

Environmental Assessment Document

Initial Environmental Examination: Baran Chhabra Urban Drainage Subproject
Project Number: 40031
August 2008

India: Rajasthan Urban Sector Development Investment Program

Prepared by Local Self Government Department

For the Government of Rajasthan
Rajasthan Urban Infrastructure Development Project

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
DSC	- Design and Supervision Consultancy
EA	- Executing Agency
EAC	- Expert Appraisal Committee
FI	- Financial Intermediary
GoI	- 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
lpcd	- liter per capita per day
lps	- liter per second
LSGD	- Local Self-Government Department
MFF	- Multi-tranche Financing Facility
MLD	- Million liter Per day
MoEF	- Ministry of Environment and Forests
NAAQS	- National Ambient Air Quality Standards
OD	- Outer Diameter
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
SPM	- Suspended Particulate Matter
STP	- Sewerage Treatment Plant
ToR	- Terms of Reference
UA	- Urban Agglomeration
UIDSSMT	- Urban Infrastructure Development Scheme for Small and Medium Towns
uPVC	- Unplastized Poly Vinyl Chloride
USEPA	- United States Environmental Protection Agency
WC	- Water Closets

WEIGHTS AND MEASURES

lakh	–	100 thousand = 100,000
crore	–	100 lakhs = 10,000,000
$\mu\text{g}/\text{m}^3$	–	micrograms per cubic meter
km	–	kilometer
lpd	–	liters per day
m	–	meter
mg/l	–	milligrams per liter
mm	–	millimeter
ppm	–	parts per million

NOTE{S}

- (i) In this report, "\$" refers to US dollars.
- (ii) "INR" and "Rs" refer to Indian rupees

CONTENTS

I. INTRODUCTION	1
A. Purpose of the Report	1
B. Extent of the IEE study	1
II DESCRIPTION OF THE PROJECT	3
A. Type, Category and Need	3
B. Location, Size and Implementation Schedule	3
C. Expected Subproject Outcomes	4
D. Description of the Sub-project including detailed scope	4
III. DESCRIPTION OF THE ENVIRONMENT	8
A. Physical Resources	8
B. Ecological Resources	18
C. Economic Development	18
D. Social and Cultural Resources	25
IV. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: LOCATION AND DESIGN	27
V. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: INFRASTRUCTURE CONSTRUCTION	28
A. Screening out areas of no significant impact	28
B. Main Drains	28
VI. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: OPERATION AND MAINTENANCE	34
A. Screening out areas of no significant impact	34
B. Operation and maintenance of the improved drainage system	34
C. Environmental impacts and benefits of the operating system	35

VII	INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN	36
A.	Summary of environmental impacts and mitigation measures	36
B.	Institutional arrangements for project implementation	37
C.	Environmental Monitoring Plan	42
D.	Environmental management and monitoring costs	43
VIII.	PUBLIC CONSULTATION AND INFORMATION DISCLOSURE	46
A.	Project stakeholders	46
B.	Consultation and disclosure to date	46
C.	Major Issues discussed during Public consultation are	48
D.	Future consultation and disclosure	48
IX	FINDINGS AND RECOMMENDATIONS	49
A	Findings	49
B	Recommendations	52
X	CONCLUSIONS	52
	Appendix – 1: Rapid Environmental Assessment (REA) Check List for Baran Drainage	54
	Appendix- 2: PUBLIC CONSULTATION	58

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 prepared 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 categorised 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 categorised 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 categorises 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 urban drainage sub-project 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 Baran drainage sector. It discusses the generic environmental impacts and mitigation measures relating to the location, design, construction and operation of physical works proposed under the urban drainage subproject of RUIDP. A master plan for the Drainage network for Baran-Chhabra is under preparation.

II DESCRIPTION OF THE PROJECT

A. Type, Category and Need

14. This is a urban drainage sub-project, and as explained earlier, it 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 sub-project is needed because the present drainage system is inadequate for the needs of the growing population. There are open drains alongside certain roads and streets, but many are blocked and overflowing, and most contain household sewage discharged through illegal connections. Leakage from drains and the municipal water supply system is a major problem in the historical fort where many structures are suffering serious water damage. 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 Baran town and the other urban centres to those expected of modern Asian towns.

B. Location, Size and Implementation Schedule

15. The sub-project is located in Baran town of Baran District, in the south east part of Rajasthan in north-western India (**Figure 2.1**). The infrastructure will be located in and around the town, where new concrete *nallahs* (drainage channels) will be built to carry waste water for final disposal (**Figure 2.2**).

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

16. Detailed design will begin in the middle of 2008 and should be completed by the end of the year 2009. Construction will begin in latter part of 2008, and should take around twelve months, so all work should be completed by the end of 2009.

17. Based on the topography of Baran town, the watershed is divided into 5 drainage zones. Three out of five drainage zones are almost equally populated and all the drains from these zones are connecting to the Banganga River which a very small river is having an average bed width of 25 m. The Banganga River is a non perennial river flowing from south to north passing Baran town and finally meeting Parbati River at Mangrol about 15 Km from Baran town. The catchment area directly draining to the Banganga River is named as Banganga River drainage zone. In addition to its own drainage catchment area, the river is the recipient of the drainage from remaining zones through various major drains. The Forest drain is the existing drain of stone masonry of 3.78 Km and the surrounding areas 4.48 Sq.Km is under this drainage zone. This Forest drain is finally connected to Banganga River. Similarly, Ramnagar Nallah (drain) of 2.76 Km of length covering an area of 3.38 Sq.Km. is also finally connecting to Banganga River. There are two more drains in this town, one is Nalka *nallah* at the western part of the town and another is Patheda *nallah* at the eastern part which also outfall to Banganga River.

18. At many places soil/garbage is dumped in the Banganga River for which natural flow is obstructed. Due to this, most of the areas in the catchment area of Banganga River is getting flooded during monsoon. It also impedes the flow of drainage of other major drains out falling into the river. At the same time, upstream of the connecting drains to Banganga River are also getting flooded. To overcome the drainage problem, desiltation of Banganga River is necessary. Conversion has also to be done for Ramnagar *Nallah* (drain) and Forest drain which are covering the drainage zones of the most populated areas of Baran town.

C. Expected Subproject Outcomes

19. Relief of drainage congestion of the whole of Forest Nallah Zone, Ramnagar *Nallah* Zone, Banganga River Zone and a part of Patheda *Nallah* Zone of Baran; giving relief to not only the residents of the area; but also the people of the town as a whole as the area, being highly commercial, draws a large number of population for various activities. The following are the expected outcome from the Subproject:

- a. substantial reduction in water flooding of the catchment area both in term of the water depth and duration of flooding;
- b. reduction in financial loss prevalent without the Subproject due to loss of business during acute water flooding in the area for substantial period of time;
- c. uninterrupted business activities in the areas;
- d. less damage to the roads and thereby savings in road maintenance cost; and
- e. overall improvement of the environmental condition of the area

D. Description of the Sub-project including detailed scope

20. The total length of the new drain will be constructed in Random Rubble (RR) masonry channel with cement concrete bed increasing the velocity of flow in the drain which will consequently increase the water carrying capacity of particular section. This in turn will facilitate

in evacuating the storm water rapidly and thus resulting in substantial reduction in water flooding of the catchment area both in term of the water depth and duration of flooding.

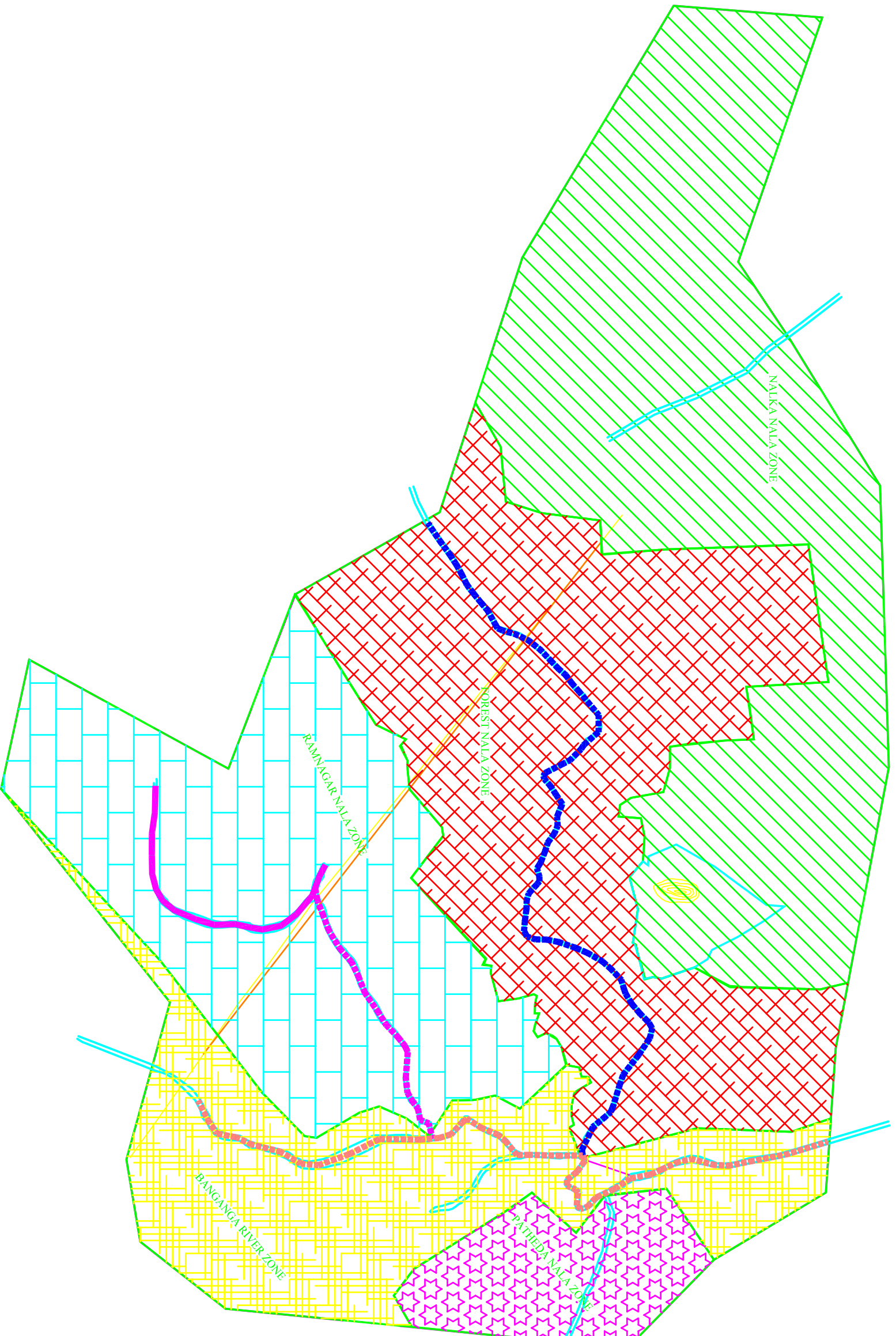
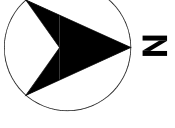
21. Works involve "Construction of storm water drainage system at Banganga/Forest/Ramnagar *Nallah* involve Cleaning of *Nallahs*/River, Construction of Side walls, Culvert & Box culvert wherever required cleaning of the existing drain, construction of drainage channel, culverts and covering of the drain at sections for providing access. Details of work is described below

- a) Desilting of drain to achieve the existing bed levels where drain bed is lined.
- b) Excavation of trenches and foundations for all works in all sorts of strata including refilling of trenches, disposal of surplus soil and site clearance works.
- c) Reconstruction broken bypass channel
- d) Construction of RR stone masonry retaining wall in drain and 62mm PCC/ CC Flooring followed by PCC in bed and construction of RCC structure for some reaches.
- e) Plaster RR Masonry wall on water face to give smooth finish. Construction of stone masonry parapet wall on one sides of drain at ground level.
- f) Providing rainwater inlets.
- g) Provide weep Hole as per Details.
- h) Side Backfilling of RR Masonry wall to the required proctor density.
- i) Repair and Construction of bituminous road with preparation of Sub base such as GSB, WBM as specification.
- j) Repair of damage RR Masonry where require as per side condition.
- k) Construction of 1 No. of Box Culverts and 6 Nos. of Culvert/ 2 Nos. high-level bridges.
- l) Dismantling of existing culvert and other faulty structure create obstruction in flow of water.

Fig 2.1: Location of the project area

Fig 2.2: Proposed drainage scheme of Baran

STORM WATER DRAINAGE ZONES FOR BARAN



SR. NO.	DESCRIPTION	Length in municipal council area in km	AREA in Sq km
1	NALKA NALKA ZONE	1.32	2.85
2	FOREST NALKA ZONE	3.78	4.48
3	RAMNAGAR NALKA ZONE	2.76	3.38
4	BANGANGARIVER	3.53	2.42
5	PATHEDA NALKA ZONE	0.70	0.77

LEGEND:-

SR. NO.	DESCRIPTION
1	NALKA NALKA ZONE
2	FOREST NALKA ZONE
3	RAMNAGAR NALKA ZONE
4	RAMNAGAR NALKA ZONE
5	PATHEDA NALKA ZONE

- Construction of Ram Nagar Nallah
- Desilting of Ram Nagar Nallah
- Construction of culverts on Forest Nallah and repairing
- Desilting of Banganga River

