Environmental Assessment Document

Initial Environmental Examination: Bharatpur Urban Drainage Subproject

Project Number:

August 2008

India: Rajasthan Urban Sector Development Investment Program

Prepared by Local Self Government Department

ABBREVIATION

AC	-	asbestos cement
ADB	-	Asian Development Bank
CC	-	Construction Contractors
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
km	-	kilometer
lpcd	-	litre per capita per day
lps	-	litre per second
m	-	meter
LSGD	-	Local Self-Government Department
MFF	-	Multi-tranche Financing Facility
mg/L	-	milligrams per liter
MoEF	-	Ministry of Environment and Forests
NAAQS	-	National Ambient Air Quality Standards
OD	-	outer diameter
OM	-	Operations Manual
ppm	-	parts per million
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

WEIGHT AND MEASURES

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

CONTENTS

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

2. National Law

8. The GoI EIA Notification of 2006 (replacing the EIA Notification of 1994), sets out the requirement for Environmental Assessment in India. This states that Environmental Clearance (EC) is required for specified activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are 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). EC is thus not required for the drainage subproject that is the subject of this Environmental Examination.

3. Review and Approval Procedure

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

C. Scope of Study

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

II. DESCRIPTION OF THE PROJECT

A. Type, Category and Need

14. This is a drainage subproject, and has been classified by ADB as Category B, because it is not expected to have major negative environmental impacts. Under ADB procedures such projects require an IEE to identify and mitigate the impacts, and to determine whether further study or a more detailed EIA may be required. The subproject is needed because the present 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 Bharatpur and the other urban centers to those expected of modern Asian towns.

B. Location, Size and Implementation Schedule

15. The subproject is located in Bharatpur, the headquarters town of Bharatpur District, in the eastern part of Rajasthan in north-western India **(Figure 2.1).** The infrastructure will be located in and around the town, where new *nallahs* (drainage channels) will be built to carry storm water for final disposal **(Figure 2.2).**

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.

C. Existing Drainage Situation

17. The present drainage condition of Bharatpur is far from satisfactory. For the storm water drainage, the town is divided in three zones: (i) Rampura Damora, (ii) Central Flood Control Drain (CFCD), and (iii) Ranjit Nagar. Flood control drains are the main drainage channels which serve the drainage zone I, II and III respectively. In addition there are some secondary drains.

18. The condition of the drainage channels is not good. However, Rampura Damora has been considered for improvement on priority basis as this drain is expected to drain water from areas like Rajendra Nagar, Jawahar Nagar, Krishna Nagar, Bijli Nagar Chowrah, some part of Atal Bandh, etc. The area, apart from being high value residential district, accommodates residential quarters of senior government officials, commercial establishments, government offices and also is hub for retail and wholesale trades. The existing drain is primarily of earthen construction except for some initial 700 meters (m), which has stone masonry side walls. The earthen portion, which is more than 3,000 m, containing some masonry walls in some short stretches, has irregular sections and has been almost fully silted up due to poor or nil maintenance and indiscriminate waste dumping. This has resulted in non-functional drainage from the catchment area with consequent water flooding of the areas for substantial period even after a moderate rainshower. Therefore, an improvement of Rampura Damora drain has been identified as a major priority by the City Level Investment Plan (CLIP) prepared for Bharatpur.

D. Description of the Subproject Including Scope of Work

19. The storm water drainage subproject in Bharatpur includes: (i) de-silting of approximately 700 meters of existing masonry drains; (ii) rehabilitation of approximately 3km of the existing drainage outfall and construction of approximately 1.5km of new drainage outfall; (iii) de-silting and construction of about 1.5km of secondary drains and connecting those to the main drains proposed as above; and (iv) construction of road culverts, entry points, drain cover for access as required on the drains to be rehabilitated as part of the subproject. Upon completion, the storm water drainage subprojects will result in reduced flooding risks for the concerned ULB.

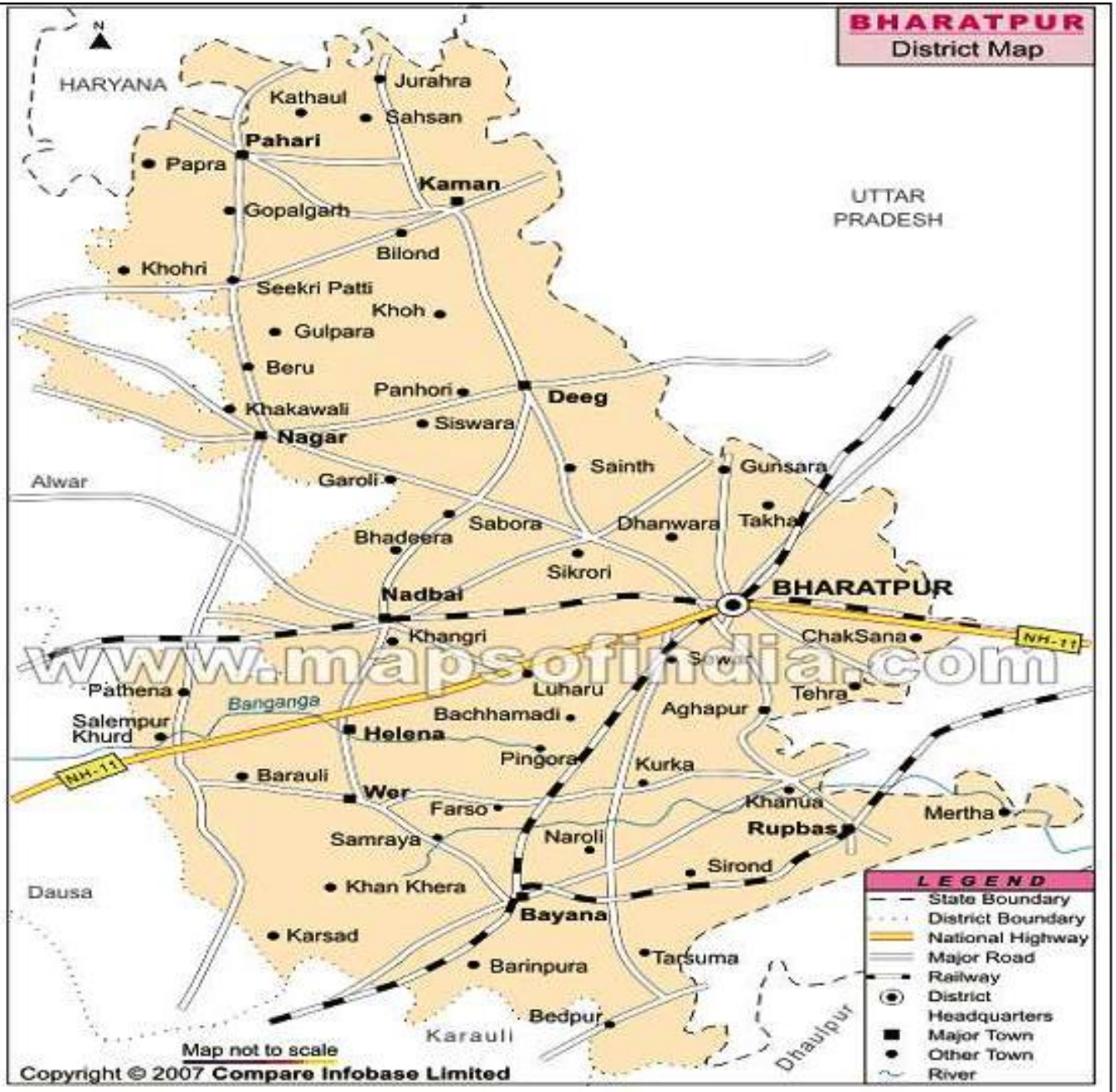
20. The total drain length will be converted to random rubble (RR) masonry channel with cement concrete bed that will increase the velocity of water in the drain which will consequently increase the water carrying capacity of particular section. This in turn will facilitate in evacuating the storm water 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 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

