of both workers and citizens. The Contractor will be required to produce and implement a site Health and Safety Plan, and this should include such measures as:

- Excluding the public from the site;
- Ensuring that all workers are provided with and use appropriate Personal Protective Equipment;
- Health and Safety Training for all site personnel;
- Documented procedures to be followed for all site activities; and
- Documentation of work-related accidents.

120. An additional, particularly acute health risk presented by this work derives from the fact that, as mentioned above, the existing water supply system comprises mainly AC pipes, so there is a risk of contact with carcinogenic material if these pipes are uncovered in the course of the work. Precautions have already been introduced into the design of the project to avoid this, of which the most important are that:

- No work is proposed on those parts of the existing system that contains AC pipes (ring, carrier and distribution mains), and these will be left in situ undisturbed, so there will be no deliberate excavation of AC pipes;
- The locations of the new network will be planned to avoid all locations of existing AC pipes so AC pipes should also not be discovered accidentally.

121. Given the dangerous nature of this material for both workers and citizens, one additional measure should be taken to protect the health of all parties in the event (however unlikely) that AC pipes are encountered. This is that, during design of the water supply system, the design consultant should develop a protocol to be applied in any instance that AC pipes are found, to ensure that appropriate action is taken. This should be based on the approach recommended by the United States Environmental Protection Agency (USEPA)³, and amongst other things, should involve:

- Training of all personnel (including manual laborers) to enable them to understand the dangers of AC pipes and to be able to recognize them in situ;
- Reporting procedures to inform management immediately if AC pipes are encountered;
- Development and application of a detailed H&S procedure to protect both workers and citizens. This should comply with national and international standards for dealing with asbestos, and should include:

³ In the USA, standards and approaches for handling asbestos are prescribed by the Occupational Health and Safety Administration (OHSA) and the Environmental Protection Agency (EPA) and can be found at <http://www.osha.gov/SLTC/asbestos>

- Removal of all persons to a safe distance;
- Usage of appropriate breathing apparatus and protective equipment by persons delegated to deal with the AC material;
- Procedures for the safe removal and long-term disposal of all asbestos-containing material encountered.

122. There could again be some short-term socio-economic benefits from the construction work if local people gain employment in the workforce. To ensure that these benefits are directed to communities that are affected by the work, as suggested in Section IV.B.5, the Contractor should be required to employ at least 50% of his labor force from communities in the vicinity of construction sites. Creating a workforce from mainly local people will bring additional benefits by avoiding problems that can occur if workers are imported; including social difficulties in the host community and issues of health and sanitation in poorly serviced temporary camps.

VI. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: OPERATION AND MAINTENANCE

A. Screening out Areas of No Significant Impact

123. Because a water supply system should operate without the need for major repair and maintenance (see below), there are several environmental sectors which should be unaffected once the system becomes operational. These are identified in **Table 6.1** below, with an explanation of the reasoning in each case. These factors are thus screened out of the impact assessment and will not be discussed further.

Table 6.1: Fields in which operation and maintenance of the completed water supply system is not expected to have significant impacts

Field	Rationale
Climate	Extraction and use of water from river will not affect climate
Fisheries & aquatic biology	Intake of water do not support a significant aquatic flora or fauna
Wildlife, forests, rare species, protected areas	There are none of these features in or outside the town
Coastal resources	Nagaur is not located in a coastal area
Industries	The water supplied by the new system will not be for industrial use

B. Operation and maintenance of the improved water supply system

124. The new source augmentation works should operate with little maintenance beyond routine actions required to keep the pumps and other equipment in working order at the WR. This will be straightforward, involving regular checking and recording of performance for signs of deterioration, servicing and replacement of parts, etc. Small manpower will be employed to operate and maintain the water reservoir site.

125. The main requirement for maintenance of the transmission main and distribution system will be for the detection and repair of leaks. The generally flat topography and the usage of good quality Ductile Iron (DI) and Mid Density Polythene Pipe (MDPE)/uPVC pipes should mean that pipeline breaks are very rare, and that leaks are mainly limited to joints between pipes. The repair of household connections and the provision of new connections to slums and developing areas to increase the number of people supplied should reduce the incidence of illegal connections, which are often a major source of leaks.

126. The bulk meters installed at storage reservoirs and pumping stations will allow amounts of water flowing through individual parts of the network to be monitored, which will pinpoint areas where there are leaks, and/or where water is being taken from the system illegally. A small Leak Detection Team will then visit these areas with audio devices to locate individual leaks, which will then be repaired in essentially the same way that the pipes were installed. Trenches will be dug to reveal the leaking area and the faulty connection will be re-fitted, or the pipe will be removed and replaced if necessary. If illegal connections are found these will be removed and the pipe will be re-sealed, or a new connection with a meter will be provided for the household.

127. There will also be some small scale maintenance required at the new OSHRs and Clear Water Reservoir sites, which will involve the same sort of checking of pumps and other equipment as conducted at the Raw Water Reservoir, plus the regular replenishment of chlorination cylinders to maintain water treatment. Two or three men will be employed at each site for this purpose. Chlorine cylinder will be stored for disinfection of water.

128. Proper disposal of solid sludge, chlorine cylinder from water treatment plant are most important

C. Environmental impacts and benefits of the operating system

1. Physical Resources

129. If trenches are dug to locate and repair leaks or remove and replace lengths of pipe or illegal connections, the work will follow the same procedure that was followed during construction phase. In this case soil and backfilled sand will be removed to expose the leaking junction or pipe, and if necessary a new pipe will be brought to site and replaced. The trench will then be refilled and re-compacted. This work should be very infrequent, and will affect individual small locations for short periods only (an average of a few hours for most repairs). Physical impacts will therefore be negligible. Work will not be conducted during rainfall so there will be no effect on drainage, and the removed material will be replaced in the trench so there will be no waste.

130. One of the main risks of improving a water supply system through increased abstraction is that the source will be used unsustainably, at a rate that is above the level of natural replenishment, and that the source becomes depleted as a result. That should not be an issue in this case as the water will be extracted from river. There is downstream abstraction and some water is used by local farmers, this requires only a proportion of the volume available, and the Irrigation Department has granted approval for the abstraction for the municipal supply. It should also be noted that water conservation measures included in the subproject (in particular the replacement of leaking distribution mains and faulty house connections) should significantly reduce system losses, and thus limit the volume needed.

2. Ecological Resources

131. There are no significant ecological resources in or around the town, so any repairs or maintenance work can be conducted without ecological impacts. As there is no significant flora and fauna in or around project site, there should also not be any ecological impacts from the increase in abstraction.

3. Economic Development

132. Although network repairs could result in shops losing some business if the work means that access is difficult for customers, any losses will be small and short-lived and will probably be at the level of normal business fluctuations. It should therefore not be necessary to compensate for such losses. Nevertheless simple steps should be taken to reduce the inconvenience of the works, including:

- Informing all residents and businesses about the nature and duration of any work well in advance so that they can make preparations if necessary;
- Requiring contractors employed to conduct these works to provide wooden walkways across trenches for pedestrians and metal sheets where vehicle access is required;
- Consulting the local police regarding any such work so that it can be planned to avoid traffic disruption as far as possible, and road diversions can be organized if necessary.

133. The provision of an improved and expanded water supply system is not expected to have direct economic benefits for business or industry, as connections will only be provided to domestic users. However businesses will almost certainly benefit from the expected improvement in the health and wellbeing of their workforce (see below) as this should result in fewer days lost through illness, and overall increased productivity.

4. Social and Cultural Resources

134. Although there is a high risk of excavation in the town discovering material of historical or archaeological importance, there will be no need to take precautions to protect such material when areas are excavated to repair leaks in the network, as all work will be conducted in trenches that have already been disturbed when the infrastructure was installed.