III. DESCRIPTION OF THE ENVIRONMENT

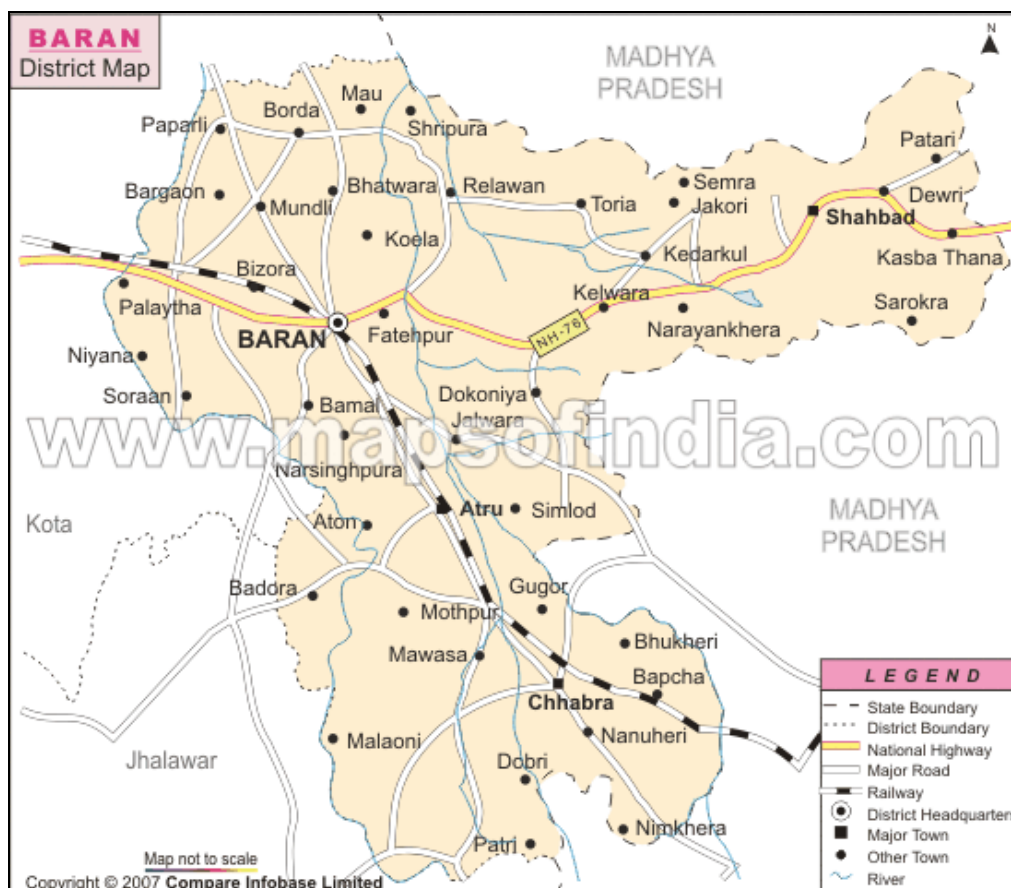
A. Physical Resources

1 Location

22. Baran-Chhabra Local Planning Area (LPA) located in Baran District (in the southeast part of Rajasthan) comprises the two Municipal Boards of Baran and Chhabra situated approximately 59 km apart with their municipal boundaries meeting at one point. Viewed as one LPA, Baran-Chhabra is located approximately 126 km from Divisional Headquarter Kota. The two municipalities are well connected by Kota-Bina Railway line which was established on 1906. The town is well connected by road and railway and linked with other city by the NH-76 (Pindwara-Kota-Baran-Shivapuri) and SH-19 (Indergarh-Mangrol-Jhalawar-Dag Agra). Banganga River flows to the north of the Baran town and joins the river Parvan, a tributary of the River Chambal and Chhabra is situated in the bank of Renuka River.

23. The town has been growing as the commercial centre in the region. A Gas Thermal Power Plant is situated at Anta, 22 km west of Baran town. **Figure 3.1** shows the regional setting of the Baran-Chhabra LPA. Baran -Chhabra are part of the Hadoti region, a famous heritage tourism destination comprising of Gugor Fort which is believed as 800 years old, Kula Devi Mataji and Nageswar Shiv Mandir.

Figure 3.1: District map of Baran



24. The general statistic of the Baran District is tabulated in the **Table 3.1**

Table 3.1: Some important features of district Baran

Parameters	Particulars
Sub division	Baran, Chhabra, Shahabad, Kishangang, Atru, Mangrol
Tehsils	Baran, Anta, Chhipabarod Chhabra, Shahabad, Kishangang, Atru, Mangrol
Sub Tehsils	Kelwara
Panchayat Samities	Baran, Anta, Chhipabarod Chhabra, Shahabad, Kishangang, Atru
Municipalities	Baran, Chhabra, Anta, Mangrol
Gram Panchayats	215 nos.
Villages having water supply	1069 nos.
Major source of water supply	Dams at Hikar, tubewell, Handpumps
Parliamentary Constitution	Kota- Baran Assembly Kota Jhalawar- Chhabra, Kishangang, Atru,
Assembly Constitution	Baran, Chhabra, Kishangang, Atru

2 Topography, Drainage, Natural hazard and Drought

25. **Topography:** Baran lies between the East longitude 76° 31' E and North latitude 25° 60' N and also known as 'Annapurna Nagri'. It is situated at the north-West of Baran District at 260 meters above MSL. Baran Municipal Council is situated nearer to SH-19 and NH-76. A Broad gauge line from Kota to Guna is also connecting the town to various major towns of Rajasthan. Town is situated at a distance of 67 Km. from Kota by Rail nearest Air port is at Kota where commercial craft is not available. Banganga River flows to the north of the town and joins the river Parvan, a tributary of river Chambal. Chhabra is located between the East longitude 77° 02' E and North latitude 24° 39' N. It is situated at the South-east portion of Baran District at 260 meters above MSL.

26. **Drainage:** The land slopes gently northward from the high table land of Malwa in MP. It is well watered, drained by rivers flowing in North and North-Eastern directions. There are hills in the south, north and eastern portion of the district and it is gently fertile. There are hills in the east Shahabad Tehsil, having the highest point, named as Mamooni, which is 546 m above mean sea level. These hills are the part of Aravali Ranges.

27. **Natural Hazards- Earthquake:** Baran - Chhabra 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 Baran district.

28. **Drought:** Low rainfall coupled with erratic behavior of the monsoon in the State makes Rajasthan the most vulnerable to drought. Based upon the discussion with PHED officials, the water table in the Baran City continuously decreases by 1-2 meter on an annual basis combined with significant drawdown conditions.

Figure 3.2: Earthquake zones of Rajasthan

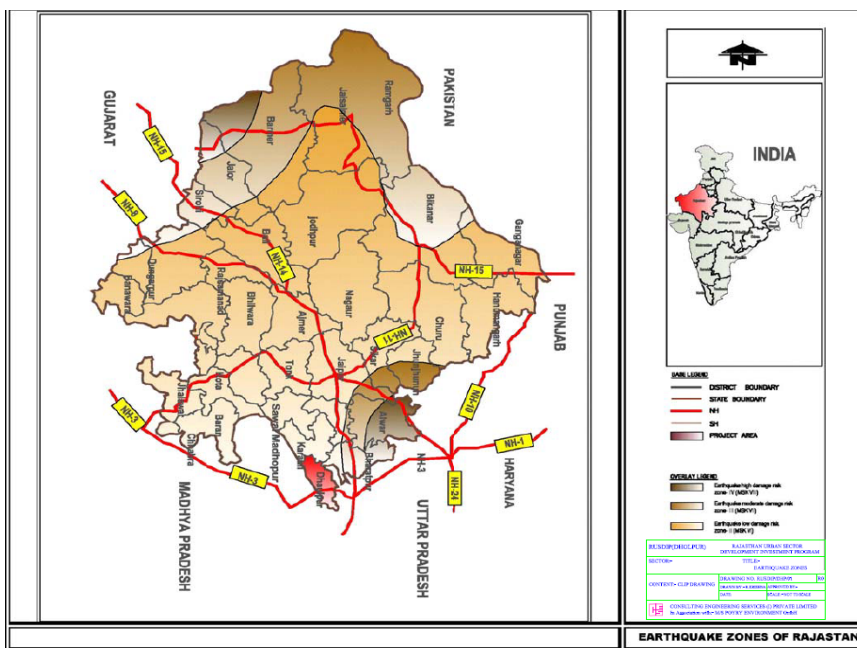
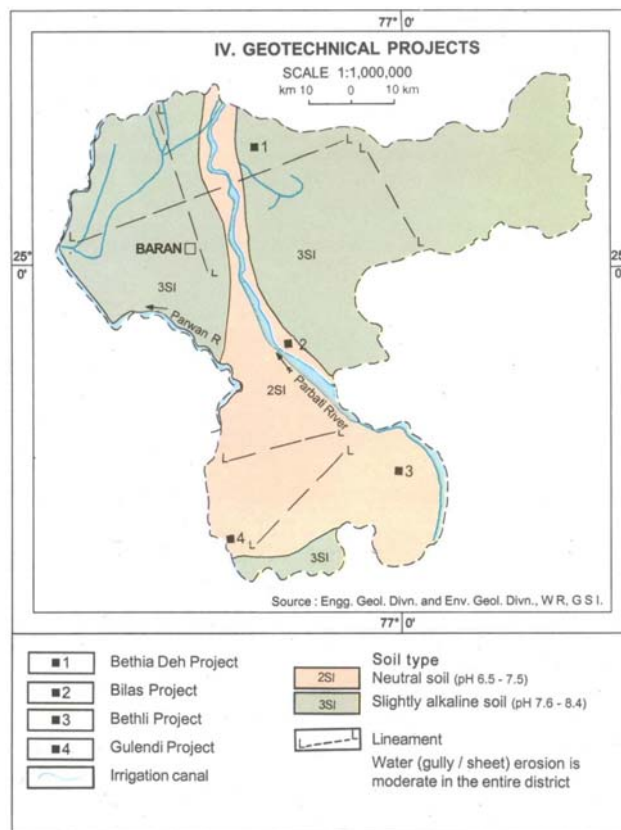


Figure 3.3: Natural Hazard map of Baran (GSI Resource map)



3 Geology, geomorphology, mineral resources and soil

29. Major part of Baran district is occupied by Shale-Sandstone –limestone sequences belonging to the Vindhyan SuperGroup and the Deccan. The oldest rock type belonging to the Vindhyan Super Group .These are Classified in to the Rewa and Bhandar Groups. This is conformably overlain by the Bhandar Group comprising Ganurgarh Shale ,Bundi Hill. Of these the Bundi Hill Sandstone and the Sirbu Shale Formations in ascending order of succession. Younger alluvium is found along the present day flood plains of the rivers, supports extensive cultivation.

30. Mineral Resources: Baran district is endowed with bauxite, clay and building stone. Bauxite occurs near Majola. In Mamoni area reserves of 0.5 millions tonnes of bauxite averaging 49.54 % AO, 5 % SiO₂, 31.1 % FeO and 6.99 % TiO₂ are found. The length and width of deposit are 1400 m and 450 m, respectively .The thickness varies from 3 to 15 m. The Vindhyan sandstones form good building stone which are sold under the trade name “Kota stone”

31. Geology and mineral map of the district is shown in **Figure 3.4** and geomorphologic map of the district is depicted in **Figure 3.5**.

Figure 3.4: Geology and mineral map of Baran district (Source: GSI Resource map)

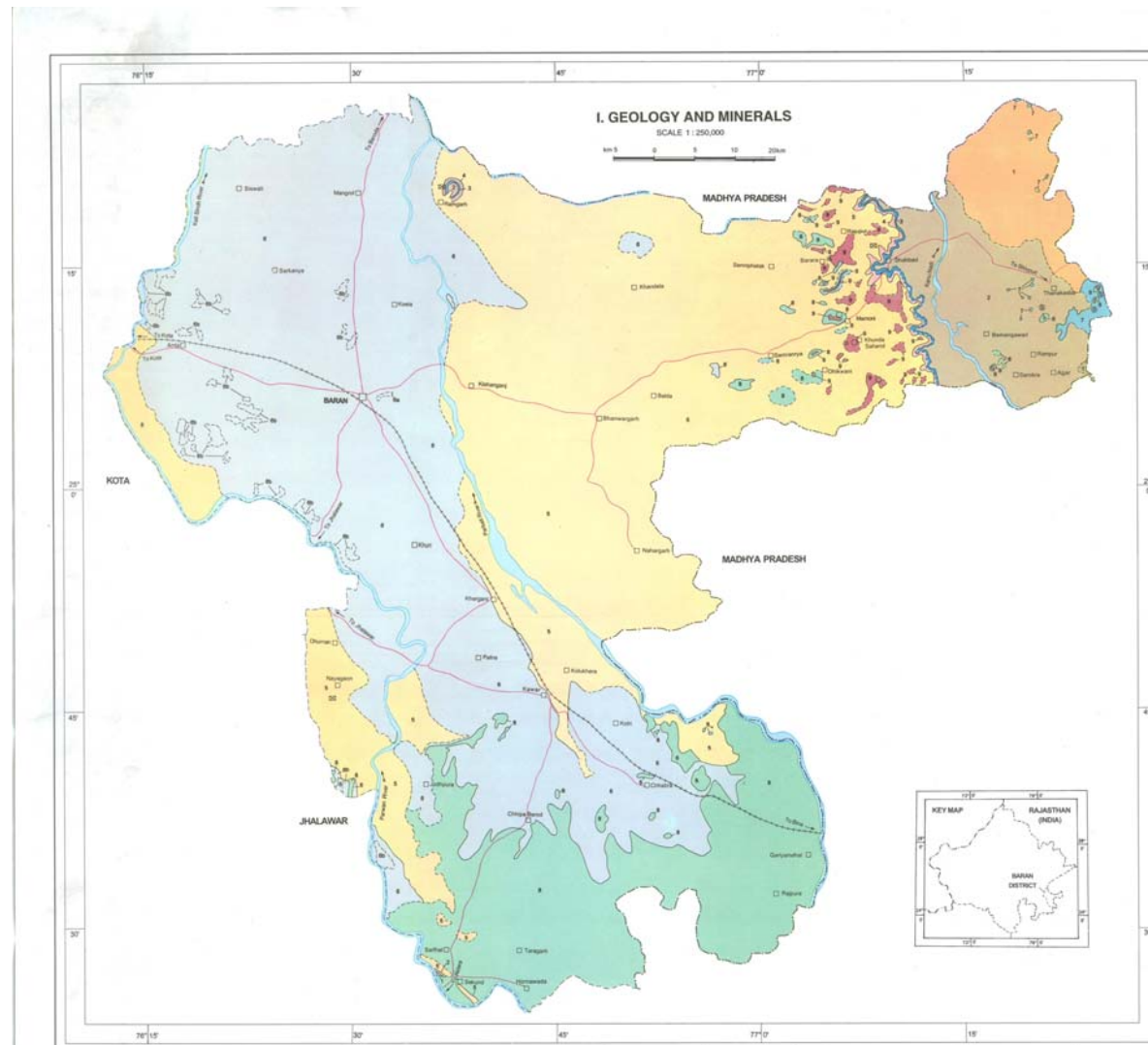
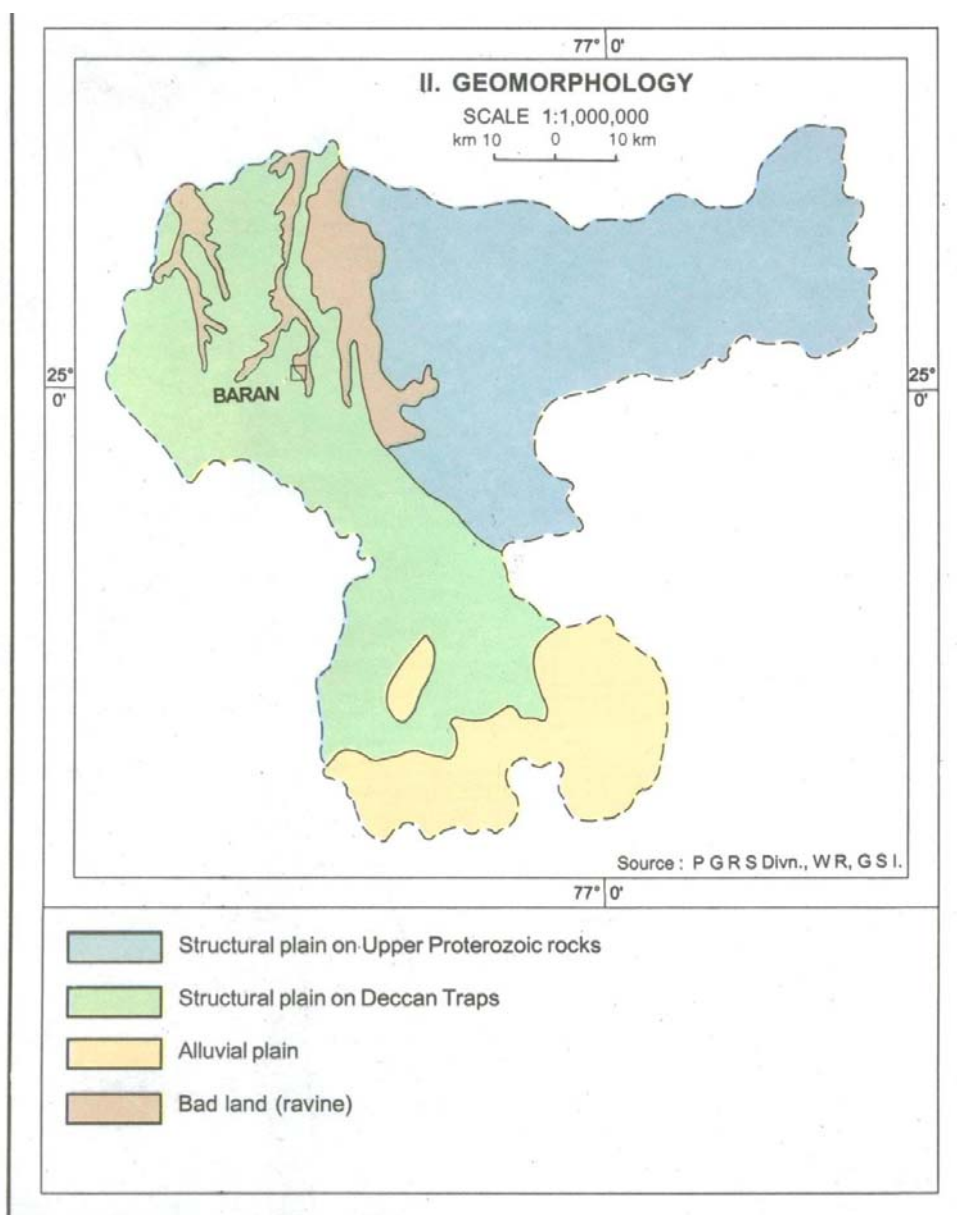