- De-silting of drain to achieve the existing bed levels where drain bed is lined.
- Construction of RR stone masonry side walls in drain and 62mm RCC Flooring.
- Inside plastering of RR Masonry wall to attain better flow condition.
- Construction of storm water inlets at various places.
- Construction of weep holes on the side walls.

- Side backfilling of RR Masonry wall to the required proctor density.
- Repair and construction of bituminous road.
- Repair of damaged RR Masonry as required.
- Construction of 11 nos. of road culverts.
- Covering of the drain for an approximate length of 500.0m
- De-silting and masonry construction of about 1,500 meters length of secondary drains and connecting those to the main drain proposed to be constructed under the subproject.

Figure 2.1: Map showing the location of the project



Rajasthan Urban Sector Development Investment Program
ADB TA 4814-IND

Bharatpur Regional Map

Govt of Rajasthan
Asian Development Bank

Figure 2.2: Proposed Drainage Network of Bharatpur

PROPOSED DRAINAGE SYSTEM FOR BHARATPUR TOWN

N

RAILWAY TRACK
TO JAIPUR
SEWAR VILLAGE
SKY RIPPERS
INDARA COLONY
MALIPURA VILLAGE
MAHRAHI VIDHYA MANDIR
AJAN CANAL
CENTRAL MUSTARD RESEARCH CENTRE
MALIPURA MODE
CENTRAL JAIL
AJAN MANDIR
M.E.S.
M A H A L MOTI JHEEL
B Y E - P A S S
P.H
S.P.M NAGAR
DIRECT
S.P.M ZONE
MANDI
RAILWAY DEPOT
RANI BAGH
AG LAND
OIL MILL
F.I.C.
FACTORY
TYONGA VILLAGE
TO MATHURA
JAIPUR BY PASS
CW
OIL DEPOT
GODOWN (OIL DEPOT)
RAILWAY TRACK
GOVERDHAN CANAL
SURAJMAL COLONY
GOVERDHAN ROAD
STADIUM
DHARMSHALA
MASJID
BUS STAND
KUMHER GATE
C. F. C. D.
RANJEET NAGAR S.R. ZONE
STATION ROAD
DIRECT SUPPLY
RANJEET NAGAR
I.T.I S.R. ZONE
I.T.I
G.M. FACTORY DAL MILL
K.S.E.B.
IND.
PRAKESH UDHYOG
HARI
A.G. LAND
SCHOOL
CHANDPOL GATE
HIRADAS S.R. ZONE
GANDHI PARK S.R. ZONE
GOVERDHAN GATE
GHIRAJ CANAL
LAXMAN MANDIR
FORT S.R.
FORT S.R. ZONE
CIMMCO FACTORY
CHADDRAIN
ATAL BANDH
GANGA MANDIR
JAGHEE NA GATE
GOVERDHAN CANAL
CIMMCO SCHOOL GROUND
OPEN LAND
BHAWANPURA VILLAGE
KALI KI BAGICCHI
Benaran Gate
SWARAN JYANTI NAGAR
JAWAHAR NAGAR
NAGAR PALIKA
SUPER MARKET S.R. ZONE
NEW HOSPITAL
S.T.C HOUSING
S.T.C
Bijli Ghar
Suraj Pool
SURAJMAL NAGAR
RIICO AREA
RIICO S.R. ZONE
SHRI NAGAR
MALLAH BSSTI (PANCHI KA NAGLA)
P.H.E.D.
KRISHANA NAGAR
COMPANY BAGH
RAMNAGAR DAMORA DRAIN
AG
ELECTRAFIED
COLLECTRATE
D.D. NAGAR
Collector House
KRISHNA NAGAR S.R. ZONE
KRISHNA NAGAR PHED
RAJENDRA NAGAR
POLICE LINE S.R. ZONE
POLICE LINE
M.S.J. COLLEGE
SARAS CHORAHA
Faujdar House
MADERIPURA
DIRECT WATER SUPPLY
DIRECT WATER SUPPLY BRIJ NAGAR
D.I.G. OFFICE BHARATPUR RANGE
A.G. LAND
LIFE INSTITUTE
Gol Bagh
GOL BAGH PALACE
A. GATE
MOTI MAHAL
ASTHAWAN KA NAGLA
MEHANDI BAGH
PAKKA BAGH
CHAND BAI KA NAGARA
NOH VILLAGE
RAILWAY LINE
NALLA
TO PATHPUR SIKARI AGRA
DIRECT SUPPLY
AGRICULTURE-LAND
To Jaipur
N.H.11
To Agra
KEVALADEV NATIONAL PARK
DALMIA DAIRY

LEGEND:-

EXISTING NALLH / CANAL

PROPOSED NALLAH TO BE REHABILATATION

III. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

1. Location

22. The Urban Agglomeration (UA) of Bharatpur is situated at the foothills of the Aravalli Mountain series and is strategically located between the most eastern part of the State. It forms boundaries with Gurgaon district of Haryana in the north and north–east. Mathura and Agra lies in the east. Dhaulpur district lies in its south and Sawai Madhopur, Dausa and Alwar district in the west . Bharatpur town is one of the historical towns of the Rajasthan state and it is also a Railway Junction. District map of Bharatpur is shown in **Figure 3.1.**

2. Topography, Natural Hazards, and Drought

23. Topography: Bharatpur lies between the East longitude 76^{o} 53' to 78^{o} 17'and North latitude 26^{o} 22' to 27^{o} 83'. It is situated at 100 meters above mean sea level. The National Highway No.11 (NH 11) connecting Agra ,Jaipur and Bikaner passes through Bharatpur. Its total length within the District is about 71 kilometers (km) .The total road length is 1,985 km. Bharatpur lies in the north east of Rajasthan. Topographically, Bharatpur is levelled and saucer in shape .

24. Natural Hazards: Bharatpur town lies in medium to high risk zone (III and IV). The area is prone to earthquakes as it is located on comparatively unstable 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 Bharatpur district.