135. Repair work could cause some temporary disruption of activities at locations of social and cultural importance such as schools, hospitals, temples, tourist sites etc, so the same precautions as employed during the construction period should be adopted. These include:

- Consulting the town authorities to identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- Completing work in these areas quickly;
- Providing wooden bridges for pedestrians and metal sheets for vehicles to allow access across open trenches where required;

- Consulting municipal authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

136. The responsible authorities will employ local contractors to conduct network repairs, and contractors should be required to operate the same kinds of Health and Safety procedures as used in the construction phase (see Section IV.C.5) to protect workers and the public. This should include application of the asbestos protocol if any AC pipes are encountered, and prohibition of the use of AC pipes for any repair or maintenance work.

137. The use of local contractors will provide economic benefits to the companies and the workers they employ. There is however little prospect of directing these benefits to persons affected by any maintenance or repair works as contractors will utilise their existing workforce. To provide at least some economic benefits to affected communities, persons employed to maintain the ORs and CWR should be residents of the neighbouring areas.

138. The citizens of the town will be the major beneficiaries of the improved water supply, as they will be provided with a constant supply of better quality water, piped into their homes. This should improve the social capital of the town, and individual and community health and well-being. Diseases of poor sanitation, such as diarrhoea and dysentery, should be reduced, so people should spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health.

VII. INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN

A. Summary of environmental impacts and mitigation measures

139. **Table 7.1** lists the potential adverse impacts of the Nagaur water supply subproject as identified and discussed in Sections IV, V and VI, and the mitigation proposed to reduce these impacts to acceptable levels. The table also shows how the mitigation will be implemented, who will be responsible, and where and when the mitigation activities will take place. The mitigation programme is shown as the quarter of each year in which each activity will occur, which relates to the project programme described in Section II.B. The final column assesses whether the proposed action will successfully mitigate the impact (shown as 0), and indicates that some of the measures will provide an additional benefit (shown as +).

B. Institutional arrangements for project implementation

140. The main agencies involved in managing and implementing the subproject are:

- LSGD is the Executing Agency (EA) responsible for management, coordination and execution of all activities funded under the loan.
- The Implementing Agency (IA) is the Project Management Unit of the ongoing RUIDP, which will be expanded to include a broader range of skills and representation from the Urban Local Bodies (ULB, the local government in each town). Assigned as the RUSDIP Investment Program Management Unit (IPMU),

this body will coordinate construction of subprojects across all towns, and ensure consistency of approach and performance.

- The IPMU will be assisted by Investment Program Management Consultants (IPMC) who will manage the program and assure technical quality of design and construction; and Design and Supervision Consultants (DSC), who will design the infrastructure, manage tendering of Contractors and supervise the construction process.
- Investment Program Implementation Units (IPIU) will be established in seven zones across the State to manage implementation of subprojects in their area. IPIUs will be staffed by professionals seconded from government departments (PHED, PWD), ULBs, and other agencies, and will be assisted by consultants from the IPMC and DSC as necessary.
- The IPMU will appoint Construction Contractors (CC) to build elements of the infrastructure in a particular town. The CCs will be managed by the IPIU, and construction will be supervised by the DSC.
- LSGD will be assisted by an inter-ministerial Empowered Committee (EC), to provide policy guidance and coordination across all towns and subprojects. The EC will be chaired by the Minister of Urban Development and LSG, and members will include Ministers, Directors and/or representatives of other relevant Government Ministries and Departments.
- City Level Committees (CLCs) have also been established in each town, chaired by the District Collector, with members including officials of the ULB, local representatives of state government agencies, the IPIU, and local NGOs and CBOs. The CLCs will monitor project implementation in the town and provide recommendations to the IPIU where necessary.

141. **Figure 7.1** shows institutional responsibility for implementation of environmental safeguard at different level.

Figure 7.1: Institutional Responsibility- RUS DIP

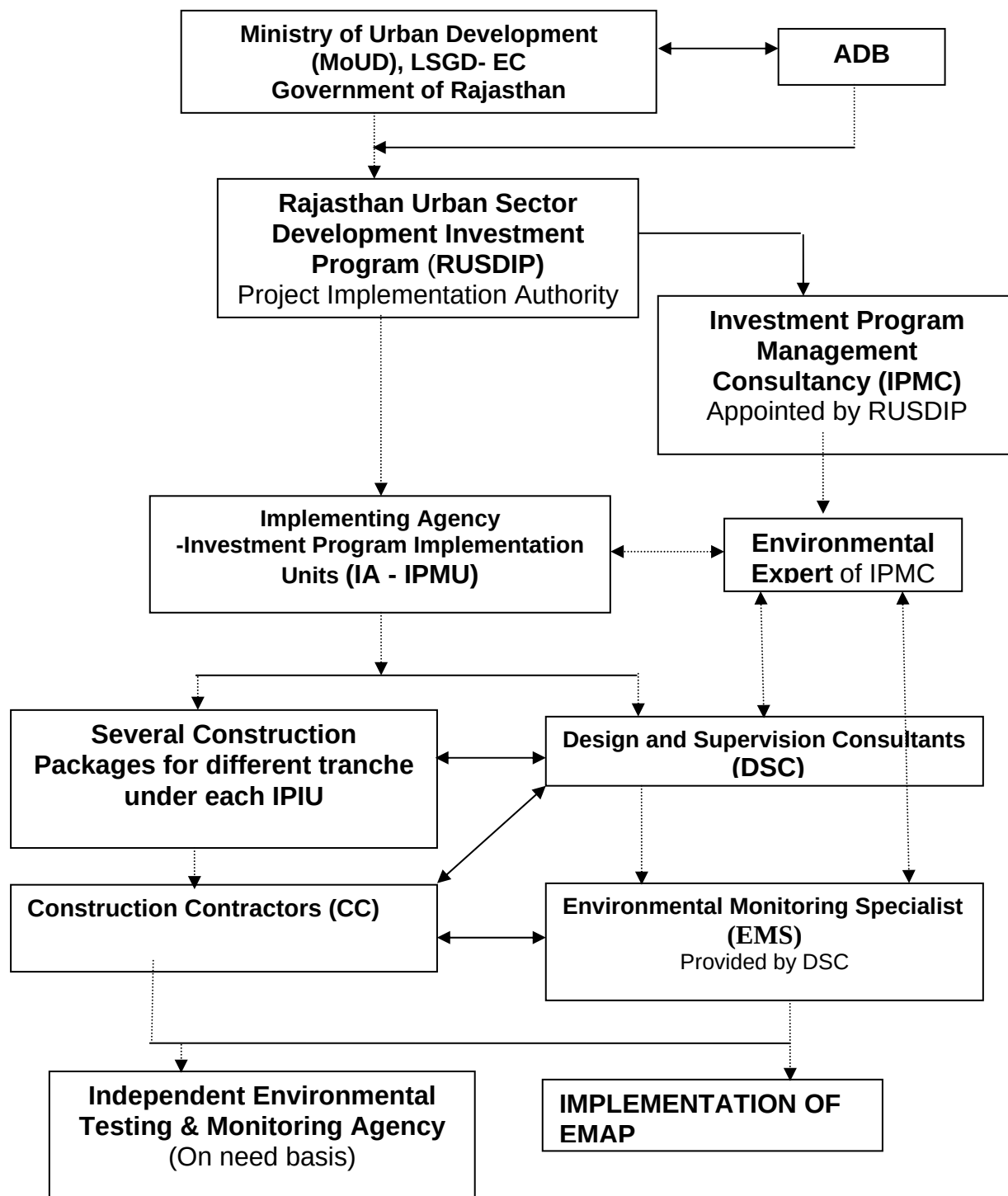


Table 7.1: Environmental impacts and mitigation for the Nagaur Water Supply Subproject
(Black = continuous activity; Grey = intermittent)