Figure 3.5: Geomorphology of Baran district (source: GSI Resource map)



32. Soil characteristics: Soil of the region falls within low rainfall zone of 650- 1000 mm. The soils are black of alluvial origin, clay loam and groundwater salinity is reported. **Table 3.2** shows nutrient level in the Baran soil including area coverage of saline and sodic soil. The nutrient status of the Baran soil is graded as medium to high level.

Table 3.2: Fertility status – major nutrients and problematic soils of Baran district

	Nutrient			Saline Soil(Ha)	Sodic or Alkali(Ha)
	N	P	K		
Status	Medium	Medium	High	1008	1584

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

4 Climate

33. The mean daily maximum temperature of Baran is 42.6 degrees Celsius. The mean daily minimum temperature is 29.7 degrees Celsius. The area experiences a humid climate and the annual rainfall is 882 mm.

34. The rainfall over Baran Chhabra is moderate and is concentrated over four months 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 a large extent. The average rainfall for both the towns of last 18 years is as tabulated in **Table 3.3**.

35. Seasonal rainfall data for the recent year (2005-2006) is shown in **Table 3.4**. **Figure 3.6** shows yearly variation (1997-2007) of rainfall at Baran and Chhabra.

Table 3.3: 18 years Rainfall data for both the town

Year	Av. Rainfall in mm for Baran	Av. Rainfall in mm for Chhabra
1990	777.0	1203.0
1991	1046.8	943.6
1992	605.4	720.0
1993	631.0	1216.0
1994	989.6	1125.0
1995	723.0	1135.0
1996	797.0	1277.0
1997	691.0	1116.0
1998	645.0	956.8
1999	782.0	869.0
2000	860.0	928.0
2001	868.0	751.0
2002	254.0	440.5
2003	571.0	994.0
2004	768.0	994.0
2005	923.5	864.0
2006	925.4	887.0
2007	613.0	749.0

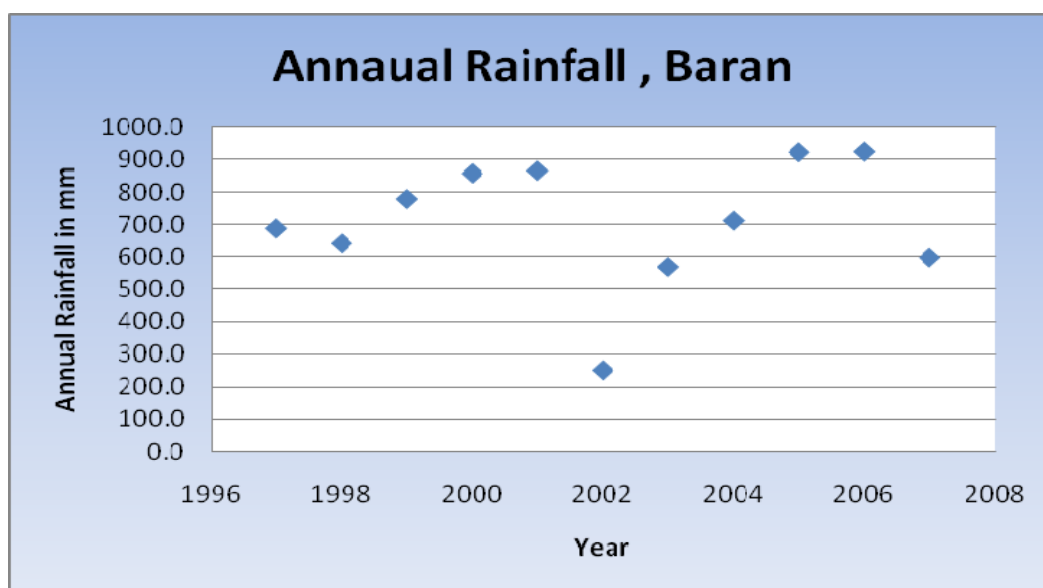
Source: Collectorate Land Record Section

Table 3.4: Rainfall at Baran in recent years (2005-06)

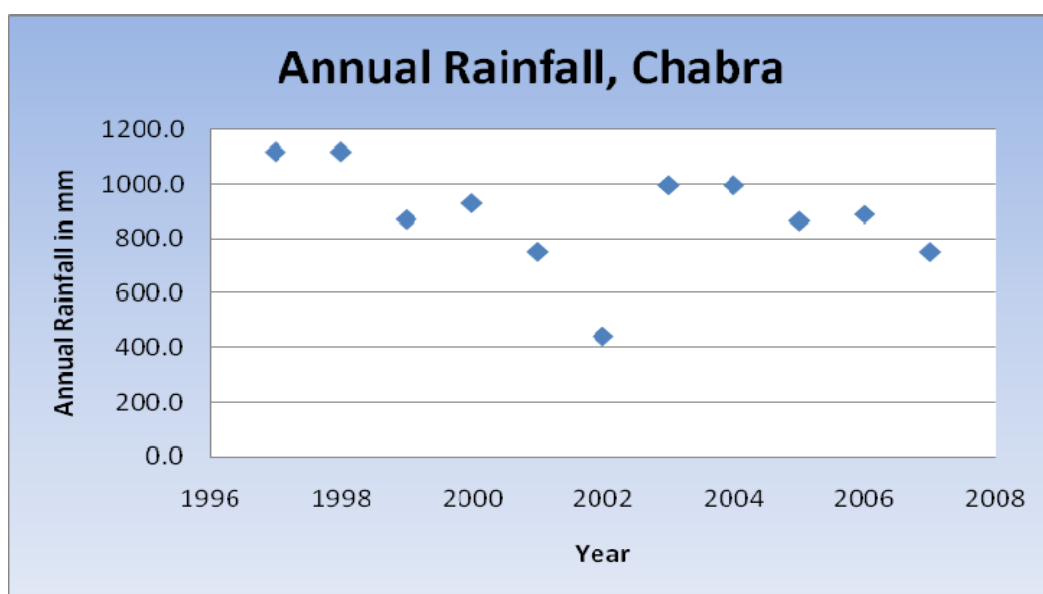
S.No.	Months	Rainfall (mm)
1	June	51.8
2	July	441.6
3	August	93.8
4	September	607.4
5	October	0
6	November	0
7	December	0
8	January	0
9	February	0
10	March	31.4
11	April	0
12	May	33.6
13	Monsoon Rainfall	1194.6
14	Non monsoon rainfall	65.0
15	Annual Rainfall	1259.6

(Source: Irrigation Department, Govt. of Rajasthan)

Figure 3.6: Rainfall at Baran and Chhabra during 1997 to 2007.



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



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

5 Air Quality

36. There are no data on ambient air quality of Baran and Chhabra Town, which is not subject to monitoring by the Rajasthan State Pollution Control Board (RPCB) as there are no major industries. The nearest station is located at Kota (73 km from Baran). Traffic is the significant pollutant in Baran-Chhabra, so levels of oxides of sulphur and nitrogen are likely to be well within the National Ambient Air Quality Standards (NAAQS). The ambient air quality data is depicted in **Table 3.5**.

Table 3.5: Ambient Air Quality in Kota (Annual Average, 2004; units in µg/m³)

Monitoring Station	Land use	SO _x	NO _x	RSPM	SPM
Kota Residential, Rural and others area	Residential	7.95	22.85	121	272
NAAQ Standard	Residential	60	60	60	140
Kota Industrial area	Industrial	9.66	24.21	132	323
NAAQ Standard	Industrial	80	80	120	360

RSPM: Respirable Suspended Particulate Matter; SPM: Suspended Particulate Matter

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

6 Surface Water

37. There is no water quality monitoring station at Baran and Chhabra. It is expected that during monsoon season the water quality will be deteriorated by large volume suspended solid.

7 Geohydrology and Groundwater

38. There are number of National Hydrographic monitoring stations of Central Ground Water Board in and around Baran. Fluctuation of ground water level is shown in **Table 3.6**. In most of the cases ground water table ranged between 2 - 10 m bgl.

Table 3.6: Number and Percentage of National Hydrograph Network Station (Baran) 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	20	1.21	46.16	1	5	5	25	10	50	3	15	1	5	0	0
Nov-05	20	1.39	39.06	1	5	10	50	6	30	2	10	1	5	0	0
Aug-05	22	0.65	43.2	4	18.18	9	40.91	5	22.73	3	13.64	1	4.55	0	0
May-05	15	3.1	55.5	0	0	3	20	6	40	3	20	3	20	0	0

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 3.7**. Geohydrological map of the district is shown in **Figure 3.7**.

Table 3.7: Ground Water Quality in and around Baran

Parameters	Maximum Level	Minimum Level	Standard of Drinking water (IS: 10500: 1991)	
			Desirable limit (mg/l)	Maximum Permissible limit (mg/l)
pH	8.03	7.7		
EC (micro-mhos/cm at 25 °C)	2800	640		
Cl (mg/l)	178	21	250	1000
SO ₄ (mg/l)	1038	12	200	400 (if Mg does not exceeds 30 ppm)
NO ₃ (mg/l)	47	0	-	100
PO ₄ (mg/l)	0.25	0.1		
Total Hardness(mg/l)	1040	230	300	600
Ca(mg/l)	120	44	75	200
Mg(mg/l)	180	24	30	100

Parameters	Maximum Level	Minimum Level	Standard of Drinking water (IS: 10500: 1991)	
			Desirable limit (mg/l)	Maximum Permissible limit (mg/l)
Na(mg/l)	235	44	-	-
K(mg/l)	20	1.6	-	-
F(mg/l)	1.3	0.65	1.0	1.5
Fe(mg/l)	7.8	0.14	0.3	1.0
SiO ₂ (mg/l)	30	12		
TDS (mg/l)	1820	416	500	2000

Note: Total –9 nos. samples

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

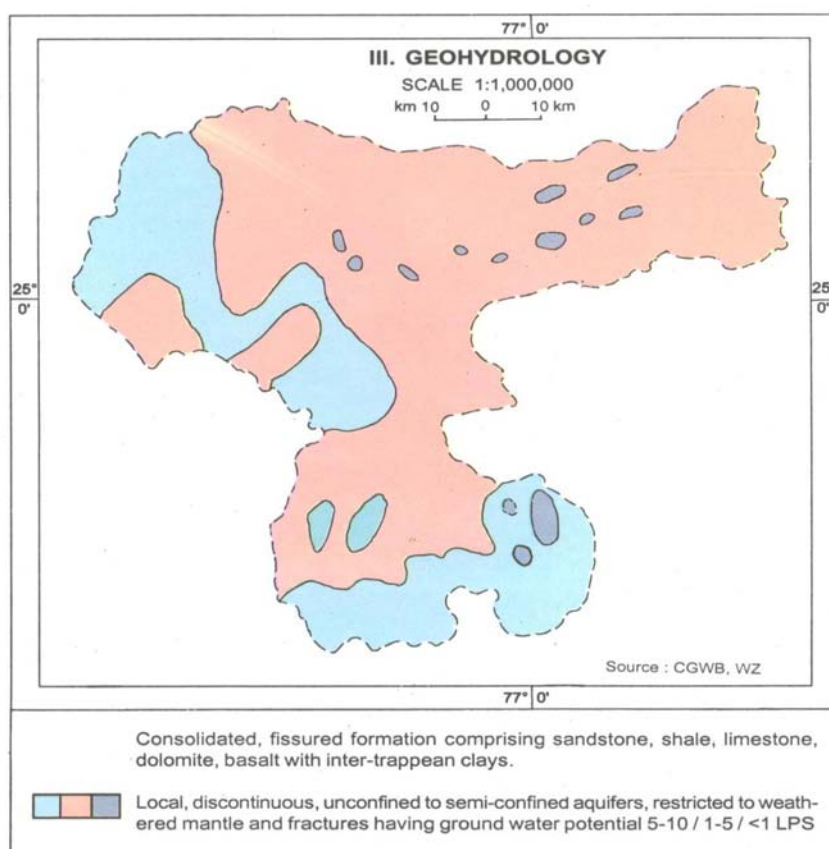
40. Supply water quality as measured by Public Health dept. is shown below. It is noted that ground water contains high level of TDS.