25. Drought: Low rainfall coupled with erratic behavior of the monsoon in the State makes Rajasthan the most vulnerable to drought. Based on the discussion with Public Health and Engineering Department (PHED) officials the water table in the town continuously decreases by 1-2 meter (m) on an annual basis combined with significant drawdown conditions.

3. Geology, Geomorphology, Mineral Resources, and Soil

26. The rock types exposed are grouped under Alwar and Ajabgarh Groups belonging to the Delhi super group (Lower to Middle Proterozoic). The rocks of Alwar group comprising quartzite, basic volcanic tuffaceous sandstone, shale etc. are well exposed in the southwestern part of the district around Khankhera. The Ajabagarh Group of rocks consisting of conglomerate are quartzite are exposed near Wer and around Dig and Kaman. The rocks of the Delhi Super group are succeeded by sandstone of the Bhander group which forms a part of the Vindhayan Super group (Upper Proterozoic). The rock of the Bhander Group are well–exposed in southern and southeastern parts of the district. The major parts of the district are occupied Quaternary alluvium and blown sand which conceal the hard rock geology. The area has been divided into two river basins, namely Barah river basin towards north and Banganga river basin towards south. Hydrogeological domains of unconsolidated and consolidated rocks formation with varying ground water potential.

Figure 3.1: District map of Bharatpur

Figure 3.2: Earthquake Zones of Rajasthan

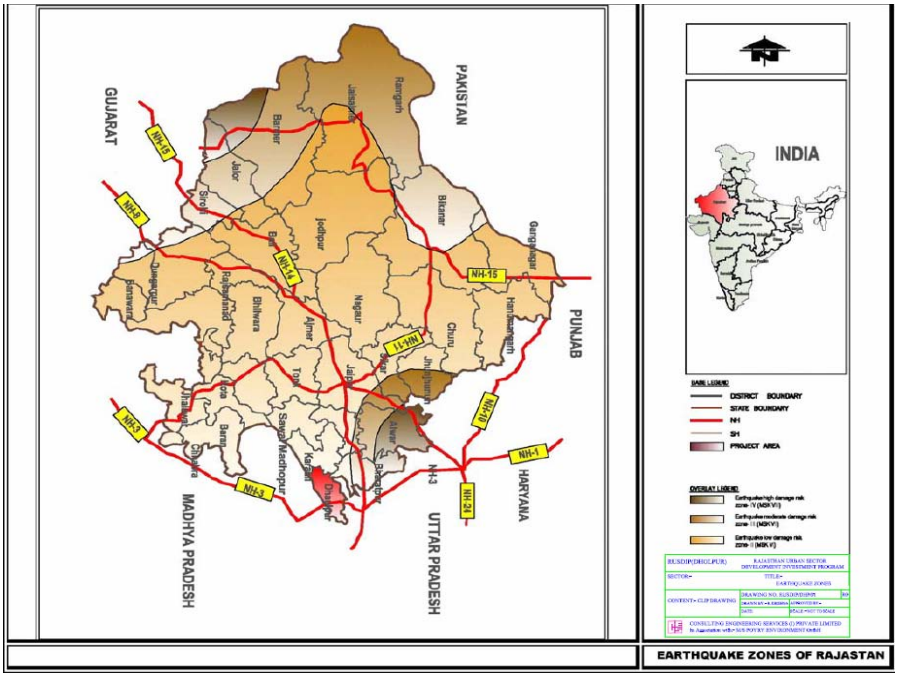
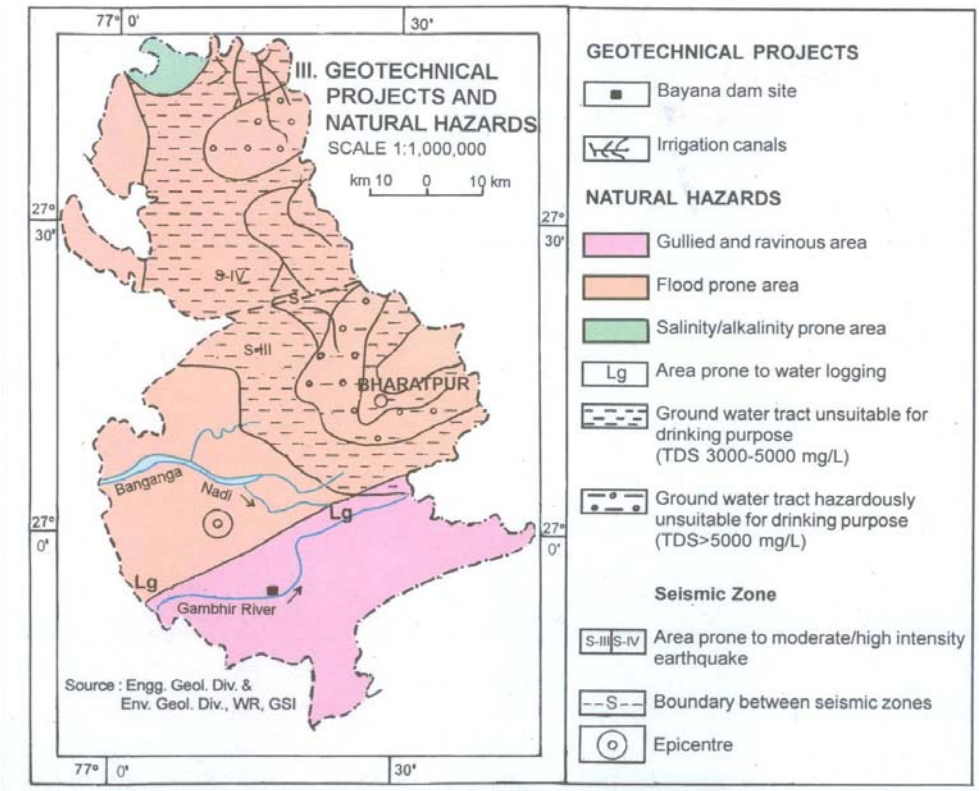


Figure 3.3: Natural Hazard Map of Bharatpur



27. Mineral Resources: Barytes, buildings atones quartz are the important minerals of the district. Barytes closely associated with the basic intrusive occurs in the rocks of the Delhi Super group. Barytes veins occur as fissure filling in quartzite. Occurrences are reported from Hatori (27°00' :77°06'), Karwar (27°00' :77°03') etc. Small deposit of copper with an indicated reserve of 1 million tone with 1% Cu is located near Khankhera (26°55' :77°08'). Minor occurrence of lead is reported from Jotri (27°35' :76°58'). Quartz is available at many places in the district. Quartzite and sandstone are quarried at Bansi Paharpur (26°56 :77°03'), Dig (27°27' :77°19') etc. White spotted, reddish sandstone of the Bhander Group is in great demand as building Stone.

28. Geology and mineral map of the district is shown in **Figure 3,4** and geomorpholigal map of the district is depicted in **Figure 3.5.**

29. Soil characteristics: Soil of the region falls within low rainfall zone of 500- 700 mm. The soil is generally alluvial, prone to water logging. The nature of recently alluvial calcareous has been observed. **Table 3.1** shows nutrient level in the Bharatpur soil including area coverage of saline and sodic soil. The nutrient status of the Bharatpur soil is graded as low to medium level.