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	2008				2009				
Construction: Source Augmentation Works						D	D	3	4	1	2	3	Op	⁴
Excavation for transmission main	M	P	Find beneficial uses for waste soil in construction, land raising and infilling of excavated areas	Contractor	All sites									+
Waste soil could create dust in windy weather	M	T	Remove waste soil as soon as it is excavated	Contractor	All sites									0
			Use tarpaulins to cover dry soil when carried on trucks											0
Trees may be removed at CWR site	M	P	Plant and maintain three trees for every one removed	Contractor	All sites									0
Traffic and activities may be disrupted by trucks carrying waste soil	M	T	Plan routes to avoid Nagaur Town and narrow roads	Contractor	From CWR site									0
			Schedule transportation to avoid peak traffic periods											0
Ground disturbance could damage archaeological and historical remains	S	P	Request state and local archaeological authorities to assess archaeological potential of all work sites	DSC	All sites									0
			Select alternatives if sites have medium-high potential	DSC										0
			Include state and town historical authorities as project stakeholders to benefit from their expertise	LSGD										0
			Develop and apply protocol to protect chance finds (excavation observed by archaeologist; stop work if finds are suspected; state authority to plan appropriate action)	DSC and Contractor										+
Economic benefits if local people are employed in Contractor's workforce	M	T	Contractor should employ at least 50% of workforce from communities in vicinity of work sites	Contractor	All sites									+
						2008				2009/2010				
Construction: Network Improvements						D	D	3	4	1	2	3	Op	
Trenching will produce additional amounts of waste soil	M	P	As above: find beneficial uses in construction or infill	Contractor	All sites									+
Waste soil and imported sand may create dust	M	T	As above: remove waste quickly, cover/spray stockpiles	Contractor	Network sites									0
			Only bring sand (for backfill) to site when needed											0

Sig = Significance of Impact (NS = Not Significant; M = Moderately Significant; S = Significant). Dur = Duration of Impact (T = Temporary; P = Permanent)

D = Detailed Design period; Op = Period when infrastructure is operating

⁴ This column shows impacts remaining after mitigation: 0 = zero impact (impact successfully mitigated); + = positive impact (mitigation provides a benefit)

* Mitigation of these impacts will be provided through a separate Resettlement Plan

[illegible]

[illegible]

142. Resettlement issues will be coordinated centrally by a Resettlement Specialist within the IPMU/ IPMC, who will ensure consistency of approach between towns. A local Resettlement Specialist will also be appointed to IPIUs of zones in which there are resettlement impacts and they will prepare and implement local Resettlement Plans following the framework established in Tranche 1.

143. Environmental issues will be coordinated by an Environmental Specialist within the IPMU/ IPMC, who will ensure that all subprojects comply with environmental safeguards. An Environmental Monitoring Specialist (EMS) who is part of the DSC team will implement the Environmental Monitoring Plan from each IEE (see below), to ensure that mitigation measures are provided and protect the environment as intended. Domestic Environmental Consultants (DEC) will be appointed by each IPIU to update the existing IEEs in the detailed design stage, and to prepare IEEs or EIAs for new subprojects, where required to comply with national law and/or ADB procedure.

C. Environmental Monitoring Plan

144. **Table 7.1** shows that most mitigation activities are the responsibility of the Construction Contractors (CC) employed to build the infrastructure during the construction stage, or the O&M Contractors employed to conduct maintenance or repair work when the system is operating. Responsibility for the relevant measures will be assigned to the Contractors via the contracts through which they are appointed (prepared by the DSC during the detailed design stage), so they will be legally required to take the necessary action. There are also some actions that need to be taken by LSGD in their role as project proponent, and some actions related to the design that will be implemented by the DSC.

145. A program of monitoring will be conducted to ensure that all parties take the specified action to provide the required mitigation, to assess whether the action has adequately protected the environment, and to determine whether any additional measures may be necessary. This will be conducted by a qualified Environmental Monitoring Specialist (EMS) from the DSC. The EMS will be responsible for all monitoring activities and reporting the results and conclusions to the IPMU, and will recommend remedial action if measures are not being provided or are not protecting the environment effectively. The EMS may be assisted by environmental specialists in particular technical fields, and junior or medium-level engineers who can make many of the routine observations on site. Post-construction monitoring will be conducted by the relevant Government Agency (GA) to whom responsibility for the infrastructure will pass once it begins to operate⁵.

146. **Table 7.1** shows that most of the mitigation measures are fairly standard methods of minimising disturbance from building in urban areas (maintaining access, planning work to avoid sensitive times, finding uses for waste material, etc), and experienced Contractors should be familiar with most of the requirements. Monitoring of such measures normally involves making observations in the course of site visits, although some require more formal checking of records and other aspects. There will also be some surveys of residents, as most of the measures are aimed at preventing impacts on people and the human environment.

147. **Table 7.1** shows the proposed Environmental Monitoring Plan (EMP) for this subproject, which specifies the various monitoring activities to be conducted during all phases. Some of the

⁵ In the operational period some infrastructure will be the responsibility of the Municipal Boards/Councils, whilst others will be the responsibility of the appropriate branch of the State government (such as PWD, PHED, etc)

measures shown in **Table 7.1** have been consolidated to avoid repetition, and there has been some re-ordering to present together those measures that relate to the same activity or site. The EMP describes: (i) mitigation measures, (ii) location, (iii) measurement method, (iv) frequency of monitoring and (v) responsibility (for both mitigation and monitoring). It does not show specific parameters to be measured because as indicated above, most measures will be checked by simple observation, by checking of records, or by interviews with residents or workers.

148. Given the scale of the investment in providing the infrastructure, LSGD will also wish to conduct monitoring during the operational period to confirm the long-term benefits of the scheme. **Table 7.2** shows that this will cover two elements, which will monitor:

- The chemical and bacteriological quality of water provided by the municipal system;
- The health of the population and the prevalence of diseases of poor sanitation.

Table 7.2: Environmental Monitoring Plan

Mitigation Activities and Method	Location	Responsible for Mitigation	Monitoring Method	Monitoring Frequency	Responsible for Monitoring
CONSTRUCTION					
Find beneficial uses for waste soil (construction, land raising, infill)	All sites	Contractor	Site observations; CC records	Monthly	EMS
Remove waste soil as soon as it is excavated	All sites	Contractor	Site observations	Weekly	EMS
Use tarpaulins to cover dry soil and sand when carried on trucks	All sites	Contractor	Observations on and off site	Weekly	EMS
Cover or damp down soil and sand stockpiled on site	Inhabited areas	Contractor	Site observations	Weekly	EMS
Only bring sand (for backfill) to site when needed	Inhabited areas	Contractor	Site observations; CC records	Weekly	EMS
Leave spaces for access between mounds of soil	Network sites	Contractor	Site observations	Weekly	EMS
Plan truck routes to avoid Nagaur Town, narrow or congested roads, important or fragile buildings, religious and tourist sites	All sites	Contractor	Observations off site; CC record	Weekly	EMS
Plan transport of waste to avoid peak traffic and tourist season	All sites	Contractor	Observations on and off site	Weekly	EMS
Plant and maintain three trees for every one removed	All sites	Contractor	Observations on/off site; CC records	Monthly	EMS
*Acquire land as described in Resettlement Framework	Where required	LSGD	Landowner surveys; LSGD record	As needed	IMA ⁶
*Avoid taking >10% of the land of any owner or tenant	Where required	DSC	Owner/tenant surveys; DSC records	As needed	IMA
* Compensate farmers in cash for loss of crops and trees	Where required	LSGD	Farmer surveys; LSGD records	As needed	IMA
*Compensate businesses for lost income	Where required	LSGD	Shopkeeper survey; LSGD record	As needed	IMA
Provide bridges to allow people & vehicles to cross trench	Network sites	Contractor	Site observation; resident survey	Weekly	EMS
Increase workforce in inhabited areas to finish work quickly	Network sites	Contractor	Site observations; CC records	Monthly	EMS
Inform shopkeepers and residents of work in advance	Network sites	LSGD	Resident surveys; CC records	Monthly	EMS
Consult town authority and avoid existing infrastructure	All sites	DSC	Site observation; design reports	Monthly	EMS
Locate water and sewer pipes on opposite sides of roads	Network sites	DSC	Site observation; design reports	Monthly	EMS
Integrate subprojects to conduct trenching at same time	Network sites	DSC/LSGD	Site observation; design reports	Monthly	EMS
Plan work with town authorities – work when traffic is light	Network sites	Contractor	Site observations; CC records	Monthly	EMS