Table 3.8: Present supply water quality at Baran

Total supply per day (lac liter)	Type of Sources Surface / Ground	Ground	Surface	No. of CWR	No. of SR	F ⁻ Min	F ⁻ Max	TDS Min	TDS Max	NO ₃ ⁻ Min	NO ₃ ⁻ Max
55.2	Both (G:S 2:9)	2.0	9	5	8	0.37	0.6	296	1140	4	12

(All values in mg/l unless stated otherwise)

Figure 3.7: Geohydrological map of the Baran district (Source: GSI Resource map)



B. Ecological Resources

41. Flora: This region or province or division in botanical terms, supports good teak forests which, however, been under heavy biotic pressure. Another dominant species is mahuwa whereas other common constituent species are sadad, baheda , dhonkra , dhav.

42. Fauna: In Baran district, the wild animals found are striped hyaena (Hyaena), jackal (*Canis aureus*), baghera (*Panther pardus*), monkey (*Macaca mulatta*), common mongoose (*Herpestes edwardsii*), Indianfox (*Vulpes bengalensis*), blue bull(*Boselaphus tragocamelus*) etc.

Shergarh wildlife Sanctuary :

43. The vegetation comprises mixed miscellaneous forests with Kaldhi , Salar , Dhaura, Khair etc.

44. There is no forest area nearby the sub-project site. No endangered flora and fauna is reported from the site.

C. Economic Development

45. Baran, as a district head quarter, has a special administrative status and is a resourced rich region. It continues to be the main regional center for trade and commerce and various socio-economic activities, since major portion of near by Tehsils are irrigated by Chambal Canal System which sourced at Kota and reached to Madhyapradesh.

46. According to the Census of 1991, the work force participation ratio in Baran is 27.60 percent, which is equal to as for Kota (27.6%) and Jaipur (27.0%) and marginal lower than Udaipur (28.0) and more than the state of Rajasthan (26.6%). **Table 3.9** shows the details of work force participation of Baran. However, as per census 2001, in the Baran town the work force amounts of 22,330 persons out of which main workers 25.13% (19136) and marginal workers 6.20% (3194). Categories of workers are as cultivators of 479 nos., Agricultural labors of 342 nos., household industries workers of 2065 nos. and other workers of 19,444 nos.

47. According to the Census of 2001, the work force participation ratio in Chhabra is 31.79 percent, as for Kota (27.6%) and Jaipur (27.0%) and marginal lower than Udaipur (28.0) and more than the state of Rajasthan (26.6%). **Table 3.10** shows the details of work force participation of Chhabra.

Table 3.9: Work Force Participation Rate in Baran

Sector	1991			2001		
	No. of Worker	% to total Worker	% to total Population	No. of Worker	% to total Worker	% to total Population
Primary	1643	10.31	2.85	1445	1.98	1.84
Secondary	4280	26.86	7.42	2757	3.78	3.5
Tertiary	10010	62.83	17.34	68699	94.24	87.33
Total	15933	100.00	27.60	72901	100	92.67

Source: Census of India and Baran Statistical Outline (1980, 1987, 2000, 2004).

Table 3.10: Work Force Participation Rate in Chhabra

Sector	1991			2001		
	No. of Worker	% to total Worker	% to total Population	No. of Worker	% to total Worker	% to total Population
Primary	759	17.37	4.63	762	10.51	3.34
Secondary	735	16.82	4.49	890	12.28	3.90
Tertiary	2876	65.81	17.55	5595	77.20	24.54
Total	4370	100.00	26.67	7247	100	34.79

48. Growth of industries and the employment generation of Baran district is furnished in **Table 3.11**

Table 3.11: The Growth of industries and employment generation of Baran District

Sl. No.	Year	No. of registered Units	Employment
1	1991-92	82	262
2	1992-93	137	418
3	1993-94	188	550
4	1994-95	239	653
5	1995-96	299	797
6	1996-97	375	1085
7	1997-98	468	1330
8	1998-99	576	1799
9	1999-2000	692	2145
10	2000-01	917	2660
11	2001-02	1045	2998
12	2002-03	1174	3316
13	2003-04	1315	3698

Source: District Industries office, Kota

49. Power status of the area: There is one power generating unit at Baran. The consumption of electricity by different sectors is shown in Table below.

Table 3.12: Consumption of Electricity in Million Kwh (2003-04)

District	Domestic	Non- Domestic (Commercial)	Industrial	Public Lighting	Public Water Works	District	Domestic
			Small	Medium	Large		
Baran	26.558	6.486	3.12	1.116	6.14	0.852	5.531

1. Land use

50. First Master plan for Baran was prepared in 1988 for 20 years (1988-2001) with land use classification under 7 categories. The draft master plan was notified on 20th December, 1991 for public objections and suggestions. Finally, the Govt. approved the Master Plan per Section 6(3) of Rajasthan Urban Improvement Act, 1959 and notified under section 7 of the said Act in 1993 with a plan period of 20 years assuming that the city population in the year 2011 will increase 1.30 lakhs. The Master Plan highlighted 200 registered industrial units in

Baran employing about 900 workers in 1988. Development around the present area and a separate industrial township between Baran-Shahabad and Baran-Atru state highway has also been envisaged to provide for about 9,300 person in the year 2011.

51. **Table 3.13** shows Land use of Baran urban area. Figure 3.8 indicates proportion of land use of Baran in the year 2001. Figure 3.9 shows land use of Baran district as a whole.

52. However the Master plan for Chhabra is a long term proposal envisaged to ensure prospective planning in order to enhance the growth rate of the town through the phased development to be implemented under RUSDIP. As reported, town planning department at Kota had conducted various physical and socio-economic surveys towards the preparation of master plan.

3.13: Baran UA Existing Land Use Pattern

Land Use	1988		2001	
	Area in acres	% of developed area	Area in acres	% of developed area
Residential	330	40.59	1300	44.37
Commercial	110	13.53	220	7.51
Industrial	17	2.09	190	6.48
Government	17	2.09	150	5.12
Recreation	35	4.31	380	12.97
Public/Semi Public	130	15.99	350	11.95
Circulation/Transport	174	21.40	340	11.60
Total Area	813	100.0	12,500	100.00

Source: Baran Master Plan, 2001.

Figure 3.8: Land use proportion for Baran Urban area - 2001

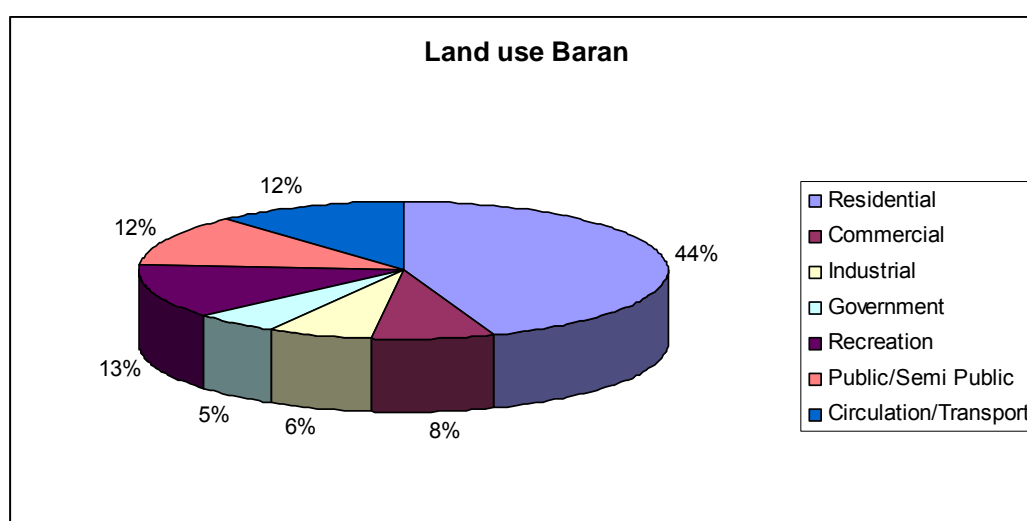
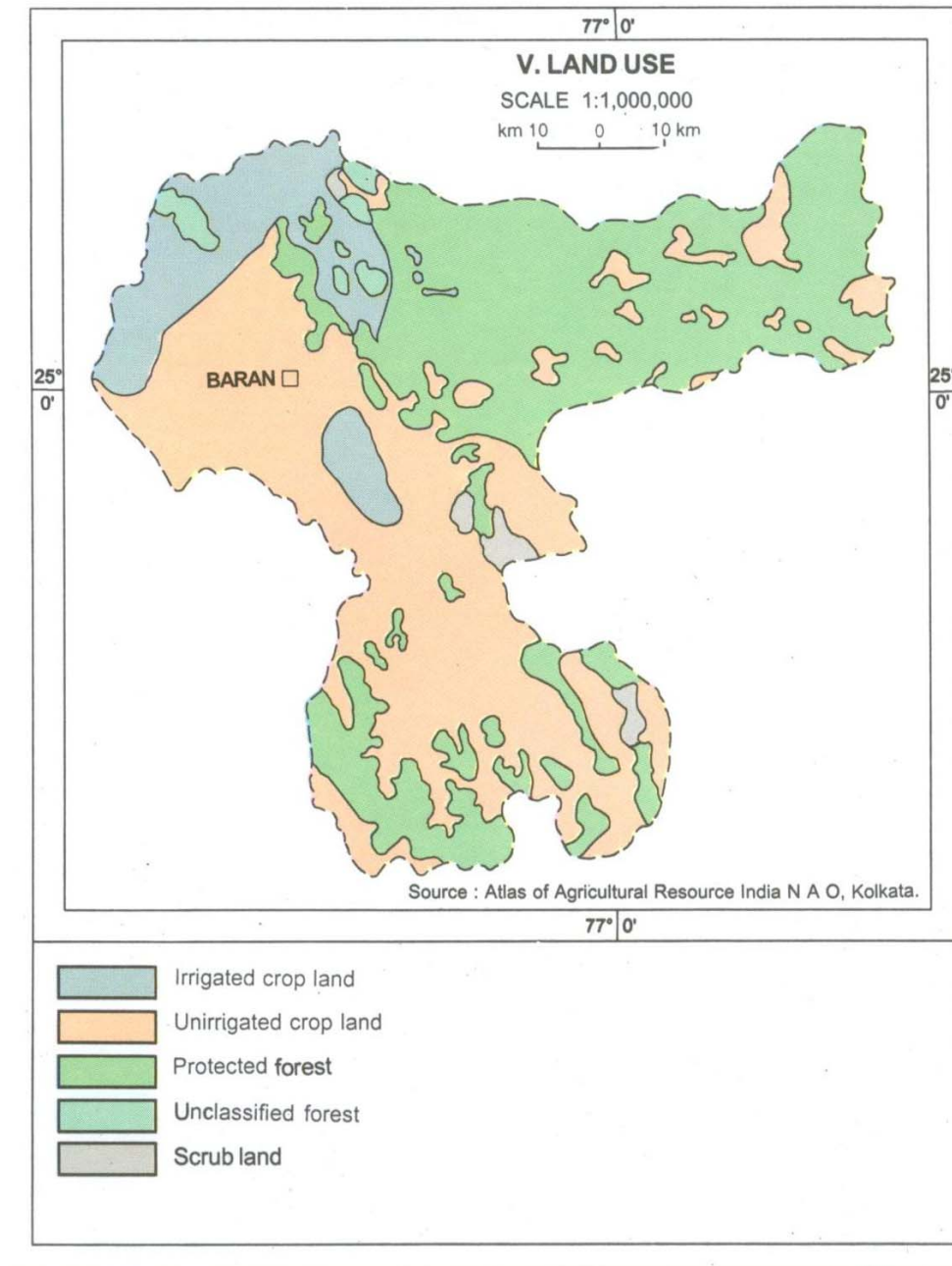


Figure 3.9: Land use of Baran district (Source: GSI Resource map)



2. Commerce, Industry and Agriculture

53. Baran is the district headquarters for Baran District and performs all administrative functions. Traditionally, Baran is a commercial town and the main occupation of the people is agriculture and commercial. The development and expansion of the town took place outside the old town when the Kota-Bina Railway line established in 1906. With the establishment of railway line, gradually different institutions and establishment inflow to the town. All these activities led

to residential development to a considerable extent followed by commercial and agricultural. After the completion of 1st phase of Chambal project, the town further developed at a rapid pace with facilities such as grain mandi, grain godown, hospital, college, etc., featuring along the western limits of the old town.

54. Chhabra is agriculturally a productive area and therefore most of the earlier industries were agro based, but in the last two decades due to the industrial area development by RIICO, there has been a considerable diversification in the industrial base. The town still has a very good agricultural area in its hinter land. Grain Mandi of 'B' category and warehouse are situated here. The occupation structure is also shown that majority (77.20%) of the working force is engaged in tertiary sector. Trade and commerce is the principal activity in this area during past few decades. For various historical, traditional, economic reasons the existing central business area continues to function as most important centre for trade and commerce. The Irrigation Department has completed Hinglot Dam, and Lhasi Dam project is under construction. These projects are expected to further spur the growth of agriculture and industries. Recently a Thermal Power Plant has also been proposed in this region by the State Government at Motipura Chowki situated 20 km from the town. Such project also contributes to economic growth of the town and the region.

55. District level data has been analyzed as pertinent information specific to Baran on the industrial units and worker is not available. Most of the business transaction, both wholesale and retail are still carried out in the markets of the old city and it has been graded as class A. recently the area of wholesale market has been extended to accommodate the proposed vegetable market. Presently timber and stone stock yards are found along the Nallah and mangrol road on the western periphery of the old town. There are no large scale industries in Baran except a rice mill located on the Atru road. There are few small scale industries like oil and rice mills are located in the existing developed area.

Table 3.14: Type of Industries in Baran District

Name of Industries	No. of Units	Employment
Agro-based	125	527
Textile	16	52
Forest Based	22	88
Paper	16	98
Bubber & plastic based	13	53
Chemical	10	52
Mineral based	15	131
Iron & steel	66	229
Repair & services	90	279
Others	15	44
Total	386	1553

Source: District Industries office, Kota

56. In and around the Baran and Chhabra city area there are about 70-80% of lands used for agricultural purpose. Crop production statistics as depicted in **Table 3.15** indicates much more crop production in Rabi season in compared to Kharif season.