Table 3.1: Fertility status – major nutrients and problematic soils of Bharatpur district

	Nutrient			Saline Soil (hectares)	Sodic or Alkali (hectares)
	Nitogen	Phosphorus	Potassium		
Status	L	M	M	32,613	45,217

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

4. Climate

30. The climate of Bharatpur is generally dry .The maximum average temperature during summer is 44 degree Celsius to 47 degree Celsius and during winters it is -5 degree Celsius to 1 degree Celsius. Being a plain terrain, it is relatively hot and dry and the temperature reaches around 47 degree Celsius, which recedes only after arrival of South West monsoon towards the end of June. With departure of monsoon in mid September, the temperature gradually rises again and falls steeply from November .The climate is generally dry. The wind blows at low except during summer and monsoon when hard and turbulent winds are experienced .Winds blow South West to North East in summer and winter experience northern and North West winds. The average rainfall is 646 mm. 95 percent of the annual rains is experienced during June to September. The maximum rainfall was experienced in 1996.

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

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

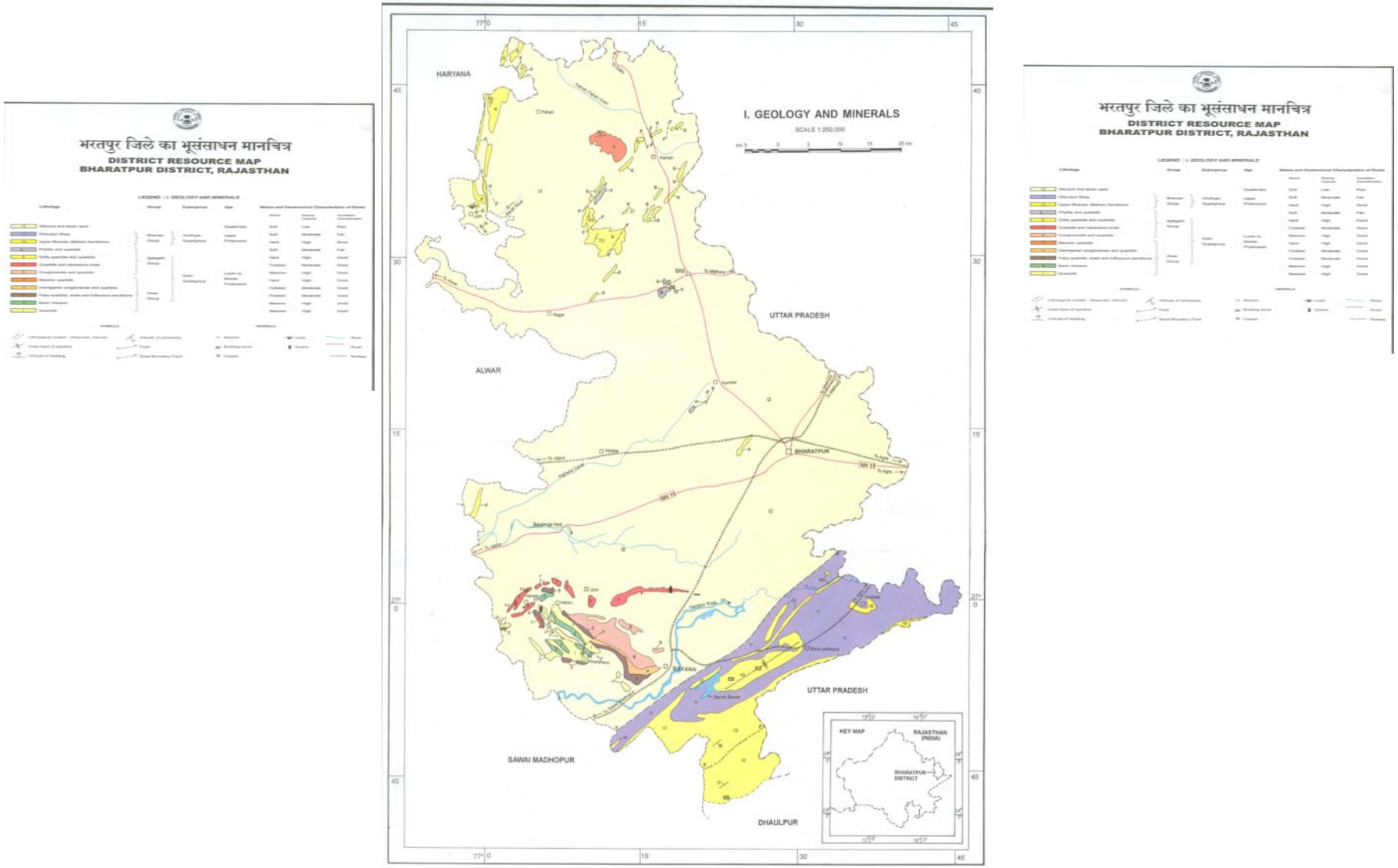


Figure 3.5: Geomorphology of Bharatpur District

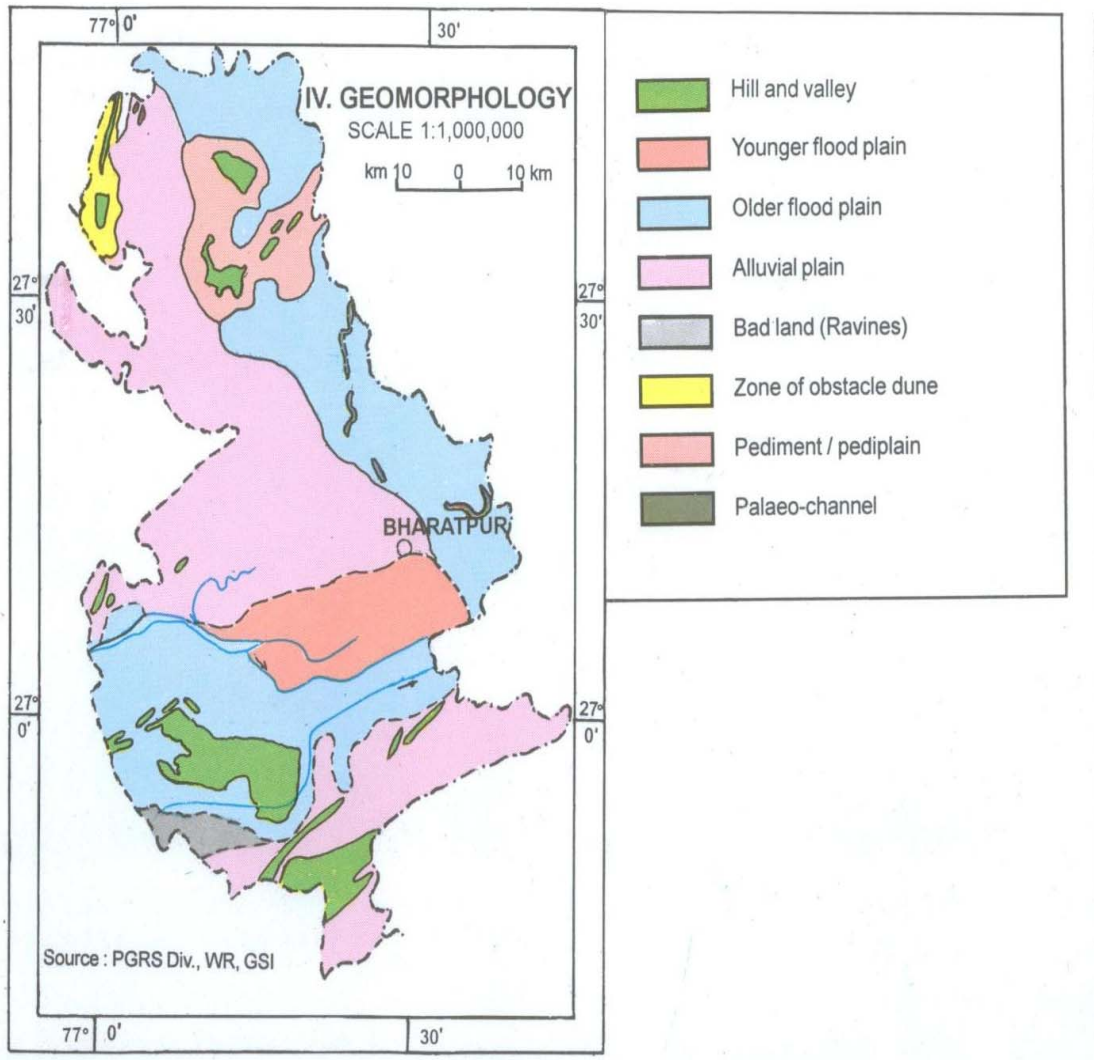
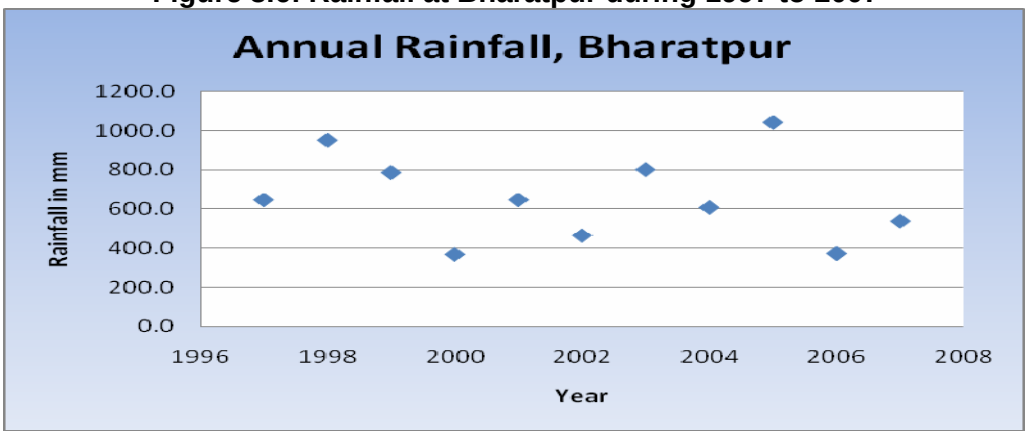


Table 3.2: Rainfall at Bharatpur in recent years (2005-06)

Months	**Rainfall (mm)**
June	38
July	809
August	53
September	82
October	0
November	0
December	0
January	0
February	0
March	34.5
April	0
May	45
Monsoon Rainfall	**982**
Non monsoon rainfall	**79.5**
Annual Rainfall	**1061.5**

(Source: Irrigation Department, Govt. of Rajasthan)

Figure 3.6: Rainfall at Bharatpur during 1997 to 2007



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

5. Air Quality