⁶ Resettlement issues (asterisked) will be monitored by an Independent Monitoring Agency (IMA) established under the Resettlement Framework

Mitigation Activities and Method	Location	Responsible for Mitigation	Monitoring Method	Monitoring Frequency	Responsible for Monitoring
Ensure police provide traffic diversions when necessary	Network sites	Contractor	Site observations; CC records	Monthly	EMS
Request archaeological authorities to assess potential of all sites	All sites	DSC	DSC records; design reports	As needed	EMS
Select alternatives if sites have medium or high potential	All sites	DSC	DSC records; design reports	As needed	EMS
Include state and town historical authorities as stakeholders	All sites	LSGD	CC records; observations at meetings	As needed	EMS
Develop and apply archaeological protocol to protect chance finds	All sites	DSC and CC	DSC and CC records; site observations	Weekly	EMS
Avoid using pneumatic drills near buildings at risk from vibration	All sites	Contractor	Site observations; CC records	Weekly	EMS
Use modern vehicles and machinery and maintain as specified	All sites	Contractor	Site observations; CC records	Monthly	EMS
Consult authorities, custodians of buildings, communities: address key issues, avoid working at sensitive times	Network sites	Contractor	Site observations; CC records; resident surveys	Monthly	EMS
Plan work to minimise shutdown of water supply system	All sites	DSC	Design reports; resident surveys	Monthly	EMS
Provide alternative water to affected residents	All sites	LSGD	Site observation; resident survey	Weekly	EMS
Inform communities of any shutdown in advance	All sites	LSGD	Site observation; resident survey	Weekly	EMS
Prepare and implement a site H&S Plan (safety of workers/public)	All sites	Contractor	Site observations; CC records	Monthly	EMS
Exclude public from the site	All sites	Contractor	Site observations; CC records	Monthly	EMS
Ensure that workers wear Personal Protective Equipment	All sites	Contractor	Site observations; CC records	Monthly	EMS
Provide Health and Safety training for all personnel	All sites	Contractor	CC records; worker interviews	Monthly	EMS
Follow documented procedures for all site activities	All sites	Contractor	Site observations; CC records	Monthly	EMS
Keep accident reports and records	All sites	Contractor	CC records	Monthly	EMS
Design infrastructure to avoid known locations of AC pipes	Network sites	DSC	DSC records; design reports	As needed	EMS
Train all personnel in dangers and recognition of AC pipes	All sites	Contractor	Site observations; CC records	Monthly	EMS
Develop and apply protocol if AC pipes are encountered	All sites	DSC/CC	DSC & CC records; site observations	Weekly	EMS
If AC pipes are encountered, report to management immediately	All sites	Contractor	Site observations; CC records	Weekly	EMS
Remove all persons to safe distance	All sites	Contractor	Site observations; CC records	Weekly	EMS
Workers handling AC: wear breathing apparatus; protective suits	All sites	Contractor	Site observations; CC records	Weekly	EMS
All AC material must be removed and disposed of safely	All sites	Contractor	Observations on and off site; CC records	As needed	EMS
Employ at least 50% of workforce from communities near sites	All sites	Contractor	CC records; worker interviews	Monthly	EMS

Mitigation Activities and Method	Location	Responsible for Mitigation	Monitoring Method	Monitoring Frequency	Responsible for Monitoring
OPERATION AND MAINTENANCE					
Inform shopkeepers and residents of work in advance	Network sites	GA	Resident surveys	Monthly	
Provide walkways and bridges for vehicles	Network sites	OM Contractor	Site observation; resident survey	Monthly	
Request police to divert traffic if necessary	Network sites	OM Contractor	Site observations	Monthly	
Avoid using drills or trucks near fragile buildings	Network sites	OM Contractor	Site observations	Monthly	
Complete work quickly in sensitive areas	Network sites	OM Contractor	Site observations; OMC records	Monthly	
Consult and inform authorities & people, avoid sensitive periods	Network sites	OM Contractor	Site observation; resident survey	Monthly	
Prepare and operate H&S plan to protect workers and citizens	All sites	OM Contractor	Site observations; OMC records	Monthly	
Apply AC protocol to protect all persons if AC pipes encountered	All sites	OM Contractor	Site observations; OMC records	Monthly	
Employ people who live nearby to maintain RWR, OR and GR	All sites	GA	Employer record; worker survey	Monthly	
LONG-TERM SURVEYS					
Survey of chemical and bacteriological quality of municipal water	WTP and Domestic sites	LSGD	Water quality sampling and analysis	Annual for 5 years	Consulting laboratory
Survey of public health and incidence of water borne disease	Nagaur Town	LSGD	Hospital records; resident surveys	Annual for 5 years	Social studies consultant

149. An accredited laboratory will be appointed to monitor the quality of water at the intake and at the point of supply to consumers (in houses and slums), and a domestic social studies consultant will be appointed to monitor public health and the incidence of disease. These surveys will be conducted annually over the first five years of operation of the system, and require the initial collection of baseline data on pre-project conditions, during the construction period.

D. Environmental management and monitoring costs

150. Most of the mitigation measures require the contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. Regardless of this, any costs of mitigation by the contractors (those employed to construct the infrastructure or the local companies employed to conduct O&M when the system is operating) are included in the budgets for the civil works. Mitigation that is the responsibility of LSGD will be provided as part of their management of the project, so this also does not need to be duplicated here. Costs of acquiring land and compensating shopkeepers and farmers for loss of income (**Table 7.1**) are calculated separately in the budgets for the Resettlement Framework and Resettlement Plans so are also excluded from this analysis.

151. Since at present all subprojects are under design stage the finalisation of environmental management and monitoring cost can be done after designing and acceptance of the subprojects.

152. The remaining actions in the Environmental Management Plan are:

- The environmental monitoring during construction, conducted by the EMS; and
- The long-term post-construction surveys that will be commissioned by LSGD.

153. These have not been budgeted elsewhere, and their costs are shown in **Table 7.3**, with details of the calculations shown in footnotes beneath the table. The figures show that the total cost of environmental management and monitoring for the subproject as a whole (covering design, 2.5 years of construction and the first five years of operation) is INR 2.57 million, ie US\$ 59767.00.

Table 7.3: Environmental Management and Monitoring Costs (INR)

Item	Quantity	Unit Cost	Total Cost	Sub-total
1. Implementation of EMP (2 years)				
Domestic Environmental Monitoring Specialist	1 x 3 month	130,000 ⁷	390,000	
Survey Expenses	Lump sum	120,000	120,000	5,10,000.00
2. Survey of municipal water quality (6 years)				
Domestic Consultant	6 x ½ month	130,000	390,000	
Sample Analysis	6 x 20	4,000 ⁸	480,000	
Other Expenses	Lump sum	200,000	200,000	10,70,000.00
3. Survey of public health (6 years)				
Domestic Consultant	6 x ½ month	130,000	390,000	
Other Expenses	Lump sum	250,000	250,000	6,40,000.00
4. Environmental mitigation cost including greenery development	Lump sum	350,000	350,000	350,000.00
TOTAL				25,70,000.00

⁷ Unit costs of domestic consultants include fee, travel, accommodation and subsistence

⁸ Cost of a standard suite of drinking water quality parameters (pH, turbidity, chlorinity, alkalinity, conductivity, TDS, DO, total and faecal coliforms, and selected metals) per sample

E. Associated Facilities

154. Indira Gandhi Nahar Project (IGNP) is one of the most gigantic projects in the world aiming to dedesertify and transform desert waste land into agriculturally productive area. The project objectives include drought proofing, providing drinking water, improvement of environment, afforestation, employment, rehabilitation, development and projection of animal wealth and increasing agricultural produce. The project construction commenced in the year 1958. Indira Gandhi Nahar Project was designed to utilise 9,367 Mm³/yr of the total 10,608 Mm³/yr allocated to Rajasthan from the surplus waters of the Ravi and Beas rivers. This water from IGNP shall connect to the subproject as stated in Section II.