Table 3.15: Crop production in around Baran and Chhabra

Type of Crops	Under Rabi Crops 2003-04 (Prod in Tonnes)	Under Kharif Crops 2003-04 (Prod in Tonnes)
Cereals	133188	79170
Pulses	8793	2034
Food Grains	141981	81204
Oilseeds	181662	126569
Others	188985	1318
Total	512628	209091

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

3 Infrastructure

57. Water supply: PHED supplies water to Baran town from River Parbati a perennial river at Baran. There are two more sources one is at Heekar Dev which is 15 km away from this town and another is at Majawatan Dev which is 16 km. Water produced at source is of 6.0 MLD and 1.0 MLD at Heekar Dev and Majawatan Dev respectively. From Heekar Dev, water transmitted is about 5.0 MLD and from Majawatan Dev, water transmitted is of about 0.8 MLD from source to the town by pumping. The PHED officials informed that the present transmission and distribution losses are of 25%. Presently, eleven (11) tube-wells tap ground water of 1.00 MLD for meeting the balance requirement. Per capita water supply based on the present stage supply is approximately 60 lpcd. The water supply of Chhabra town is completely depending up of ground water sources. Ground water is being tapped by means of open well and tube wells. The present daily demand of water is about 2.52 MLD and supply is about 1.55 MLD. As reported by the PHED officials, there are 22 nos. tube-well and 38 hand pumps out of which 35 hand pumps are working. It is also reported that the yield of tube wells is about 1.06 MLD (based on pumping of 4.0 hours per day, yield of each-well @ 200 LPM).

58. Sewerage System: At present there is no under ground sewerage system in Baran and Chhabra. Majority of house hold (72% for Baran and 85% for Chhabra) are having individual septic tank. Open drains meant for storm water carry wastewater (mainly sludge and in few cases sewage too) from individual households. The storm water drain discharges into natural streams that ultimately join Parbati River in Baran. The untreated wastewater of Baran ultimately joins the River Parbati, 15 km away of Baran. There is no sewage treatment facility in both the towns.

59. Sanitation: A predominant proportion of city households depend on individual sanitation facilities (and illegal connections opening into drains). It is estimated that approximately 72 percent and 85 % of houses (assessed properties) have access to individual sanitation facilities – either septic tanks or pit latrines, within their premises for Baran and Chhabra respectively. Others use the community toilets provided by the Municipal Boards and significant population also resort to open defecation. Most of the domestic sewage for the city is either discharged at open places through surface drains or through local soak-pits.

60. Drainage: Presently Baran has a minimal storm water drain exists in the town. As reported by the Municipality Board, Baran covered with 90 km of drain and the overall topography slopes from north to east direction. With the exception of the old town areas, newly developed areas are reported situated at relatively low grade levels which essentially translate in to 'depression' effect, wherein the central portion of the town is at a lower level than the adjoining areas which is also from adjoining areas which also from catchments zone. A numbers

of drains/rivers such as Patheda Nallah, Forest Nallah, Ramnagar Nallah, Nalka Nallah, and the Banganga River flow through Baran. The total length of Banganga River is 65- km and the catchments area within the Baran town is about 48.12 sq.km.

61. Industrial Effluents. Small industries exists in under RIICO, which is out side the city area and small amount of effluent disposed scattered in local nallahs. As reported by the local MC, the responsibility of effluent disposal is under RIICO'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.

62. Solid Waste: Baran with a population of 78,665 (2001) generates about 10 tons of solid waste daily which is 127 gm per capita which is significantly lower than the normative standard of 250 gm per capita while Chhabra generates 8 tons with 22,796 population (2001) which is 351 gm per capita which is significantly higher than the normative standard of 250 gm per capita. The major sources of Municipality solid wastes for both the city are domestic, fruits, vegetable markets, hotel, restaurant, street sweeping, hospital, institution/office etc. Presence of a large number of domestic cattle in the towns and tourist inflow also contributes to waste quantity. Significant quantity of waste is generated during the local Fair/festivals that are being held every year is still to be counted and to be encountered in the planning.

63. For Baran: Waste transportation from dust bins and open collection points to waste disposal sites on the outskirts of the city is carried out using tractor by loading manually, which reduces the productivity of vehicles and manpower deployed. It is reported by BMB that each vehicle makes 4 trips per day between the assigned ward. The existing transport fleet of the BMB has a rated capacity of 3 MT per vehicle per day. From the field observations, it was found that the waste was not transported fully and lay scattered in the town in open condition emanating foul smell and causing public nuisance. It is very much essential to synchronize the operation of collection and transportation of waste. **Table 3.16** shows the Solid waste transport of Baran. In Baran, 6 MT of solid waste transport out of total generation of 10 MT and Chhabra, 2.25 MT transport out of 8.0 MT.

Table 3.16: Solid Waste Transportation

Description	Quantity	Ownership	Capacity	Trips	Waste Transported
	Nos		Tons	Per vehicle/ day	Tons/day
Baran					
Tractors	2	Baran MB	0.75	4	6
Chhabra					
Tractors	1	Chhabra MB	0.75	3	2.25

Source: Respective Municipal Boards.

64. For both the towns there no are no proper solid waste disposal facilities. In Baran, currently the waste is being disposed off at this site by crude open dumping method mostly along the Jhalawar road and in barren agricultural land. In Chhabra, waste is disposed openly in the outskirts of the town near Kadaipar phatak, along the Gogar road.

4. Transportation

65. Baran and Chhabra comprises a road network of 125.6 km, consisting of 57.6 km bituminous roads, earthen road is of 33.0 km and 35 km cement concrete roads. Only 32.6 km

road network is maintained by PWD, which is 26 percent of road length. All remaining roads are maintained by the municipal boards. In the recent past, both municipal boards have invested substantially in upgrading roads to cement concrete roads. **Figure 3.17** shows road surface composition at Baran.

Table 3.17: Road Surface Composition, Baran

Road Type	Total length (km)	Dist.
Surface Type		
Concrete Roads	35	27.90
Black Topped Roads	57.5	45.80
Total Surfaced Roads		
WBM Roads		
Earthen and Other Roads	33	26.30
Total Unsurfaced Roads		
Total Road Length	125.6	100.00%
Agency		
PWD	32.60	26.0
Municipal	80.0	63.70
Krishi Upaj Mandi (KUM)	13.0	10.30
Total	52.60	100.00%

Source: Municipal Boards.

D. Social and Cultural Resources

1 Demography

66. According to Census 2001 the population of Baran-Chhabra LPA is 101461 and spreads over an area of 22.88 sq. km (13 sq.km for Baran and 9.0 sq.km for Chhabra) and organized in 50 wards (30 in Baran and 20 in Chhabra). The average density in the two Municipal Boards is 4434 persons per sq. km, significantly too high. The LPA has recorded a growth rate of 36-37 percent during the last three. **Table 3.18** indicates the population growth in Baran and Chhabra towns and the corresponding density variations over the last four decades.

Table 3.18: Decadal Population Density, Baran-Chhabra LPA

Year	Area (sq. km)	Total Population		
		Total	Growth Rate (%)	Density
1961	-	30,322		-
1971	-	39,516	30.32	-
1981	22.88	54,262	37.32	2372
1991	22.88	74,103	36.56	3239
2001	22.88	101,461	36.92	4434

Source: Census of India, 2001

67. Both towns and the LPA of Baran and Chhabra have shown a higher growth rate as compared to the district average. The LPA witnessed a high growth rate in the 1981-2001 and recorded at 36-37 percent growth. Subsequently, the growth rate for both towns individually and also as a whole is compared in the **Table 3.19** which indicates the decadal population variation and the corresponding growth rate for the two towns and the LPA. From the Table it is very much evident that the Growth rate for Baran is in decreasing pattern and the Growth rate for Chhabra is in increasing pattern

Table 3.19: Decadal Population Growth Trends

Year	Population	Decadal Growth Rate (%)	Population	Decadal Growth rate (%)	Population	Growth Rate (%)
	Baran		Chhabra		Baran & Chhabra	
1961	22764		7558		30,322	
1971	29809	30.95	9707	28.43	39,516	30.32
1981	42000	40.90	12262	26.32	54,262	37.32
1991	57719	37.43	16384	33.62	74,103	36.56
2001	78665	36.29	22796	39.14	101,461	36.92

Source: Census of India, 2001.

2 Health and educational facilities

68. There are good educational facilities in Baran district, which serve both townspeople and inhabitants of surrounding villages and towns in the hinterland. There are 930 primary schools, 102 secondary and higher secondary schools, 2 general degree colleges, 3 industrial training institutes (ITI). **Table 3.18** shows education facility in the district.

Table 3.20: Educational facility of Baran District

Item	No.
Primary Schools	930
Middle Schools	332
Higher Secondary and Secondary Schools	102
Degree Colleges	2
ITI	3

Source: Rajdarpan ;The official web portal of Rajasthan

69. At the district headquarter Baran has "B" grade district hospital, one maternity and child welfare centre, 3 dispensaries and 4 urban family welfare centres. There are 47 dispensaries/hospitals in the district. **Table 3.21** shows detail of medical facility of the Baran urban area.

Table 3.21: Medical facility at Baran Urban area and district

S.No.	Facilities	Number
1	Hospital	1
2	maternity and child welfare centre	1
3	dispensaries and	3
	Urban Family Welfare Centers	4
4	Total	9

Source: Rajdarpan ;the official web portal of Rajasthan

3 History, culture and tourism

70. Being part of the Hadoti region, Baran- Chhabra has immense tourism potential. The GoR Tourism Policy has identified Baran and Chhabra as destination points in the Hadoti Circuit. Baran is said to have been founded by the Solanki Rajputs during 14th or 15th century. The town derives its present name because it is believed to have been populated by the inhabitants of twelve (Barah) adjacent villages. The fort, which now lies in complete ruins, was the nucleus of the old city around which the earlier settlement took place near the Banganga River.

71. Chhabra town is populated due to temple of Kula Devi Mataji and Nageswar Shiv Mandir, which is located on the eastern hill top. The town is also popular for Gujor Mataji Fair in the winter on the Bank of River Renuka. The town is named as Chhabra as six main gates constructed in the city wall. Recently the state Government has also funded Chhabra town for heritage conservation of Gugor Fort which is believed to be almost 800 years old. For the above mentioned culture, fair number of domestic tourist attract towards the Baran-Chhabra.

Table: 3.22: Important historical sites for tourist interest at Baran Chhabra

Sl. No.	Name of monument/site	Locality	District
1	Ruins of temples	Ganesh-Ganj or Atru	Baran
2	Yupa Pillars	Badwa	Baran
3	Temple (12 century)	Baran	Baran
4	Ancient ruins and structural remains	Krishnavilas	Baran
5	Old temples, statues and inscriptions	Shergarh	Baran

IV. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: LOCATION AND DESIGN

72. 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. This has been done in Sections V and VI below and no other impacts are expected.

73. 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.

74. However in the case of this subproject, it is not considered that there are any impacts that can clearly be said to result from either the design or location. 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 fields 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.

V . POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: INFRASTRUCTURE CONSTRUCTION

A. Screening out areas of no significant impact

75. From the descriptions given in Section III.C it is clear that implementation of the project should not have major environmental impacts because the drains will be built in a relatively small area, and the construction work will be quite straightforward.

76. 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	Work will be carried out for improvement of water flow through river – positive impact
Wildlife and rare or endangered species	There is no wildlife or rare or endangered species in the town
Coastal resources	Baran is not located in a coastal area
Population and communities	Construction will not affect population numbers, location or composition

77. These environmental factors have thus been screened out presently but will be assessed again before implementation of project.

78. Rapid Environmental Impact Assessment checklist along with mitigation measures is given in **Appendix 1**.

B. Main Drains

1 Construction method

79. As explained in Section II.C this subproject will involve construction of new main drains. Drain will be approximately 5 m wide and 2 m deep, open at the top, with a concrete floor and brick sides faced with mortar. Each will be located alongside main roads, on government land on which a Right of Way (ROW) has been granted for this work.

80. Trenches for each drain will be dug by backhoe digger, supplemented by manual digging where necessary. Excavated soil will be placed nearby, and once the 5m x 2m cavity has been created with the required gradient, concrete (mixed on site) will be poured in to form the base, at

a thickness of around 150 mm. The walls will then be built from a single skin of bricks placed by hand by masons, and a top covering of mortar will be applied to finish the inside and upper surface of each wall. Loose soil will then be shovelled in to fill any space remaining between the brick and the edge of the trench.

2 Physical Resources

81. Although construction of drains involves quite simple techniques, the invasive nature of excavation, and in this case the relatively large size and length of the drains, means that there will be quite a lot of physical disturbance, in areas where there are a variety of human activities.

82. There is generation of waste soil during the construction of drain. There will be moderate physical changes where the drains are built, and this quantity of waste could not be dumped without causing further physical impacts (on air quality, topography, soil quality, etc) at the disposal site. The work will be mostly conducted in the dry season, there is a lot of potential for the creation of dust, and this will be increased by the need to import quite large quantities of building material such as sand, bricks and cement.

83. During desilting of river, large volume of silt will be generated. Proper scientific disposal of silt should be carried out after chemical testing of silt since silt may be hazardous

84. 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:

- Contact the town authorities to find beneficial uses for as much waste material as possible, 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;
- Reduce the generation of dust by removing waste soil as soon as it is excavated (by loading directly into trucks);
- Plan the work carefully so that building material such as sand is only brought to site when needed;
- Cover or dampen the sand and soil stockpiled on site to reduce dust in windy weather;
- Use tarpaulins to cover loose material when transported to and from the site by truck.

85. The other important 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 collect 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 excavation will be conducted in the dry season.

86. Physical impacts will also be reduced by the method of working, whereby the drains will probably be constructed by small teams working on short lengths at a time, so impacts will be mainly localised and short in duration. Because of this and the mitigation measures proposed above, impacts on the physical environment are not expected to be of major significance.