32. There are no data on ambient air quality of Bharatpur 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 Alwar (116 km from Bharatpur). Traffic is the only significant pollutant in Bharatpur, 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 3.3.**

Table 3.3: Ambient Air Quality in Alwar (Annual Average, 2004; units in µg/m3)

Monitoring Station	Land use	SOx	NOx	RSPM	SPM
Alwar Residential, Rural and others area	Residential	8.1	11.6	175.0	302.0
NAAQ Standard	*Residential*	*60*	*60*	*60*	*140*
Alwar Industrial area	Industrial	7.6	12.4	107.0	182.0
NAAQ Standard	*Industrial*	*80*	*80*	*120*	*360*

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

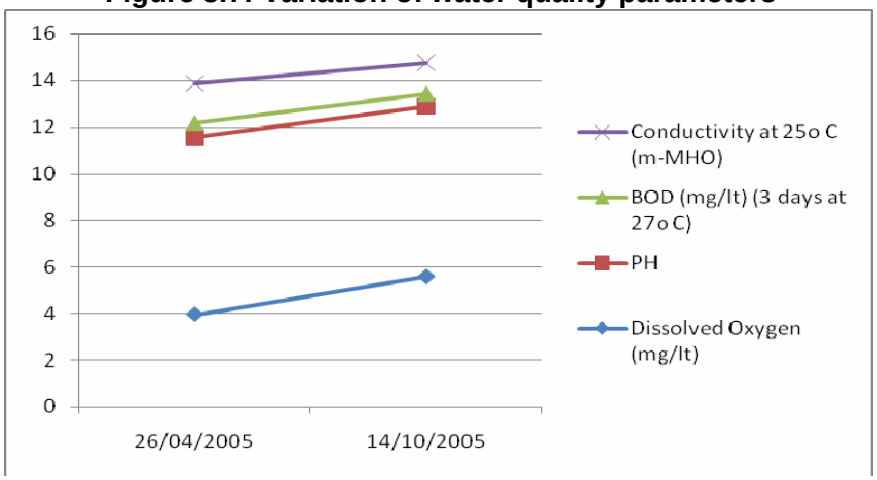
6. Surface Water

33. There is no water quality monitoring station at Bharatpur. The Ghatal Village is located at Bhiwadi Industrial Area, Alwar district, 116 km from Bharatpur. The monitoring has been carried out by Rajasthan Pollution Control Board at Ghatal well. The data on DO, pH, BOD and Electrical conductivity is given in **Table 3.4**. During 2005 to 2006 pH and BOD ranged from 7.15 to 7.35 mg/l and 2.8 to 4.46 mg/l respectively. **Figure 3.7** shows variation of water quality at Ghatal village well.

Table 3.4: Ghatal village well (116 km from Bharatpur)

Date of Sample Collection	Dissolved Oxygen (mg/lt)	P^H	BOD (mg/lt) (3 days at 27o C)	Conductivity at 25^o C (m-MHO)
26/04/2005	3.95	7.58	0.65	1.7
14/10/2005	5.57	7.32	0.55	1.31

Figure 3.7: Variation of water quality parameters



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

7. Geohydrology and Groundwater

34. Geohydrological map of the Bharatpur district is shown in **Figure 3.8.** For broadly grouping geological formations from ground water occurrence and movement considerations, the various lithological units have been classified into two groups on the basis of their degree of consolidation and related parameters. These are unconsolidated porous, quaternary formation and fissured formations – consolidated sedimentary rocks. On an average 90 % of the district area covered with unconsolidated porous formations.