155. The RUIDP and the project authorities shall, at the time of connecting to the downstream water resource points of the IGNP would determine if the water supply storage/treatment facilities put up to ADB funded water supply would connect are also compliant with Indian Environmental Laws. This measure is required to be ensured by RUIDP for all ADB assisted projects because the way these water source facilities are operated and maintained can greatly affect the health of the population, the quality of the environment, the benefits to the poor at the consumption point.

156. Environmentally safe, continuous and reliable water sources and adequate capacity for treatment, transmission, and distribution, as well as properly functioning pumps, reservoirs, and networks are a must for RUIDP to mandate a safe water supply service to the local population

VIII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Project Stakeholders

157. Most of the main stakeholders have already been identified preliminary. If any other stakeholders that are identified during project implementation will be brought into the process in the future. Primary stakeholders are:

- Residents, shopkeepers and businesspeople who live and work alongside the roads in which network improvements will be provided and near sites where facilities will be built
- Owners and users of any land that is acquired along the transmission main route;
- Custodians and users of socially and culturally important buildings in affected areas;
- State and local authorities responsible for the protection and conservation of archaeological relics, historical sites and artefacts;
- State and local tourism authorities.

158. Secondary stakeholders are:

- LSGD as the Executing Agency;

- Other government institutions whose remit includes areas or issues affected by the project (state and local planning authorities, Department of Public Health Engineering, Local Government Dept, Ministry of Environment and Forests, Roads and Highways Division, etc);
- NGOs and CBOs working in the affected communities;
- Other community representatives (prominent citizens, religious leaders, elders, women's groups);
- The beneficiary community in general; and
- The ADB, the Government of India, Ministry of Finance.

B. Consultation and Disclosure to Date

159. Some informal discussion was held with the local people during site visit. Issues discussed are

- Awareness and extent of the project and development components
- Benefits of Project for the economic and social upliftment of community
- Labour availability in the Project area or requirement of outside labour involvement
- Local disturbances due to Project Construction Work
- Necessity of tree felling etc. at project sites
- Water logging and drainage problem if any
- Drinking water problem
- Forest and sensitive area nearby the project site
- Movement of wild animals in the area

160. Local populations are very much interested on the project and they will help project authorities in all aspects. But mitigation measures will be required at project sites to minimise the impact on water body, sensitive areas etc.

161. The public Consultation and group discussion meeting were conduct by RUIDP on Date 04 June 2008 after advertising in Local NEWS papers. The objective of the meeting was to appraise the stakeholders about the environmental and social impacts of the proposed program and the safeguards provided in the program to mitigate the same. In the specific context of Nagaur, the environmental and social impacts of the proposed subprojects under Tranche 2 in Nagaur were discussed.

Meetings and individual interviews were held at potentially temporarily affected areas; and local informal interviews were conducted to determine the potential impacts of subproject construction to prepare the sample Environmental Framework. A town-wise stakeholder consultation workshop was conducted which provided an overview of the Program and subprojects to be undertaken in Nagaur; and discussed the Government and ADB's Environment policies acts and potential environment impacts of the subprojects in Nagaur. During the workshop, Hindi versions of the Environmental Framework were provided to ensure participants understood the objectives, policy principles and procedures related to Environment, English and Hindi versions of the Environmental Framework have been placed in the Urban Local Body (ULB) office and Environmental Framework will be provided later on. The NGO to be engaged to implement the Mitigation Measures will continue consultations, information dissemination, and disclosure. The Environmental Framework will be made available in the ULB office, Investment Program Project Management Unit and Implementation Unit (IPMU and IPIU) offices, and the town library. The finalized IEE containing Mitigation Measures will also be disclosed in ADB's website, the State Government website, the local government website, and the IPMU and IPIU websites. ADB review and approval of the RP is required prior to award of civil works contracts. Detail of this Public consultation/ Group Discussion are attached as **Appendix 5**

C. Major Issues discussed at Public Consultation are

- (i) Proposed water supply project should ensure enough supply of drinking water in all wards of town.
- (ii) Executive agency should give preference to engage internationally reputed contractor like Gammon, HCC, etc as people do not faith about the local contractors in respect of quality of works as well as timely completion of work;
- (iii) Efforts should be made by government to supply drinking water round the clock;
- (iv) Livelihood affected households should be given assistance in the mode of cash compensation;
- (v) Local people should be employed by the contractor during construction work;
- (vi) Adequate safety measures should be taken during construction work;
- (vii) Mobile kiosks/vendors/hawkers have shown willingness to shift in nearby places without taking any compensation and assistance from the Executing Agency;
- (viii) Local people have appreciated the water supply proposal of the government and they have ensured that they will cooperate with the Executing Agency during project implementation.

D. Future consultation and disclosure

162. LSGD will extend and expand the consultation and disclosure process significantly during implementation of RUSDIP. They will appoint an experienced NGO to handle this key aspect of the programme, who will conduct a wide range of activities in relation to all subprojects in each town, to ensure that the needs and concerns of stakeholders are registered, and are addressed in project design, construction or operation where appropriate. The

programme of activities will be developed during the detailed design stage, and is likely to include the following:

- Consultation during detailed design:
 - o Focus-group discussions with affected persons and other stakeholders (including women's groups, NGOs and CBOs) to hear their views and concerns, so that these can be addressed in subproject design where necessary;
 - o Structured consultation meetings with the institutional stakeholders (government bodies and NGOs) to discuss and approve key aspects of the project.
- Consultation during construction:
 - o Public meetings with affected communities to discuss and plan work programmes and allow issues to be raised and addressed once construction has started;
 - o Smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in subproject monitoring and evaluation;
- Project disclosure:
 - o Public information campaigns (via newspaper, TV and radio) to explain the project to the wider town population and prepare them for disruption they may experience once the construction programme is underway;
 - o Public disclosure meetings at key project stages to inform the public of progress and future plans, and to provide copies of summary documents in Hindi;
 - o Formal disclosure of completed project reports by making copies available at convenient locations in the study towns, informing the public of their availability, and providing a mechanism through which comments can be made.

IX. FINDINGS AND RECOMMENDATIONS

A. Findings

163. The Project is designed to improve the quality of life of small town residents and enhance the small towns' roles as market, services, and manufacturing centers. It has a strong community development focus reinforced by integrated poverty reduction, health and hygiene improvement investment projects. The towns' economies will benefit from enhanced productivity as a result of health improvement, time savings in collecting water, as well as from increased urban efficiency arising from improved roads, bridges, drainage, drinking water and sanitation. Residents in towns will also benefit from savings in health care costs.

164. During project design, community meetings were held with beneficiaries to discuss sanitation, poverty, resettlement, affordability issues, and environmental concerns. Socioeconomic surveys obtained information and individual views on current situations and future preferences. Potential environmental impacts of urban infrastructure improvements are mainly short-term during the construction period and can be minimized by the proposed mitigating measures and environmentally sound engineering and construction practices

165. The process described in this document has assessed the environmental impacts of all elements of the infrastructure proposed under the Nagaur Water Supply Subproject. Potential negative impacts were identified in relation to both construction and operation of the improved infrastructure, but no impacts were identified as being due to either the project design or location. Mitigation measures have been developed in generic way to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result some measures have already been included in the outline designs for the infrastructure. These include:

- Locating all pipelines within the ROW of existing roads, to avoid the need to acquire land or relocate people;
- Locating pipelines on unused land adjacent to roads wherever possible, to avoid damaging roads and disrupting traffic and other activities.