3 Ecological Resources

87. There are no significant ecological resources in or outside the town (protected areas or rare or important species or habitats), so construction of the drains should have no ecological impacts. However, 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

88. All of this work will be conducted within an easement granted for creation of the drains, so there will be no need to acquire land, and thus there should be no direct effect on the income or assets of landowners, or the livelihoods of tenants. The proposed alignment is however encroached by structures in places (shop-fronts, boundary walls of houses), some of which may need to be removed. ADB policy on Involuntary Resettlement requires that no-one should be worse off as a result of an ADB-funded project, so where income-generating structures are removed (eg. portions of shops or business premises), some form of compensation will need to be provided. A separate Resettlement Plan and Resettlement Framework have been prepared to examine these and related issues and provide appropriate mitigation. This establishes that:

- Drain alignments will be amended to avoid the removal of structures where this can be achieved within the existing easement and without compromising the functioning of the drain;
- Where this cannot be done and income-generating structures have to be removed, the owners will be compensated for the loss at the replacement cost of the structure.

89. Shops and other businesses located alongside the proposed drain routes will also experience economic impacts, as it is inevitable that the presence of trenches, excavated material, workers, vehicles and machinery will discourage customers from visiting certain premises whilst work is in the vicinity. Business income will therefore decrease for a short period, and although losses will be relatively small they could still be significant for small traders and other businesses that exist on low profit margins. These impacts should therefore be mitigated by:

- Compensating shopkeepers and other affected businesses for lost income;
- Leaving spaces for between mounds of excavated soil and providing footbridges for pedestrians and metal sheets for vehicles to maintain access across trenches where required;
- Increasing the workforce in these areas to complete the work quickly;
- Consulting affected businesspeople and informing them in advance when work will occur.

90. Excavation could damage existing infrastructure, in particular water pipes and electricity pylons, which are mainly located alongside roads. 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 Baran Municipal Board of the nature and location of all infrastructure, and planning the drain routes to avoid any conflict or damage;
- Integrating construction of the various Baran subprojects (in particular water supply, drainage and sewerage) so that:
 - Different infrastructure is located on opposite sides of the road wherever feasible;
 - Roads and inhabitants are not subject to repeated disturbance by construction in the same area at different times for different purposes.

91. Transport is another type of infrastructure that may be affected by some of the work, particularly if excavated soil is placed on adjacent roads, and if construction vehicles are not used and parked with due consideration to other road users. These impacts should however be relatively easy to avoid, and the Contractor should be required to:

- Keep excavated soil, and vehicles and machinery off adjacent roads wherever possible;
- Where there is not enough space alongside the road for this to be accomplished, conduct the work during periods when traffic is light;
- Contact the town police to ensure that warning signs and traffic diversions are provided when necessary;
- Increase the workforce in any such areas so that work is completed quickly.

92. Traffic and other activities will also be disrupted by the increase in the number of heavy vehicles in the town (in particular trucks removing waste and delivering materials), and this might also damage fragile buildings if vibration is excessive. These impacts should therefore 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 and other materials to avoid peak traffic periods, the main tourism season, and other important times.

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/or historical remains, or even unknown sites. In this case, excavation will be conducted in Baran town, which has been inhabited for a long period, and where there could

therefore be a significant risk of artefacts being discovered. This should be ascertained by consulting the appropriate authorities, and steps should be taken according to the nature of the risk. This should involve:

- 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 by the Contractor in conducting all 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. Drain construction 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, interrupted access for pedestrians and vehicles, and vibration from heavy vehicles and machinery. Given the historical importance of Baran, any such damage or disruption could be highly significant, so 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 BMB to identify any buildings at risk from vibration damage and avoiding any use of heavy vehicles in the vicinity;
- Limiting dust by removing waste soil quickly, covering and watering stockpiles, importing sand only when needed, 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.

95. In addition the Executing Agency and Contractor should:

- Consult BMB, 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;

96. 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;
- Accident reports and records; etc.

97. An additional, particularly acute health risk 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 is that:

- The locations of all new infrastructures will be planned to avoid locations of existing AC pipes so AC pipes should not be discovered accidentally.

98. Given the dangerous nature of this material for both workers and citizens, additional precautions should be taken to protect the health of all parties in the event (however unlikely) that AC pipes are encountered. The design consultant should therefore 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)², and amongst other things, should involve:

- Training of all personnel (including manual labourers) to enable them to understand the dangers of AC pipes and to be able to recognise 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:
 - Removal of all persons to a safe distance;

² 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>

- 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.

99. 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 direct these benefits to the communities directly affected by the work, the Contractor should be required to employ at least 50% of his labour force from communities in the vicinity of these sites. This will have the added benefit of avoiding social problems that sometimes occur when workers are imported into host communities, and avoiding environmental and social problems from workers housed in poorly serviced camp accommodation.

VI. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: OPERATION AND MAINTENANCE

A Screening out areas of no significant impact

100. Although the drains will need regular maintenance when they are operating, with a few simple precautions this can be conducted without major environmental impacts (see below). There are therefore several environmental factors which should be unaffected once the system begins to function. 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 mentioned further.

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

Field	Rationale
Climate, topography, geology, seismology	Because of the low population and low rainfall, the drainage system will not carry enough water to significantly affect these factors.
Fisheries & aquatic biology	No natural surface water bodies will be affected by operation of the drainage system
Wildlife, forests, rare species, protected areas	There are none of these features in or outside the town
Coastal resources	Baran is not located in a coastal area

B. Operation and maintenance of the improved drainage system

101. The new drains will improve the removal of surface and storm water runoff in the town, by extending existing concrete *nallahs* and providing a new main drain to serve the outskirts. The main problems with the existing system are that the drains were poorly designed and built with ineffective gradients, and have been inadequately maintained over the years. As a result many are blocked with discarded garbage and are overflowing and leaking, and there are large areas of unsightly and unhygienic standing water around the town. The new drains will be designed to Indian specifications so gradients should be sufficient to keep water flowing, and

the provision of a municipal solid waste management system by another subproject should reduce the blockage of drains by discarded refuse.

102. It will be imperative however that the Government Agency (GA) responsible for operating the drainage network establishes a system to regularly inspect and maintain the drains, so that the infrastructure does not deteriorate and fall into disrepair, replicating the present problems. BMB other GAs will thus be provided with a range of training, capacity building and support by present subprojects and future tranches of investment, to enable them to fulfil their management responsibilities. In the case of the urban drainage subproject the main requirements are to:

- Establish a programme of regular visual inspection of the drains and their contents and functioning to provide for the early identification of remedial action;
- Ensure that all remedial action is implemented promptly, including clearing any solid waste and other material that could cause blockages, and conducting any required physical repairs to the fabric of the drains to prevent leaks.

103. The subproject will also provide maintenance equipment, including shovels, buckets, winches, pumps and tankers, so that blockages can be dealt with. Any repairs to the *nallahs* should be small-scale, involving manual replacement of bricks and mortar, and will be carried out in the dry season to avoid the need to divert the water in the drains. If these are conducted when necessary there should be no need for major repairs during the 30-year design life of the drains.

C Environmental impacts and benefits of the operating system

1 Physical Resources

104. As noted above, once the new drains are functioning they should contribute to an improvement in the physical appearance and condition of the town by helping to remove the large and unsightly pools of wastewater that are an almost permanent feature of the city. In combination with the repair of leaks in the water supply system under another subproject, the new *nallahs* should also help to ensure that similar pools do not re-form in the future. The quality of the town environment should then improve significantly.

105. If the *nallahs* are inspected and repaired regularly as outlined above, repairs should be small in scale and carried out manually by small teams of men, and should thus not produce noticeable physical impacts.

106. However the removal of blockages in the *nallahs* and other drains would have adverse impacts on the appearance and environment of the area if, as is current practice, drains are unblocked by removing garbage, silt and other material, and this is simply piled alongside. Not only is this unhygienic, but it is also inefficient, as much of this material inevitably returns to the drains, where it may cause further blockage. It will be very important for Baran Municipal Board to end this practice by ensuring that persons employed to clean drains are provided with suitable equipment (which can be as simple as shovels and wheelbarrows) and are instructed that all removed material must be deposited in the municipal waste storage bins, provided under the solid waste management subproject.

107. Water from the new drains will be discharged into a natural *nallah*. Given the relatively poor reserves of groundwater in the area, there would be some additional benefit if water from the drains was directed into the aquifer after treatment, through purpose-drilled recharging boreholes, or by simply being allowed to collect in an area of pervious ground.

2 Ecological Resources

108. Although the new drains will improve the environment of the town, there are unlikely to be significant ecological benefits as there are no natural habitats or rare or important species.

3 Economic Development

109. Maintenance and repair of the *nallahs* will be small in scale and infrequent, and if carried out as described above, should have no effects on business, traffic or other economic activities. The overall improvements in the appearance and hygiene of the town provided by this and other subprojects should make the area more attractive to tourists, and in time this should bring financial benefits by helping the economy of the town to grow.

4 Social and Cultural Resources

110. Repairs to the *nallahs* should require no new excavation, in which case there should be no need for precautions to protect undiscovered archaeological or historical material. Repair work will be small in scale and conducted from inside the *nallah* so there should also be no disturbance of activities in or around any schools, hospitals, temples, tourist sites or other social or cultural resources in the vicinity. Contractors employed to conduct any repair work 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.

111. The citizens of the town will be the major beneficiaries of the improved drainage system, as the unsightly and unhygienic pools of standing wastewater will gradually disappear and should not recur in future. This should then improve the appearance and environment of the town, as well as protecting the ancient buildings and sites from the water damage they are exposed to at present. If, as expected, this ultimately brings more tourists into the town, then the citizens could benefit socio-economically from the related growth in the economy.

VII INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN

A. Summary of environmental impacts and mitigation measures

112. **Table 7.1** lists the potential adverse impacts of the Baran drainage 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 +).

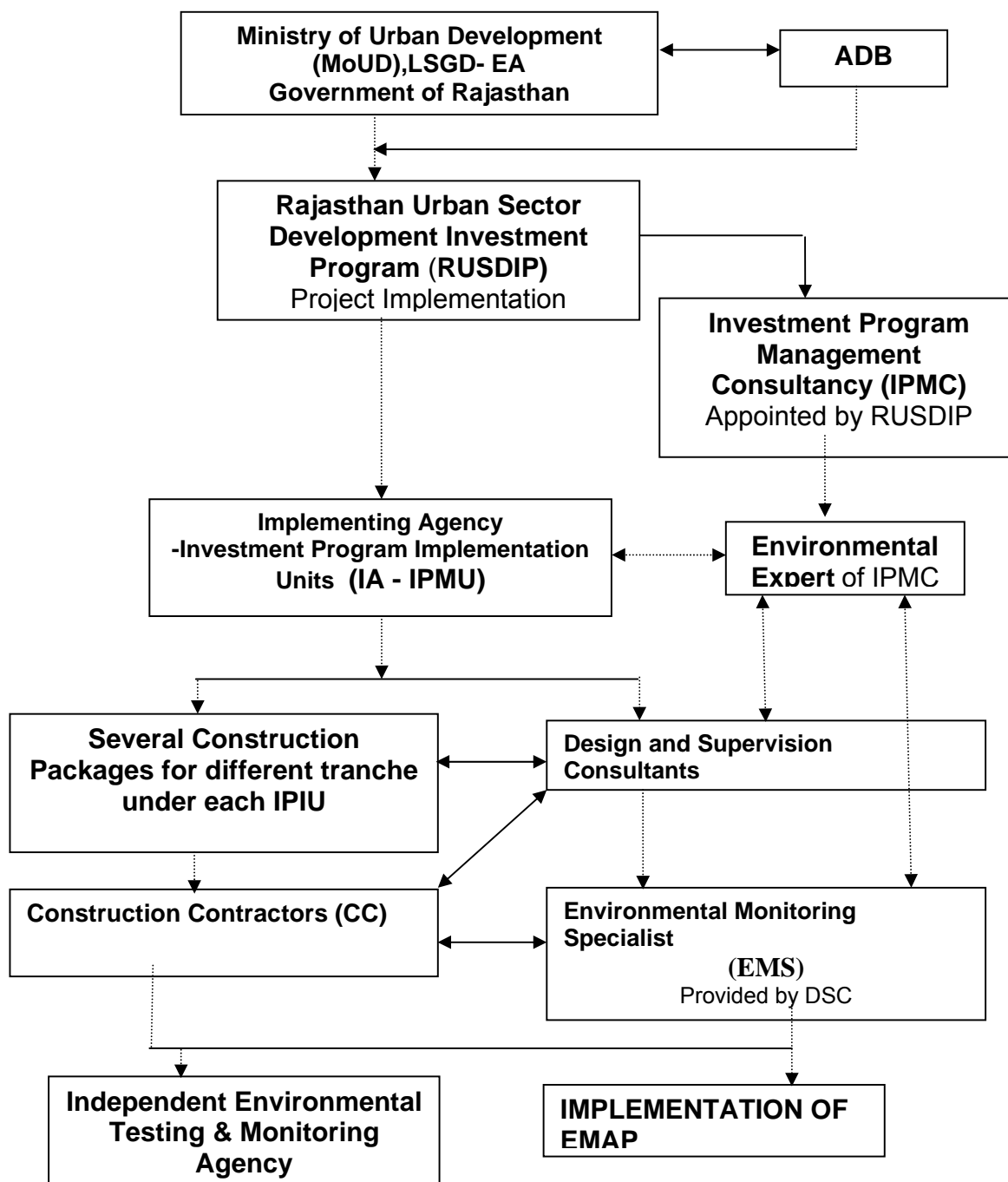
B. Institutional arrangements for project implementation

113. 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.