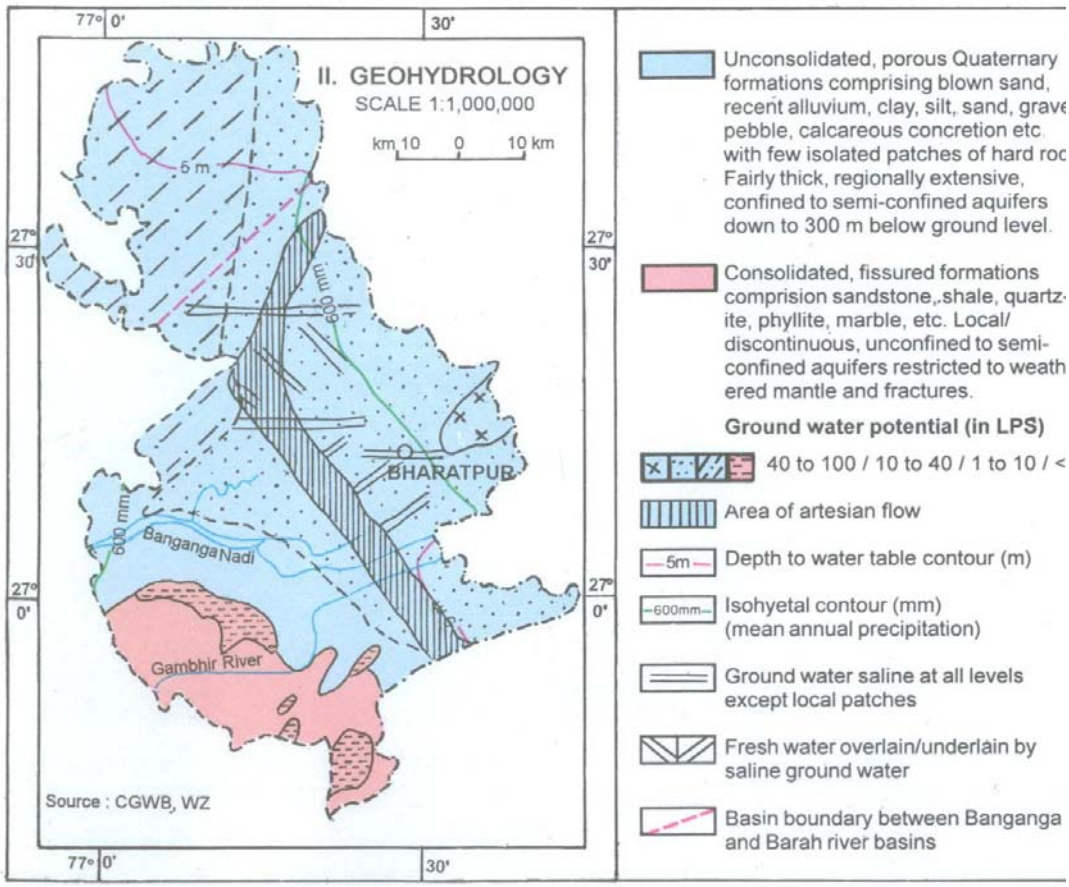
35. There are number of National Hydrographic monitoring stations of Central Ground Water Board in and around Bharatpur. Fluctuation of ground water level is shown in **Table 3.5**. In most of the cases ground water table ranged between 5 to 10 m below ground level.

Table 3.5: Number and Percentage of National Hydograph Network Station (Bharatpur) 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	44	4	21.83	0	0	4	9.09	21	47.73	18	40.91	1	2.27	0	0
Nov05	40	2.84	20.07	0	0	10	25	16	40	13	32.5	1	2.5	0	0
Aug05	40	2.07	20.09	0	0	9	22.5	18	45	12	30	1	2.5	0	0
May05	39	4.12	21.44	0	0	7	17.95	19	48.72	12	30.77	1	2.56	0	0

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

Figure 3.8: Geohydrological map of Bharatpur



36. The Central Ground Water Board carried out chemical testing of tube well water seasonally. The average concentrations of major constituents are shown in **Table 3.6**.

Table 3.6: Ground Water Quality in and around Bharatpur

Parameters	Maximum Level	Minimum Level	Standard of Drinking water (IS: 10500: 1991)	
			Desirable limit (mg/l)	Maximum Permissible limit (mg/l)
pH	9.2	7.46		
EC (micro-mhos/cm at 25 °C)	9710	235		
Cl (mg/l)	2517	14	250	1000
SO_4(mg/l)	2860	5	200	400 (if Mg does not exceeds 30 ppm)
NO_3(mg/l)	711	0	-	100
PO_4(mg/l)	1.83	0		
Total Hardness (mg/l)	2150	20	300	600
Ca(mg/l)	388	8	75	200
Mg(mg/l)	445	9.7	30	100
Na(mg/l)	2162	8	-	-
K(mg/l)	917	0	-	-
F(mg/l)	8.59	0.21	1.0	1.5

Parameters	Maximum Level	Minimum Level	Standard of Drinking water (IS: 10500: 1991)	
			Desirable limit (mg/l)	Maximum Permissible limit (mg/l)
Fe(mg/l)	5.7	0	0.3	1.0
SiO_2(mg/l)	48	18		
TDS (mg/l)	6312	153	500	2000

Note: Total – 35 nos. samples

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

37. As per PHED underground water in Bharatpur town and nearby area is having a high dissolve solid. Thus a major water supply project from river Chambal costing Rs. 500 Crore has prepared ,this project has plan to implement in two phases, phase I part I of this project costing Rs.166.50 Crores was sanctioned in the year 1999. Under this part 212 villages of Dholpur and Bharatpur district (enroot or having high salinity) and design population year 2016 of Bharatpur town is targeted to be benefited providing service level of 135 lpcd. Comparison of water quality from groundwater and surfacewater sources is given in **Table 3.7.**

Table 3.7: Comparison of Water Quality

Source	TDS	Chlorides	Fluorides	Nitrate	PH
Ground water (Bund Baretha)	175	20	5	7	7.1
Tube well (STC)	1583	350	0.54	12	7.3
Tube well DD Nagar	2111	630	0.12	10	7.7

Source –PHED March 2006, all values in mg/l except pH.

38. The quality of ground water supply within the municipal limit and surrounding vicinity is not good and potable. At present the only treatment is done by PHED is through one Treatment Plant which is having the capacity of Treatment 10.8 MLD.

B. Ecological Resources

39. Flora: The forests are generally irregular and situated on hills , usually on rocky or stony slopes or gently undulating grounds. Dhok (*Anogeissus Pendula*) is the principal species growing in these forests, others are : *Acacia catechu* (Khair) , *Acacia leucophloe* (Babul) , *Butea monosperma* (Dhak).