166. This means that the number of impacts and their significance has already been reduced by amending the design.

167. Changes have also been made to the location of elements of the project to further reduce impacts. These include:

- Locating all facilities (OR, CWR) on government-owned land to avoid the need for land acquisition and relocation of people;
- Locating the distribution main in the ROW alongside a main road, to reduce the acquisition of agricultural land and impacts on livelihoods of farmers and workers.

168. Regardless of these and various other actions taken during the IEE process and in developing the project, there will still be impacts on the environment when the infrastructure is built and when it is operating. This is mainly because of the invasive nature of trenching and other excavation; because the distribution network is located in an ancient town where there are densely populated areas and sites of historical and tourism interest; and because Rajasthan is an area with a rich history, so there is a high risk that ground disturbance may uncover important remains. Because of these factors the most significant impacts are on the physical environment, the human environment, tourism, and the cultural heritage.

169. During the construction phase, impacts mainly arise from the need to dispose of large quantities of waste soil and import a similar amount of sand to support the pipes in the trenches; and from the disturbance of residents, businesses, traffic and important buildings by the construction work. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation. These include:

- Finding beneficial uses for waste material;

- Covering soil and sand during transportation and when stored on site;
- Planning work to minimise disruption of traffic and communities;
- Providing temporary structures to maintain access across trenches where required.

170. There could also be a need to acquire small amounts of farm land along the route of the distribution main, where it is impracticable for the pipeline to follow bends in the road. Such impacts are also frequently encountered and are dealt with by a combination of the legal process and additional measures required by ADB policy on Involuntary Resettlement. Actions are discussed in a separate Resettlement Plan and Resettlement Framework, and include:

- Acquisition of land through the GOI Land Acquisition Act, through which the market value is paid, based on an analysis of recent transactions;
- Ensuring that no more than 10% of the land of a single owner or tenant is acquired;
- Providing additional compensation for loss of standing crops and productive trees.

171. One area in which impacts are much less routine is archaeology, and here a series of specific measures have been developed to avoid damaging important remains. These include:

- Assessing the archaeological potential of all proposed construction sites, and selecting alternative locations to avoid any areas of medium or high risk;
- Including archaeological, cultural and historical authorities and interest groups as project stakeholders to benefit from their expertise;
- Developing a protocol for use in conducting all excavation to ensure that any chance finds are recognised, protected and conserved.

172. The use of AC pipes in the existing water distribution network presents a particular problem, as workers and the public will need to be protected from inhalation of asbestos dust, which can be carcinogenic. This will be addressed by a number of measures, including:

- Limiting network improvements to expansion of the area covered, and leaving the existing AC system (ring, carrier and distribution mains) in situ undisturbed;
- Training staff and workers to raise awareness of the dangers of AC and enable early recognition of such pipes if encountered accidentally;
- Development of a protocol based on USEPA guidelines, to protect workers and the public if AC pipes are encountered (including evacuation of the immediate area, use of protective equipment by workers, and safe removal and disposal of AC material).

173. There were limited opportunities to provide environmental enhancements, but certain measures were included. For example it is proposed that the project will:

- Employ in the workforce people who live in the vicinity of construction sites to provide them with a short-term economic gain;
- Ensure that people employed in the longer term to maintain and operate the new facilities are residents of nearby communities.

174. These and the other mitigation and enhancement measures are summarised in **Table 7.1**, which also shows the location of the impact, the body responsible for the mitigation, and the program for its implementation.

175. Once the system is operating, most facilities (OR, CWGR) will operate with routine maintenance, which should not affect the environment. Leaks in the network will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only. It will also be conducted in areas that have already been excavated, so there will be no need to protect archaeological material.

176. The main impacts of the operating water supply system will be beneficial as the citizens of Nagaur will be provided with a constant supply of water, which will serve a greater proportion of the population, including slum-dwellers. This will improve the quality of life of people as well as benefiting both individual and public health as the improvements in hygiene should reduce the incidence of disease associated with poor sanitation. This should lead to economic gains as people will be away from work less and will spend less on healthcare, so their incomes should increase.

177. **Table 7.1** also assesses the effectiveness of each mitigation measure in reducing each impact to an acceptable level. This is shown as the level of significance of the residual impact (remaining after the mitigation is applied). This shows that all impacts will be rendered at least neutral (successfully mitigated), and that certain measures will produce a benefit (in addition to the major benefits provided by the operating schemes).

178. Mitigation will be assured by a programme of environmental monitoring conducted during both construction and operation to ensure that all measures are provided as intended, and to determine whether the environment is protected as envisaged. This will include observations on and off site, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be reported to the IPMU. There will also be longer-term surveys to monitor the expected improvements in the quality of domestic water and the health of the population.

B. Recommendations

179. There are two straightforward but essential recommendations that need to be followed to ensure that the environmental impacts of the project are successfully mitigated. These are that LSGD should ensure that:

- All mitigation, compensation and enhancement measures proposed in this Status report (**Table 7.1**) and in the Resettlement Framework for the RUSDIP are implemented in full, as described in these two documents;

- The Environmental Monitoring Plan proposed in Section VI of this report and the internal and external monitoring proposed in the Resettlement Framework is also implemented in full.

X. CONCLUSIONS

180. The environmental status of the proposed improvements in water supply and distribution infrastructure in Nagaur town has been assessed. Issues related to Involuntary Resettlement were assessed by a parallel process of resettlement planning and will be compensated by measures set out in detail in the Resettlement Framework for the subproject.

181. The overall conclusion of above process is that provided the mitigation, compensation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result of location, design, construction or operation of the subproject. There should in fact be some small benefits from recommended mitigation and enhancement measures, and major improvements in quality of life and individual and public health once the scheme is in operation.

182. There are no uncertainties in the analysis, and no further studies are required to comply with ADB procedure or national law

Appendix 1: Photograph**Proposed CWR Site****Proposed CWR Site****Proposed CWR Site**

APPENDIX 2: Environmental Features along Water Supply Pipeline – Nagaur

(From CWR Site and Intermediate Pumping Station located at the Higher Secondary School)

Km	Left Hand Side	Right Hand Side
0-1	Some trees of Babul.	Some trees of Babul
1-2	Some trees of Babul. Agricultural Department. RIICO Industrial area. Some trees of Babul Build up area.	Some trees of Babul. Some trees of Babul Tata Motor workshop. Some trees of Babul Build up area.
2-3	Some temporary shops in front of District Traffic Office. Build up area.	District traffic office Some temporary shops in front of District Traffic Office. Build up area.
3-4	Indira colony	Petrol pump. Factory of Cement products. Build up area. Petrol pump. Indira colony.
4-5	Build up area. Government Offices. Railway crossing. Market. Big Government Hospital. Big Library.	Build up area. Bhaskar Hospital. Govt. Offices. Railway crossing. Market.

Appendix 3: Rapid Environmental Assessment (REA) Checklist

Country/Project Title: India/Rajasthan (Nagaur) Urban Sector Development Investment Programme (Tranche-II).