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

Figure 7.1: Institutional Responsibility- RUSDIP



**Table 7.1: Environmental impacts and mitigation for the Baran Drainage Subproject
(Black = continuous activity; Grey = intermittent)**

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	08	2009				
						D	1	2	3	Op	
Construction											
Excavation of trenches/ desilting of river will produce large amounts of waste soil	M	P	Find beneficial uses for waste soil in construction, land raising and infilling of excavated areas	Contractor	All sites						+
Excavation and removal of waste soil and importation and storage of sand and other material could produce dust	M	T	Remove waste soil as soon as it is excavated	Contractor	All sites						0
			Cover soil & sand with tarpaulins when carried on trucks							0	
			Only bring sand to site when needed							0	
			Cover or spray stockpiles of loose material stored on site							0	
Trees may be removed along drain routes	M	P	Only remove trees if it cannot be avoided	Contractor	All sites						0
			Plant and maintain two trees for every one removed								0
Some structures in ROW may need to be removed	M	P	Realign drain routes to avoid structures where possible	DSC	All sites						0
			*Compensate owners of lost structures: replacement cost	LSGD							0
Businesses may lose income if customers' access is impeded	M	T	*Compensate businesses for lost income	LSGD	All sites						0
			Leave spaces for access between mounds of soil	Contractor						0	
			Provide bridges to allow people & vehicles to cross trench	Contractor						0	
			Increase workforce in these areas to finish work quickly	Contractor						0	
			Consult businesspeople and inform of work in advance	LSGD						0	
Excavation could damage other infrastructure	S	P	Determine location of water pipes, electricity pylons, etc and design scheme to avoid damage	DSC	All sites						0
			Locate different infrastructure on opposite sides of road	DSC							0
Residents may be disturbed by repeated trenching	M	T	Integrate subprojects to conduct trenching at same time	EDC/LGD	All sites						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

³ 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, see Section VII.B

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	08	2009				
						D	1	2	3	Op	
Construction											
Traffic may be disrupted by soil & vehicles on road	M	T	Keep soil, vehicles, machinery off road when possible	Contractor	All sites						0
			If work will affect road, conduct when traffic is light							0	
			Ensure police provide warning signs/diversions if needed							0	
			As above: increase workforce to finish this work quickly							0	
Traffic in town could be disrupted by vehicles en route to and from site, delivering materials or removing waste	M	T	Plan routes to avoid narrow streets, congested roads, important/fragile buildings, key religious & tourism sites	Contractor	All sites						0
			Plan work to avoid peak traffic and main tourism season							0	
Ground disturbance could damage archaeological and historical remains	S	P	Request state and local archaeological authorities to assess archaeological potential of proposed site	DSC	All sites						0
			Select alternative if site has 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						+	
Sites of social/cultural importance (schools, hospitals, temples, tourism sites) may be disturbed by noise, dust, vibration and impeded access	M	T	Identify buildings at risk from vibration damage and avoid using heavy vehicles nearby	Contractor	All sites						0
			As above: remove waste quickly, cover/spray stockpiles, import sand only when needed, cover soil/sand on trucks							0	
			As above: increase workforce to finish work quickly							0	
			As above: use bridges to allow access (people/vehicles)							0	
			Use modern vehicles/machinery & maintain as specified							0	
			Consult relevant authorities, custodians of buildings, local people to address issues & avoid work at sensitive times							0	
Workers and the public are at risk from accidents on site	M	T	Prepare and implement a site Health and Safety Plan that includes measures to:	Contractor	All sites						0
			- Exclude the public from site;							0	

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	08	2009				
						D	1	2	3	Op	
Construction											
			- Ensure that workers use Personal Protective Equipment								0
			- Provide Health & Safety Training (including process of transmission of HIV/AIDS) for all personnel;								0
			- Follow documented procedures for all site activities;								0
			- Keep accident reports and records.								0
Existing water supply system uses AC pipes, a material that can be carcinogenic if inhaled as dust particles	S	T	Design infrastructure to avoid known locations of AC pipes	DSC	Network sites						0
			Train construction personnel in dangers of asbestos and how to recognise AC pipes in situ	Contractor	All sites						0
			Develop & apply protocol to protect workers and public if AC pipes are encountered. This should include:	DSC and Contractor							0
			- immediate reporting of any occurrence to management	Contractor	Network sites						0
			- removal of all persons to a safe distance								0
			- use of appropriate breathing apparatus and protective suits by workers delegated to deal with AC material								0
			- safe removal and long-term disposal of AC material								+
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 construction sites	Contractor	All sites						+
Operation and Maintenance											
Appearance & environment will deteriorate if material from unblocked drains is piled on adjacent land	S	P	Drain cleaners must deposit material from blocked drains in municipal waste storage bins	GA	All drain sites						0
Water from drains could help to recharge groundwater	M	P	Discharge drain water into boreholes or porous ground after treatment.	DSC	From nallahs						+
Health & Safety of workers and the public could be at risk during repair work	M	T	Prepare and operate H&S Plan with same measures as used in construction phase	OMC	All sites						0

115. Resettlement issues will be coordinated centrally by a Resettlement Specialist within the IPMU, 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.

116. 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

117. **Table 7.1** shows that most mitigation activities are the responsibility of the Construction Contractors⁴ (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.

118. 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.

119. **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.

⁴ During implementation the contractor will submit monthly progress reports, which includes a section on EMP implementation to the IPIU. The IPIU will submit reports to the IPMU for review. The IPMU will review progress reports to ensure that the all mitigation measures are properly implemented. The IPMU will consolidate monthly reports and submit quarterly reports to ADB for review

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)

120. **Table 7.2** 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 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.

D. Environmental management and monitoring costs

121. 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 are included in the budgets for the civil works and do not need to be estimated separately here. 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 compensating shopkeepers for loss of structures and/or business income (**Table 7.1**) are calculated separately in the budgets for the Resettlement Framework and Resettlement Plans so are also excluded from this analysis.

122. Since at present all sub-projects are under conceptual stage the finalisation of environmental management and monitoring cost can be done after designing of the sub-projects.

123. The remaining actions in the Environmental Management Plan are the various environmental monitoring activities to be conducted by the EMS. These have not been budgeted elsewhere, and their costs are shown in **Table 7.3**. The figures show that the total cost of environmental management and monitoring for this subproject as a whole (covering design and construction) is INR 0.94 million, ie US\$ 24,185.

Table 7.2: 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 ⁶	390,000	
Survey and testing expenses	Lump Sum	300,000	300,000	690,000
2. Improvement of aesthetics - plantation	Lump Sum	2,50,000	2,50,000	250,000
TOTAL				940,000

⁶ Unit costs of domestic consultants include fee, travel, accommodation and subsistence

Table 7.3: 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/silt after testing (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 soil and sand when transported on trucks	All sites	Contractor	Observations on and off site	Weekly	EMS
Only bring sand to site when needed	All sites	Contractor	Site observations; CC records	Weekly	EMS
Cover or damp down soil and sand stockpiled on site	All sites	Contractor	Site observations	Weekly	EMS
Leave spaces for access between mounds of soil	All sites	Contractor	Site observations	Weekly	EMS
Provide bridges to allow people & vehicles to cross open trenches	All sites	Contractor	Site observation; resident survey	Weekly	EMS
Keep soil, vehicles, machinery off road when possible	All sites	Contractor	Site observations	Weekly	EMS
Only remove trees if it cannot be avoided	All sites	Contractor	Site observations	Weekly	EMS
Plant and maintain two trees for every one removed	All sites	Contractor	Observations on/off site; CC records	Monthly	EMS
Realign drain routes to avoid encroaching structures if possible	Where required	DSC	Site observation; design reports	Monthly	EMS
*Compensate owners (at replacement cost) for lost structures	Where required	LSGD	Owner survey; LSGD record	As needed	IMA ⁷
*Compensate businesses for lost income	Where required	LSGD	Shopkeeper survey; LSGD record	As needed	IMA
Increase workforce in inhabited areas to finish work quickly	All sites	Contractor	Site observations; CC records	Monthly	EMS
Inform shopkeepers and residents of work in advance	All sites	LSGD	Resident survey; LSGD records	Monthly	EMS
Confirm location of existing infrastructure and avoid these sites	All sites	DSC	Site observation; design reports	Monthly	EMS
Locate different infrastructure on opposite sides of roads	All sites	DSC	Site observation; design reports	Monthly	EMS
Integrate subprojects to conduct trenching at same time	All sites	DSC/LSGD	Site observation; design reports	Monthly	EMS
If work will affect road, conduct when traffic is light	All sites	Contractor	Site observations; CC records	Monthly	EMS
Ensure police provide traffic diversions when required	All sites	Contractor	Site observations; CC records	Monthly	EMS
Plan transport routes to avoid narrow streets, important or fragile buildings, religious and tourism 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	Monthly	EMS
Request archaeological authorities to assess potential of all sites	All sites	DSC	DSC records; design reports	As needed	EMS

⁷ 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
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 heavy vehicles near fragile buildings	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	All sites	Contractor	Site observations; CC records; resident surveys	Monthly	EMS
Prepare and implement a site H&S Plan including personal protection from transmission of HIV/AIDS (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 including process of transmission of HIV/AIDS 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
Design infrastructure to avoid known locations of AC pipes	All 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
Keep accident reports and records	All sites	Contractor	CC records	Monthly	EMS
Employ at least 50% of workforce from communities near sites	All sites	Contractor	CC records; worker interviews	Monthly	EMS
OPERATION AND MAINTENANCE					
Deposit material from blocked drains in town waste storage bins	All drain sites	GA	Site observations	Monthly	
Discharge drain water into recharge boreholes or porous ground	From <i>nallahs</i>	DSC	Site observation; design reports	As needed	EMS
Prepare and operate H&S plan to protect workers and citizens	All sites	OM Contractor	Site observations; OMC records	Monthly	

VIII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Project stakeholders

124. 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.

125. 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, Government of India, Ministry of Finance.

B. Consultation and disclosure to date

126. 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 animal ETC.

127. Local populations are very much interested on the project and they will help project authorities in all aspects. Public consultation results specifically on environmental issues are shown in **Appendix – 2**.

128. Some of the major outcomes from the public consultation were related to construction vehicles which may create some disturbances to their day to day activities and the possible dust and noise problems during construction phase. Also dumping of solid waste at the drain is highlighted, which may leads to flooding during rainy season. Hence the necessity of proper waste collection, transport, and treatment and disposal system is envisaged.

129. The public Consultation and group discussion meeting were conduct by RUIDP on Date 31 May 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 Baran - Chhabra, the environmental and social impacts of the proposed subprojects under Tranche 2 in Baran - Chhabra were discussed.

130. Meetings and individual interviews were held at potentially temporarily affected areas; and local informal interviews were conducted to determine the potential impacts of sub-project construction to prepare the sample Environmental Framework. A town-wise stakeholder consultation workshop was conducted which provided an overview of the Program and sub-projects to be undertaken in Baran - Chhabra; and discussed the Government and ADB's Environment policies acts and potential environment impacts of the sub-projects in Baran - Chhabra. 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.

C. Major Issues discussed during Public consultation are

- (i) Proposed Storm Water Drain sub project is to ensure to proper dispose of rain water from the busy roads of city and it should not disturb aesthetic value of town during rainy seasons;
- (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 cover the drains Properly to avoid accidents;
- (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 storm water drain proposal of the government and they have ensured that they will cooperate with the Executing Agency during project implementation.

D. Future consultation and disclosure

131. 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:
 - 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;
 - Structured consultation meetings with the institutional stakeholders (government bodies and NGOs) to discuss and approve key aspects of the project.

- Consultation during construction:
 - Public meetings with affected communities to discuss and plan work programmes and allow issues to be raised and addressed once construction has started;
 - 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:
 - Public information campaigns (via newspaper, TV and radio) to explain the project to the wider city population and prepare them for disruption they may experience once the construction programme is underway;
 - 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;
 - 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

132. 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 lower water costs and from savings in health care costs.

133. 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.

134. The process described in this document has assessed the environmental impacts of the infrastructure proposed under the Baran Urban Drainage 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 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:

- Selecting routes for the proposed drains that are located entirely on government land, to avoid the need to acquire land or relocate people;
- Selecting drain dimensions to ensure that all construction can be conducted within the width of an existing easement, to avoid the need to acquire additional land.

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

136. Regardless of these and various other actions taken during the IEE process and in developing the subproject, 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 work; because the drains are located in an area where there are shops and other businesses; 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, and the cultural heritage.

137. During the construction phase, impacts mainly arise from the need to dispose of large quantities of waste soil and import sand and other building materials; and from the potential disturbance of 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;
- Providing temporary structures to maintain access across trenches;
- Planning work to minimise disruption of traffic, business and communities.

138. Although there will be no need to acquire land or relocate people, some structures (such as shop fronts) that are encroaching into the easement may have to be removed, and roadside businesses may lose some income as access will be difficult for customers when work is in their vicinity. ADB policy requires that no-one should be worse off as a result of an ADB-funded project, so a Resettlement Plan and Framework have been prepared to deal with these and related issues. This establishes that:

- Drain alignments will be amended to avoid the removal of structures where possible;
- Where this cannot be achieved, owners will be compensated at replacement cost for any structures that have to be removed;

- Cash compensation will also be provided for any loss of business income.

139. One field 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 routes or sites 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.

140. Special measures were also developed to protect workers and the public from exposure to carcinogenic asbestos fibres in the event that Asbestos Cement pipes used in the existing water supply system are uncovered accidentally during excavation work. These are to:

- Avoid all known sites of AC pipes when the locations of new infrastructure are planned in the detailed design stage;
- Train all construction personnel to raise awareness of the dangers of AC and enable early recognition of such pipes if encountered;
- Develop and apply a protocol 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).

141. 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;
- Consider directing water from the drains onto porous ground or into purpose-made boreholes to make a small contribution to improving groundwater reserves in the area.

142. 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 programme for its implementation.

143. Once the drains are completed it is important that they are properly maintained to prevent the infrastructure falling into disrepair and replicating the problems of the present system. The responsible agency should therefore:

- Establish a programme for the regular visual inspection of the condition and functioning of the drains;
- Ensure that blockages are cleared and repairs are conducted promptly and effectively.

144. If this is done any repairs should be small-scale and infrequent, involving the manual replacement of small areas of brick and concrete, which can be done from within the drain area and should therefore not have significant environmental impacts.

145. The main impact of the new *nallahs* will be beneficial as the unhygienic pools of wastewater that are an unsightly feature of the town at present should gradually drain away; and the improved drainage and repair of leaks in the water supply system provided by another subproject should ensure that similar pools do not re-form in the future. This will improve the appearance and environment of the town, as well as protecting the ancient buildings and sites from the water damage that is of such concern at the moment. If, as expected, this attracts more tourists to the area, then there could be economic benefits for the town and its citizens.

146. **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 benefits provided by the operating scheme).

147. 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 PIU.

B Recommendations

148. 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 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 VII.C of this report and the internal and external monitoring proposed in the Resettlement Framework are also implemented in full

X CONCLUSIONS

149. The environmental status of the proposed improvements in urban drainage system of Baran 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.

150. The overall conclusion of both processes is that providing 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.

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

Appendix – 1: Rapid Environmental Assessment (REA) Check List for Baran Drainage

Country/Project Title : Construction of Storm Water Drainage Including Re- Sectioning of Banganga River at Baran.