40. Fauna: The district is known for its duck shoots .Geese, ducks , teals , pintails , Siberian cranes during winter. Local birds are mainly egrets , painted storks , ibises , cormorants , saras-cranes , spoonbills , and open-billed storks , darter , besides common parakeets , crows , babblers , partridges and weaver bird.

41. Bharatpur Bird Sanctuary - One of the finest bird sanctuaries in the world, Bharatpur Bird Sanctuary is a reserve that offers protection to faunal species as well. The Bharatpur Bird Sanctuary, also known as the Keoladeo Ghana National Park is a distance of 2 km from the Bhartapur town.

42. The Ecological System in the Bharatpur Bird Sanctuary, The Flora in the Bharatpur Bird Sanctuary- The Bharatpur Bird Sanctuary has a dense forest cover, which shelters a diverse flora. The vast flora is responsible in providing natural habitat to these migratory birds and also haven of free natural perpetuation. The diverse plant species found here is a real exception to the region.

43. Avifauna in the Bharatpur Bird Sanctuary- More than 300 species of birds are found in this small wildlife park of 29 sq-km of which 11 sq-km are marshes and the rest is scrubland and grassland. Migratory birds at Bharatpur bird sanctuary include, several species of Sarus Cranes, Pelicans, Geese, Grey Heron, Ducks, Eagles, Brown long eared bat, Hawks, Shanks, Stints, Garganey Teal, Wagtails, Warblers, Wheatears, Flycatchers, Buntings, Larks and Pipits, etc.

44. The Fauna in the Bharatpur Bird Sanctuary- The Bharatpur Bird Sanctuary is also inhabited by Sambar, Chital, Nilgai and Boar.

C Economic Development

45. Economic base of a town reflects its prosperity. Bharatpur being district headquarter, has been functioning as administrative town with sustained growth in tertiary economic activities. The major economic activities are trade and commerce , thus it offers a number of wholesale and retail markets which acts as a distribution center for nearby towns and villages .Tourism income contributes very much towards economic generation of the town on the contrary household industries play a big role in providing employment and income generation. As per the master plan new town centers and community centers have been proposed. The town has look of business-hub indicating fast growth. Bharatpur District is known not only for Agriculture production but for oil industries also .Occupational structure of the Bharatpur town in year 2001 is given in **Table 3.8.**

Table 3.8: Occupational Structure of Bharatpur in 2001

Sl No.	Occupation	No. of Persons Engaged	% age of Total Workers
1	Agriculture & Allied Activities	2601	4.75
2	Industry	12876	23.50
3	Construction	3836	7.00
4	Trading	12328	22.50
5	Transportation & Communication	5068	9.25
6	Other Services	18080	33.00
Total		**54789**	**100.00**

Source –Bharatpur Statistical Outline

46. The Spatial Growth of the Bharatpur town was constant for the last three decades but as per census 2001 it has increased slightly as shown in **(Table 3.9)**

Table 3.9: Spatial Growth in Bharatpur Town.

Year	Area in Sq.Km.
1961	51.41
1971	51.41
1981	51.41
1991	51.41
2001	56.14

Source: Statistical Department

47. Bharatpur is highest producer of millet, wheat, corn, barley, gram, oil seeds ,cotton, sugarcane and rice. The silica deposits have facilitated establishment of industries in Bharatpur. Production of these minerals is giving a lot of income to the state Government of Rajasthan as shown in the **Table 3.10**

Table 3.10: Production and Income of Minerals

Sl No.	Name of Minerals	Production (Tonnes)	Income (Rupees)
1	Silica Sand	5132	564520
2	Quartz	60	6000
3	Masonry Stone	123449	4397960
4	Sand Stone	21508	4125120
5	Mill Stone	707	91910
6	Slate Stone	424	55120

Source –Statistical Department

48. The moderate growth of the town has resulted in many problems like gap between the demand and supply of basic infrastructure and amenities. The haphazard and unplanned growth of town has disturbed the circulation system, drainage system, and sewerage system. Thus, today drainage and sewerage has become the most pressing problem of the town. The existing drains remain flooded and have become insufficient to carryout the drainage load today. During rainy season these drains are overflooded with water and lead to water logging in areas like Pahari, Deeg, Rupbas, and Bayana .

49. There is no power generating unit at Bharatpur. The consumption of electricity by different sectors is shown in Table below.

Table 3.11: Consumption of Electricity in Million Kwh (2003-04)

District	Domestic	Non- Domestic (Commercial)	Industrial	Public Lighting	Public Water Works	District	Domestic
			Small	Medium	Large		
Bharatpur	61.29	15.632	11.33	14.791	37.76	1.728	10.646

(Source: District statistics book)

1. Land Use

50. Bharatpur district spreads over an area of 5,066 sq kms. covering urbanization area circulation, public and semi-public, agriculture land etc. water bodies, fort , agriculture research and mining. The residential area has higher percentage in Bharatpur due to slow development of dense residential units. Being the District Headquarter, percentage land use of government and semi-government is 2% and for recreation, is 1%. For commercial and industrial purposes, land use is 2.5% and 4.5%, respectively. The following table shows the existing land use pattern for year 2001 **(Table 3.12). Figure 3.9** shows the land use percentage of developed areas in Bharatpur. **Figure 3.10** shown land use of the Bharatpur district.

Table 3.12: Existing Land Use in Bharatpur

Sl No.	Land Use	% age of Developed Area
1	Circulation	15
2	Public & Semi Public	6
3	Recreational	1
4	Governmental	2
5	Industrial	4.5
6	Commercial	2.5
7	Residential	69