Subproject: Nagaur Water Supply Subproject

SCREENING QUESTIONS	Yes	No	Remarks
A. Project Siting			
Is The Project Area...			
Densely Populated?		X	Population density of Nagaur is only 157 persons in 1 sq km
Heavy with Development Activities?		X	No as such big projects are taken up in Nagaur
Adjacent To or Within Any Environmentally Sensitive Areas?		X	No protected and sensitive area nearby the proposed sub –project site
Cultural Heritage Site		X	Heritage sites are located in and around the town, but away from the subproject site
Protected Area		X	No forest land nearby the subproject
Wetland		X	No designated water body nearby the subproject site
Mangrove		X	No sea coast nearby the subproject site, there mangrove population is not expected
Estuarine		X	No sea coast nearby
Buffer Zone of Protected Area		X	No protected area nearby the subproject site
Special Area for Protecting Biodiversity		X	No special area of protected land of significant biodiversity located nearby
Bay		X	No bay nearby
Potential Environmental Impacts			
Will The Project Cause...			
Pollution of raw water supply from upstream wastewater discharge from communities industries, agriculture and soil erosion runoff		X	No such impact is anticipated. Explain the present source of water (tube wells). By 2021 year, the tube wells will be decommissioned and the source of water will be the Indira Gandhi Canal.
Impairment of historical/cultural/monuments/areas and loss/damage to these sites.		X	There is one old monument called Amar Singh ki Chattri is near project site. One big temple and other small temple is also located near project site but there is no direct impact on these monument and temple as the subproject activities will be 50-100 meters away from the temples. However, environmental impacts are temporary and short in duration. Mitigation measures are identified in the Environmental Monitoring Plan (EMP) and applicable provisions are to be included in the construction Contractor's Contract (CC)
Hazards of land subsidence caused by excessive ground water pumping.		X	Indira Gandhi Canal is the source of water for this project. --- By 2021 all tube wells will be decommission
Social conflicts arising from displacement of communities.		X	No such displacement is noted
Conflicts in abstraction of raw water for water supply with other beneficial water		X	The sources of water supply are existing tubewells. By 2021 year, the source will be the

uses for surface and ground waters?			Indira Gandhi Canal, one of the biggest canal projects in India. It uses water released from Pong dam and will provide irrigation facilities to the north-western region of Rajasthan, i.e., a part of the Thar Desert. Where Nagaur is located.
Unsatisfactory raw water supply (e.g excessive pathogens or mineral constituents)		X	Public Health Engineering Department (PHED) carries out monitoring and testing of water quality before distribution.
Delivery of unsafe water to distribution system.		X	Raw water will be treated before distribution and this will be ensured by PHED.. A chlorination plant will be located at CWR site to ensure that water is sufficiently disinfected prior to distribution.
Inadequate protection of intake works or wells, leading to pollution of water supply.		X	As said above that source of water is Indira Gandhi canal. – Indira Gandhi Nahar Project was designed to utilise 9,367 Mm ³ /yr of the total 10,608 Mm ³ /yr allocated to Rajasthan from the surplus waters of the Ravi and Beas rivers. The construction of the project has been divided into two stages. The project objectives include drought proofing, providing drinking water, improvement of environment, afforestation, employment, rehabilitation, development and projection of animal wealth and increasing agricultural produce.
Over pumping of ground water, leading to salinization and ground subsidence.		X	No use of ground water as said above that source of intake water is Indira Gandhi canal.
Excessive algal growth in storage reservoir.		X	Water tanks will be covered and treated properly to avoid any algal growth.
Increase in production of sewerage beyond capabilities of community facility.		X	No such impact is anticipated because there will be no treatment of water. Only chlorination at one location will be used to disinfect the water prior to distribution.
Inadequate disposal of sludge from water treatment plants		X	There will be proper sludge disposal from water treatment plant at pre designated locations.
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities.	X		The location of Intermediate pumping station (IMPS) is near school boundary. There are chances of increase in noise in the vicinity of IMPS both in construction and operation stage of project. Location is greater than 100 m. Mitigation measures will be considered in the planning and design stage.
Impairment associated with transmission lines and access roads.	X		Temporary impairment with access roads is anticipated. Mitigation measures are included in the EMP.
Health hazards arising from inadequate design of facilities for receiving storing and handling chlorine cylinders.		X	Chlorine gas will be used. in stead of bleaching powder. . Gases will be passed through water for disinfection. Unauthorized persons will not be allowed in the area.
Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants		X	Health and safety manual will be followed for handling of chlorine gas. Safety hazard rules will be complied.
Resettlement problems in areas requiring large plots of land.		X	No resettlement is required for proposed project since the facilities will be located in government-owned lands
Noise and dust from construction activities.	X		Four location of Overhead Service Reservoir (OSHR) are located in school compounds Other two OSHR are located near residential area. For

			all these location noise and dust will be problem during construction phase. Proper mitigation measures should be considered. Mitigation measures are identified in the Environmental Monitoring Plan (EMP) and applicable provisions are to be included in the construction Contractor's Contract (CC)
Increased road traffic due to interference of construction activities.	X		Proper traffic management and planning will be carried out during construction. Mitigation measures are identified in the Environmental Monitoring Plan (EMP) and applicable provisions are to be included in the construction Contractor's Contract (CC)
Continuing soil erosion/silt runoff from construction operations	X		Two location of OSHR are ponds although these ponds are already contaminated but during construction period there are chances that these two ponds may further deteriorates if proper mitigation measures has not been adopted. Mitigation measures are identified in the Environmental Monitoring Plan (EMP) and applicable provisions are to be included in the construction Contractor's Contract (CC)
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution system.		X	The line department will ensure safe water distribution. For this regular monitoring will be carried out by PHED.
Delivery of water to distribution system which is corrosive due to inadequate attention to feeding of corrective chemicals.		X	The line department will ensure about non corrosiveness of distribution system before distributing this water. For this regular monitoring will be carried out by PHED.
Accidental leakage of chlorine gas.		X	Proper storage of chlorine gas is essential
Excessive abstraction of water affecting downstream water users.		X	Water from Indira Gandhi canal will be used to meet the requirement of this project.
Competing uses of water.		X	No such competition is envisaged as sufficient water is available in IG canal downstream.
Increase sewerage flow due to increased water supply.		X	New sewerage system has been proposed based on increased water supply estimates.
Increased volume of sludge (wastewater from cooking and washing and sludge from wastewater treatment plant)		X	New sewerage and drainage system has been proposed based on increased water supply and storm water.

Appendix 4 PHED Letter for Water Supply

OFFICE OF THE CHIEF ENGINEER (SPECIAL PROJECT)
PUBLIC HEALTH ENGINEERING DEPARTMENT RAJASTHAN
F - 18, New Building, 1 Floor, 2, CIVIL LINES - JAIPUR - 302006
☎0141-2220553 Fax -0141-2222585 email: rj_cesp@water.nic.in

No. CESP/PHED/F.231/RUIDP/2007-08 Dated: 11/7/08

The Project Director,
Rajasthan Urban Infrastructure Development Project,
JLN Marg,
Jaipur (Raj)

SUB : Information required by ADB Mission regarding water supply projects under execution with PHED.

In the meeting held under the Chairmanship of Addl. Project Director, on 30th May 2008, in which the members of ADB Review Mission, Addl. Project Director I and II, Superintending Engineer (Water Supply), RUIDP, and other officers of RUIDP were present. The ADB Mission desired the details of surface water availability in water supply projects under execution with PHED which have been taken as source of water by RUIDP for their projects.

The town wise details are as under :-

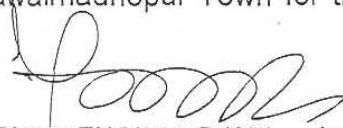
1. **Urban Water Supply Scheme, Bharatpur :-** Presently, Bharatpur water supply is dependent upon local tube wells and surface water from Bandh Baretha. PHED is implementing a multi village multi town drinking water supply project from Chambal River as source. The work of main transmission system consisting of intake works, raw water reservoir, raw water transmission main, filter plant etc. is under progress and is likely to be completed by June 2010. This project is designed to cater to a water demand of 43 MLD sufficient upto the year 2031.
2. **Urban Water Supply Scheme, Dholpur :-** Long term demand of Urban Water Supply Scheme, Dholpur, is proposed to be met from the intake works being constructed under Chambal-Dholpur-Bharatpur Drinking Water Supply Project. The total capacity of intake works is to lift 237 MLD of water against which the present system is sufficient to cater to a total water demand of 147 MLD. It is proposed to supply 15 MLD. of raw

water from the intake works to Dholpur Town, sufficient for the year 2031.