Sector Division : BCH/DR/01

Item	Screening Questions	Yes/No	Remarks
A	Is the project area adjacent to or within any of the following environmentally sensitive areas?		
	<ul style="list-style-type: none"> ▪ Cultural heritage site 	No	There is no cultural heritage site present near the influence area of the proposed drainage alignment.
	<ul style="list-style-type: none"> ▪ Protected area 	No	There are no protected areas in the proximity of Baran town, and no special area of ecological interest.
	<ul style="list-style-type: none"> ▪ Wetland 	No	There is no presence of wetlands near to the proposed project area.
	<ul style="list-style-type: none"> ▪ Mangrove 	No	There is no presence of Mangrove near to the proposed project area.
	<ul style="list-style-type: none"> ▪ Estuarine 	No	There is no form of estuarine near to the proposed project area.
	<ul style="list-style-type: none"> ▪ Buffer zone of protected area 	No	The proposed project area doesn't come near any buffer zone of protected area.
	<ul style="list-style-type: none"> ▪ Special area of protecting biodiversity 	No	The proposed project doesn't falls within any special area for protecting biodiversity.
	<ul style="list-style-type: none"> ▪ Bay 	No	Not applicable in this area.
B	Potential Environmental Impacts Will the project cause...		
	<ul style="list-style-type: none"> • impacts on the sustainability of associated sanitation and solid waste disposal systems and their interference with other urban services. 	No	At Baran maximum of drains have been closed by dumping of solid waste and a high level of silting in existing drains, which leads to frequent clogging and overflow of drains. Furthermore, lack of sewerage system in the town has led to large number of household sewers being illegally connected to the drains, posing an extremely unsanitary environment and a very high public health hazard. Hence the proposed drainage scheme is a boon during rainy season which avoid flooding and inundation.
	<ul style="list-style-type: none"> • deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed? 	No	Baran is situated in the geographical centre of Baran district and also the district head quarter. It is well connected with other cities by the NH- 76 (Pindwara-Kota-Baran-Shivapuri) and SH-19 (Indergarh-Mangrol-Jhalawar-Dag Agra) and with economic activities. Based on earlier reports certain areas require urgent attention in respect of water logging & flooding. The urbanization in the city in last

Item	Screening Questions	Yes/No	Remarks
			<p>two/three decades has been in the low-lying area and in some of the reclaimed areas. In this process, natural storm water flow pattern has been disturbed and aggravating the situation. At present major flooding problem are mainly drainage areas and not much in catchments area as the population density in these areas is very less at present.</p> <p>It was noticed that, the primary drains and major nallahs are to be augmented to avoid the frequent flooding. This proposed project will improve the existing civic conditions at Baran, which is immense necessary for the local civic to avoid flooding during rainy season.</p> <p>Hence this proposed project components will not cause any deterioration to the surrounding environmental conditions and further it will improve the existing environmental conditions.</p>
	<ul style="list-style-type: none"> degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)? 	Yes	<p>There are no chances of serious impacts on the degradation of land and ecosystems. There is no existence of wetlands and wild lands, watersheds and forests loss in the enrouted area. May be some minimal impacts to the lands during constructional works, which can be mitigated by adopting good constructional practices and effectively implementing the Environmental Management Plan (EMP).</p>
	<ul style="list-style-type: none"> dislocation or involuntary resettlement of people 	No	<p>This proposed project includes re-sectioning of Ramnagar Nallah (approx. length : 1 km), re-grading and re-sectioning of Banganga river (approx. length : 4 kms), removing rock strata in Banganga river (approx. length of 0.8 km) and re-designing of existing culverts/bridge in Forest Nallah, Ramnagar Nallah and Banganga river (approx. 13 Nos.).</p> <p>These proposed components are augmenting the existing structures. Hence the chance for dislocation or involuntary resettlement of people is nil.</p>
	<ul style="list-style-type: none"> degradation of cultural property and loss of cultural heritage and tourism revenues? 	No	<p>There is no such cultural heritage sites located near to the proposed project components. Hence there is no loss to cultural heritage and tourism revenues.</p>
	<ul style="list-style-type: none"> occupation of low-lying lands, floodplains and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and 	No	<p>There are no polluting industries existing in the town area. Baran town is also similar like all other medium level urban towns. The urbanization in the city in last two/three decades has been in the low-lying area and in some of the reclaimed areas. Also Baran was</p>

Item	Screening Questions	Yes/No	Remarks
	risks due to pollutive industries?		<p>indicated as a highly inundation prone area and improper maintenance of the canals/drains further compounds the problem of inundation during monsoon season.</p> <p>This proposed project will avoid flooding and inundation during rainy season.</p>
	<ul style="list-style-type: none"> water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality, and pollution of receiving waters.) 	No	This proposed project components will prevent water logging and inundation, by which it avoids deterioration of surface and ground water quality. Hence this proposed project will not cause any impairment to the existing water resources in the project area.
	<ul style="list-style-type: none"> air pollution due to urban emissions? 	No	The proposed project components include the augmentation of existing drains to avoid flooding and inundation. This may not cause any increase to the urban air emissions.
	<ul style="list-style-type: none"> social conflicts between construction workers from other areas and local workers? 	No	<p>From the public consultations survey it was envisaged by the local residents that there are no issues regarding construction workers from other areas and setting up of temporary worker camps in the proximate available areas. Also it was mentioned during the consultations about the availability of labours locally for the construction works.</p> <p>Hence the chances of conflicts between construction workers from other areas and local workers are less. Also considerations can be made to employ labours available in local areas during construction to avoid any such conflicts.</p>
	<ul style="list-style-type: none"> road blocking and temporary flooding due to land excavation during rainy season? 	Yes	<p>The proposed project is to avoid flooding and inundation during rainy season. There was some chance of road blocking during constructional activities.</p> <p>But this can be averted by providing alternate access roads and proper planning while execution of the contract.</p>
	<ul style="list-style-type: none"> noise and dust from construction activities? 	Yes	<p>The generation of noise during construction will not exceed normal emissions for general building construction activities. The contractor shall ensure that there shall be no noise problem to the residents. Nevertheless, the contractor shall carry out noise measurements at frequencies and locations to be agreed with the employer's representative and carry out measures to control it whenever and wherever needed.</p> <p>There may be chances of air emissions during excavation and the civil works, which shall not exceed normal emissions for general building</p>

Item	Screening Questions	Yes/No	Remarks
			activities of a similar nature. Adequate mitigation measures will provide during construction to avoid the emission of dust and noise.
	<ul style="list-style-type: none"> • traffic disturbances due to construction material transport and wastes? 	Yes	There may be a moderate increase of traffic during the construction activities, which cannot be avoided. Also adequate measures will be taken to avoid traffic disturbances during the constructional phase.
	<ul style="list-style-type: none"> • temporary silt runoff due to construction? 	Yes	The chances of temporary silt runoff due to constructional activities can be mitigated by adopting good constructional practices and effectively implementing the EMP
	<ul style="list-style-type: none"> • hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation. 	No	The proposed project components include the augmentation of existing drains and this may not cause any hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation.
	<ul style="list-style-type: none"> • water depletion and or degradation 	No	As mentioned above, the proposed project components will prevents water logging and inundation, by which it avoid deterioration of surface and ground water quality. Hence this proposed project will not cause any impairment to the existing water resources in the project area.
	<ul style="list-style-type: none"> • overpaying of groundwater, leading to land subsidence, lowered ground water table, and salinization? 	No	The proposed project components include the augmentation of existing drains and this may not cause any overpaying of groundwater, leading to land subsidence, lowered ground water table, and salinization. Also it will improve the existing environmental conditions by avoiding water logging and inundation of flood in the town area.
	<ul style="list-style-type: none"> • contamination of surface and ground waters due to improper waste disposal? 	No	The proposed project components include the augmentation of existing drains and this may not cause any contamination of surface and ground waters due to improper waste disposal.
	<ul style="list-style-type: none"> • pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems. 	No	The proposed project components include the augmentation of existing drains and this may not cause any pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems.

**Appendix- 2: PUBLIC CONSULTATION
STORM WATER / DRAINAGE BARAN**

1. PUBLIC CONSULTATION- ENVIRONMENT

Issues discussed

- 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 animal etc.

1 Date & time of Consultation 15.05.08, 1 PM

2 Location NAGARPALIKA COLONY

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community
1	Awareness of the project – including coverage area	Yes
2	In what way they may associate with the project	User
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	No
4	Presence of historical/ cultural/ religious sites nearby	No
5	Un favorable climatic condition	No
6	Occurrence of flood	In case of heavy rain
7	Drainage and sewerage problem facing	NA
8	Present drinking water problem – quantity and quality	Water quantity problem
9	Present solid waste collection and disposal problem	NA
10	Availability of labour during construction time	Local labor available
11	Access road to project site	BT Road
12	Perception on tree felling and afforestation	Yes
13	Dust and noise pollution and disturbances during construction work	Dust and noise problem
14	Setting up worker camp site within the project locality	Near city
15	Safety of residents during construction phase and plying of vehicle for construction activities	Construction vehicle should be not affecting their daily life.
16	Conflict among beneficiaries down stream users – water supply project using of river water	NA
17	Requirement of enhancement of other facilities	No
18	Whether local people agreed to sacrifice their lands (cultivable or not) for beneficial project after getting proper compensation	Govt. Land

NAME AND POSITION OF PERSONS CONSULTED

SH. PRADEEP SHARMA

COMPUTER SHOP

2. PUBLIC CONSULTATION- ENVIRONMENT

1 Date & time of Consultation 15.05.08, 1.30

2 Location NAGARPALIKA COLONY

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community
1	Awareness of the project – including coverage area	Yes
2	In what way they may associate with the project	Beneficiary
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	No
4	Presence of historical/ cultural/ religious sites nearby	No
5	Un favorable climatic condition	No
6	Occurrence of flood	During heavy rain
7	Drainage and sewerage problem facing	NA
8	Present drinking water problem – quantity and quality	QUANTITY PROBLEM
9	Present solid waste collection and disposal problem	NA
10	Availability of labour during construction time	LOCAL LABOUR AVAILABLE
11	Access road to project site	BT ROAD
12	Perception on tree felling and afforestation	YES
13	Dust and noise pollution and disturbances during construction work	Yes, DUST AND NOISE PROBLEM
14	Setting up worker camp site within the project locality	NEAR PROJECT SITE
15	Safety of residents during construction phase and plying of vehicle for construction activities	CONSTRUCTION VEHICLE SHOULD NOT AFFECTING THEIR DAILY LIFE
16	Conflict among beneficiaries down stream users – water supply project using of river water	NA
17	Requirement of enhancement of other facilities	NO
18	Whether local people agreed to sacrifice their lands (cultivable or not) for beneficial project after getting proper compensation	GOVT LAND

NAME AND POSITION OF PERSONS CONSULTED**SH. RAM SWAROOP SUMAN****SHOP KEEPER**

3. PUBLIC CONSULTATION- ENVIRONMENT

1 Date & time of Consultation 15.05.08, 2 PM

2 Location MANGROL ROAD

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community
1	Awareness of the project – including coverage area	YES
2	In what way they may associate with the project	BENEFICIARY
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	NO
4	Presence of historical/ cultural/ religious sites nearby	NO
5	Un favorable climatic condition	NO
6	Occurrence of flood	DURING HEAVY RAIN
7	Drainage and sewerage problem facing	DRAINAGE PROBLEM EXIST
8	Present drinking water problem – quantity and quality	WATER QUANTITY IS LESS
9	Present solid waste collection and disposal problem	NA
10	Availability of labour during construction time	LOCAL LABOUR AVAILABLE
11	Access road to project site	BT ROAD
12	Perception on tree felling and afforestation	YES
13	Dust and noise pollution and disturbances during construction work	YES, DUST AND NOISE PROBLEM
14	Setting up worker camp site project locality	NEAR CITY, NO OBJECTION
15	Safety of residents during construction phase and plying of vehicle for construction activities	VEHICLE SPEED SHOULD BE LESS IN CITY PORTION
16	Conflict among beneficiaries down stream users – water supply project using of river water	NA
17	Requirement of enhancement of other facilities	NO
18	Whether local people agreed to sacrifice their lands (cultivable or not) for beneficial project after getting proper compensation	GOVT LAND

NAME AND POSITION OF PERSONS CONSULTED

SH. OM CHAKRAVARTI (CONTRACTOR)

4. PUBLIC CONSULTATION- ENVIRONMENT

1.Date & time of Consultation 15.05.08, 2.30 PM

2.Location KOTA ROAD

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community
1	Awareness of the project – including coverage area	YES
2	In what way they may associate with the project	BENEFICIARY
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	NO
4	Presence of historical/ cultural/ religious sites nearby	NO
5	Un favorable climatic condition	NO
6	Occurrence of flood	DURING HEAVY RAIN
7	Drainage and sewerage problem facing	NO
8	Present drinking water problem – quantity and quality	WATER QUANTITY IS LESS
9	Present solid waste collection and disposal problem	NA
10	Availability of labor during construction time	LOCAL LABOUR AVAILABLE
11	Access road to project site	BT ROAD
12	Perception on tree felling and afforestation	YES
13	Dust and noise pollution and disturbances during construction work	DUST AND NOISE PROBLEM
14	Setting up worker camp site within the project locality	NEAR CITY
15	Safety of residents during construction phase and plying of vehicle for construction activities	VEHICLE SPEED SHOULD BE LESS IN TOWN AREA
16	Conflict among beneficiaries down stream users – water supply project using of river water	NA
17	Requirement of enhancement of other facilities	NO
18	Whether local people agreed to sacrifice their lands (cultivable or not) for beneficial project after getting proper compensation	GOVT LAND

NAME AND POSITION OF PERSONS CONSULTED
SH. SATYENDRA GAUTAM (SPARE PARTS SHOP)

5. PUBLIC CONSULTATION- ENVIRONMENT

1. Date & time of Consultation 15.05.08, 3 PM

2. Location RAJPURA WARD

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community
1	Awareness of the project – including coverage area	YES
2	In what way they may associate with the project	BENEFICIARY
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	NO
4	Presence of historical/ cultural/ religious sites nearby	NO
5	Un favorable climatic condition	NO
6	Occurrence of flood	DURING HEAVY RAIN
7	Drainage and sewerage problem facing	DRAINAGE SYSTEM IS NOT PROPER DUMPING OF SOLID WASTE IN OPEN DRAIN MAY CHOKE THE WATERWAY
8	Present drinking water problem – quantity and quality	WATER QUANTITY IS LESS
9	Present solid waste collection and disposal problem	NA
10	Availability of labor during construction time	LOCAL LABOUR AVAILABLE
11	Access road to project site	BT ROAD
12	Perception on tree felling and afforestation	YES
13	Dust and noise pollution and disturbances during construction work	DUST AND NOISE PROBLEM
14	Setting up worker camp site within the project locality	NEAR CITY
15	Safety of residents during construction phase and plying of vehicle for construction activities	VEHICLE SPEED SHOULD BE LESS IN CITY
16	Conflict among beneficiaries down stream users – water supply project using of river water	NA
17	Requirement of enhancement of other facilities	NO
18	Whether local people agreed to sacrifice their lands (cultivable or not) for beneficial project after getting proper compensation	GOVT LAND

NAME AND POSITION OF PERSONS CONSULTED
SH. ASHISH SHARMA (INSURANCE AGENT