3. **Urban Water Supply Scheme, Churu :-** Urban Water Supply Scheme, Churu, is dependent upon local ground water as well as surface water brought through multi town multi village drinking water supply scheme namely; Churu-Bisau Scheme. The scheme provides for a water demand upto 12 MLD for the town likely to be sufficient upto the year 2021, in conjunction with the ground water.
4. **Urban Water Supply Scheme, Barmer :-** The present water supply of Barmer is dependent on ground water, brought to the town from the tube wells situated around Barmer. Ground water is depleting fast and it is difficult to maintain the service level. PHED has taken up a multi village multi town drinking water supply scheme and the work of main transmission system consisting of Intake works at Indira Gandhi Main Canal, raw water reservoir, filter plant, clear water storage, pumping station and pipeline upto Barmer has been awarded. Work is likely to be completed by September 2009. The transmission system provides for the water demand of 120 MLD of Barmer Town and 691 villages of Barmer and Jaisalmer for the year 2036. (Collected)
5. **Urban Water Supply Scheme, Nagaur :-** Present water supply is dependent upon ground water being brought from a distance of 40 Kms. and source is depleting fast. PHED is implementing a multi town multi village drinking water supply scheme to bring surface water from the Indira Gandhi Canal. The work on main transmission system, consisting of Intake works, raw water reservoirs, WTP, transmission main etc. costing Rs.310.00 Crores is under progress and is likely to be completed by September 2009. The transmission system is sufficient to cater to water demand of Nagaur Town for the year 2031. Nagaur Lift Water Supply Project, Phase-I, is designed to cater 552 MLD demand of five towns namely; Nagaur, Basni, Moondwa, Kuchera and Riyanbari) and 502 villages of District Nagaur. (Collected)
6. **Urban Water Supply Scheme, Karauli :-** Urban Water Supply Scheme, Karauli, is presently dependent upon ground water. As a long term solution, PHED is implementing a multi town multi village drinking water supply namely; Chambal Sawaimadhopur Nadauti Project with Chambal River as source (Collected)

of water. The work of main transmission system consisting of Intake works, raw water reservoir, WTP, clear water reservoir, pumping station, main transmission pipeline etc. is under execution. The work is likely to be completed by March 2010. This project shall cater to the water demand of 23.26 MLD of Karauli Town for the year 2031.

7. **Urban Water Supply Scheme, Sawaimadhopur :-** Urban Water Supply Scheme, Sawaimadhopur, is presently dependent upon ground water. As a long term solution, PHED is implementing a multi town multi village drinking water supply namely; Chambal Sawaimadhopur Nadauti Project with Chambal River as source of water. The work of main transmission system consisting of Intake works, raw water reservoir, WTP, clear water reservoir, pumping station, main transmission pipeline etc. is under execution. The work is likely to be completed by March 2010. This project shall cater to the water demand of 37.66 MLD of Sawaimadhopur Town for the year 2031.


CHIEF ENGINEER (SP) 11/7/08
PUBLIC HEALTH ENGG. DEPTT.
RAJASTHAN, JAIPUR (RAJ)

Appendix 5 Proceedings of City level public consultation

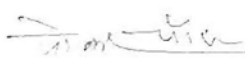
Appendix 1: Proceedings of City Level Consultation Meeting At Nagaur on June 04 '2008

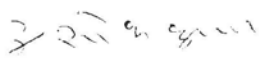
Introduction : Government of Rajasthan has embarked upon an ambitious project of developing infrastructures in the 15 towns of Rajasthan with an aim to raise general standard of hygiene and living of the people. The major factors contributing to this objective is to overcome deficit in various service sectors such as water supply, waste water, solid waste etc. The meeting is organized to make people of the town aware about this project, invite queries from them and thus to arouse interest in people for taking part in the program.

1. The public consultation meeting was therefore organized on **June 04 '2008** at Nagaur Municipal Board (NMB) meeting hall. The meeting was organized by the NMB on the request of the Board, prominent persons of the city, non-governmental organizations (NGOs), community based organizations (CBOs), political leaders, general public and also invited were the technical staff of the various government agencies (List of persons attended the meeting is enclosed herewith).
2. The objective of the meeting was to appraise the stakeholders about the environmental and social impacts of the proposed program and the safeguards provided in the program to mitigate the same.

In the specific context of Nagaur, the environmental and social impacts of the proposed subprojects under Tranche II & III in Nagaur were discussed in detail with people present.

3. Domestic environmental specialist and an EA representative, who is also the in-charge of Nagaur town, made the detailed presentation to the stakeholders (copy of presentation is enclosed herewith). Draft resettlement framework (RF) and summary initial environmental examination (SIEE) documents of RUSDIP, translated in the local language – Hindi, were displayed in the Notice Board of NMB and also distributed during presentation to the interested parties. The copies of documents are also made available to all the interested parties through the NMB. It may be noted that the EA has already distributed these documents to the affected persons (APs) and project implementation agencies, the PHED and NMB .
4. The comments, suggestions of the stakeholders are presented below:
 - stakeholders attended this meeting, which was chaired by the elected Vice-chairperson of Nagaur Municipal Board.
 - The meeting started with a briefing by the Chairman of Nagaur Municipal Board.
 - Domestic environmental specialist then made a detailed presentation on (i) objective and benefits of RUSDIP, (ii) proposed subprojects in Nagaur in Tranche II & III, (iii) mandatory environmental and social assessment requirements of subprojects, i.e. Government Regulations and as well as ADB policies on Environment, involuntary Resettlement and Indigenous


अधिसायी अधिकारी
नगरपालिका, नगर नगर


अध्यक्ष
नगरपालिका, नगर नगर

People – salient features of these three key safeguard policies were presented, (iii) key social safeguard features in the program to avoid social impacts, (iv) draft resettlement framework (v) IR impacts of Tranche II & III subprojects in Nagaur, (vi) environmental subproject selection criteria to minimize the negative environmental impacts of subproject implementation and, lastly, (vii) identified environmental impacts and mitigation measures through sample subproject IEEs.

- All the stakeholders supported the project and indicated their willingness to participate in the program to make it successful.
- Stakeholders were of the general view that these subprojects provide benefits to all the people by improving water supply, sewerage, roads and solid waste management infrastructure.
- Most of the stakeholders also indicated that solid waste at present is not managed properly. Waste is collected partially and disposed haphazardly all over, making Nagaur unhealthy. During rains the solid waste joins natural streams. Therefore, all were of the view that solid waste management subproject will improve the environmental and aesthetical values of the city.
- People were very much impressed by the ADB Policy that the “absence of formal legal title to land is not a bar to ADB policy entitlement”.
- The EA further appraised that RUSDIP is designed to minimize the IR impacts. In unavoidable cases, the LA and R & R will be handled through the Resettlement Framework (RF) of RUSDIP. Stakeholders were satisfied that all possible IR issues are included in RF, however, indicated to the EA that this shall be implemented in letter and spirit.
- The ADB has also a policy according to which contract can not be finalized unless land required and RF/RP are cleared. With this policy cost over runs and delays will be avoided.

Thimble

21/9/21

अधिशायी अधिकारी
संगरपालिका मन्त्रालय

S.No	Name	Designation	Signature
22	Ram Prasad Meena	Junior Engineer	[Signature]
23	3424212	3424212	
24	[Signature]	[Signature]	[Signature]
25	[Signature]	[Signature]	[Signature]
26	[Signature]	[Signature]	[Signature]
27	S. S. Pawar	Adm	[Signature]
28	Chandhyam Panwar	Asst. RUDP. In.	[Signature]
29	Mahesh Sonu	Support Engineer	[Signature]
30	NANESHARAD DUKIYA	STAN. S.	[Signature]
31	Jai Singh	Director Namgudi, Jaitling	[Signature]
32	[Signature]	[Signature]	[Signature]
33	[Signature]	[Signature]	[Signature]
34	G. R. Bhakar	Ex. Rm PMB	[Signature]
35	Ravi Prakash Suthar	Support Engineer DSC-II Nagaur	[Signature]
36	[Signature]	[Signature]	[Signature]
37	[Signature]	[Signature]	[Signature]
38			