Source: Town Planning Department, Bharatpur

Figure 3.9: Land Use Proportion for Bharatpur Developed Area

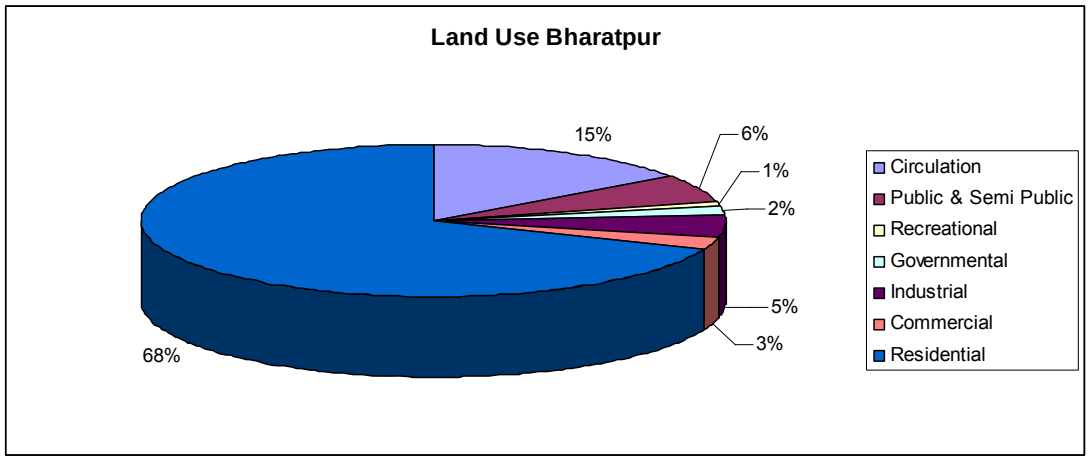
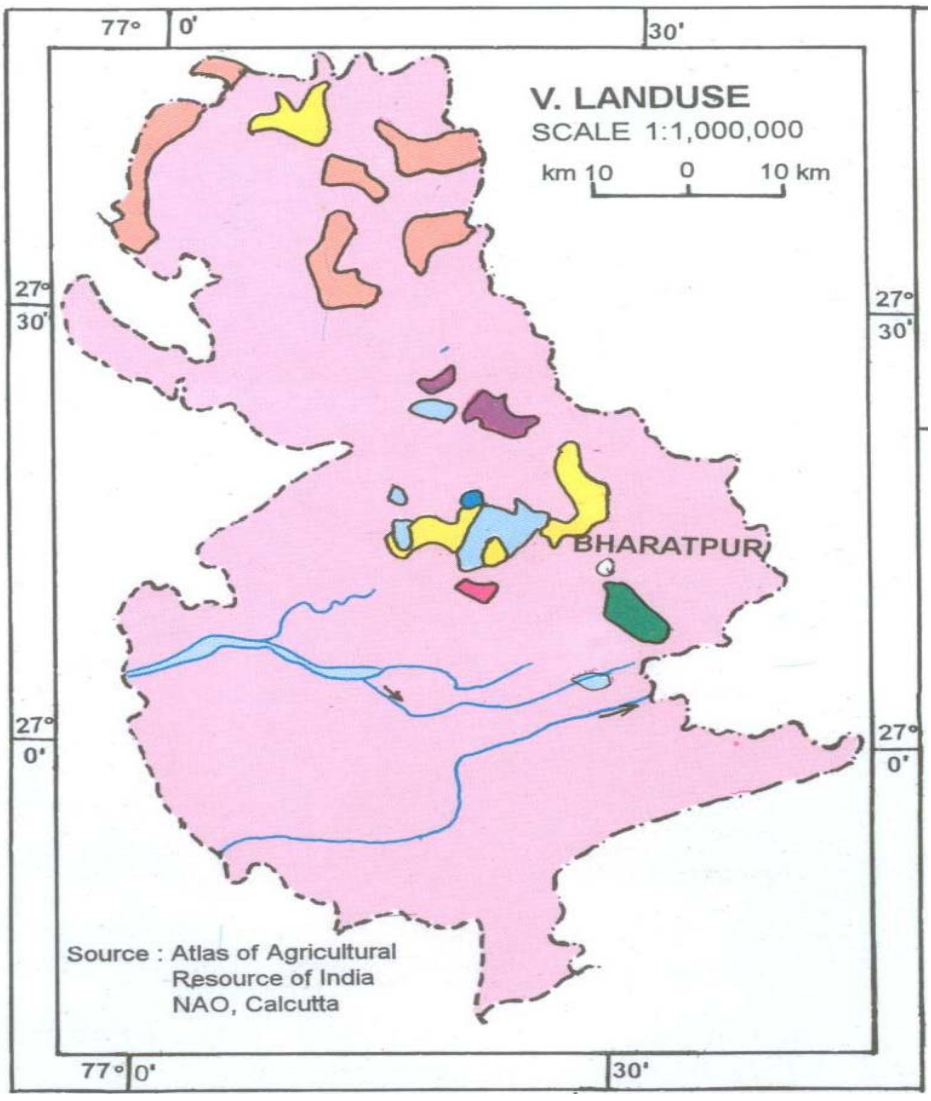


Figure 3.10: Land Use Map of Bharatpur district



51. There are 175.66 acre land allotted to the old industrial area,, of which 157 plots have been developed and 155 plots have been distributed to the entrepreneurs. While the Brij Industrial Area has been allotted with 233.06 acre land, of which 259 plots have been developed and 187 plots have been distributed to the entrepreneurs . 53.22 acre land has been allotted to the industrial area in Bayana , of which 107 plots have been developed and all plots have been distributed to the entrepreneurs. 39.08 acre land has been allotted to industrial area in Deeg, of which 89 plots have been developed and 87 plots have been distributed to the entrepreneurs. 40 acre land has been allotted to the industrial area in Jurhera, of which 54 plots have been developed and 31 plots have been distributed to the entrepreneurs

52. In Bharatpur district out of total 127 factories, 126 factories were registered under factory act as given in **Table 3.13.**

Table 3.13: Numbers of Factories at Bharatpur

Sl No.	Categories of Factories	Number of Factories
1	Oil Mills	48
2	Saw Machine	33
3	Engineering Works	2
4	Surplus	3
5	Rolling Mills	2
6	Crusher	1
7	Electric Grid	6
8	Pulse Mills	1
9	Ice Factory	10
10	Ammunition Depot	1
11	Milk and Butter	1
12	Brick Factory	8
13	Petrol Depot	3
14	Alcohol Go down	1
15	Chemical	1
16	Fire Works	1
17	Cattle Feed	1
18	Tin Containers	1
19	Roadways workshop	2
20	Cigarette	1
Total		**127**

Source –Statistical Department, Bharatpur

53. In and around the Bharatpur town area there are about 70-80% of lands used for agricultural purpose. Crop production statistics as depicted in **Table 3.14** indicates more crop production at Rabi season in compared to Kharif season.

Table 3.14: Crop production in around Bharatpur

Type of Crops	Under Rabi Crops 2003-04 (Prod in Tonnes)	Under Kharif Crops 2003-04 (Prod in Tonnes)
Cereals	547737	219514
Pulses	40180	243
Food Grains	587197	219757
Oilseeds	282211	564
Others	15826	11006
Total	**885954**	**231327**

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

2. Infrastructure

54. Water Supply: The Bharatpur urban water supply scheme dates back to year 1956. Fifteen (15) open wells were constructed near Mallah village. Due to increased in water salinity ,of open wells this scheme was augmented in year 1968 by taking water from the irrigation tank located in Bundh Baretha which is 41 km away from Bharatpur town. This scheme was designed for hundred thousand population for service level of 20 liters per capita day (lpcd). In 1985, nine (9) deep tube wells were developed as source in Mandoli village (Tehsil Roopwas) near Gambhir river. This scheme has designed to meet out water demand up to the year 1998 for design population of 1.92 lacs at 100 lpcd. Currently, the two sources of water are the irrigation tank in Bundh Baretha and the deep tube wells.

55. Sewerage System and Sanitation: Bharatpur town does not have underground sewerage system. Out of the occupied residential houses only about 41.88 % population have some kind of individual facilities and about 28.78 % population with low-cost sanitation. Most of the houses have adopted the practice of providing onsite disposal by constructing water seal, bore hole latrines or by providing septic tank with effluent discharge into soak pits or open surface drains. Low-income population generally defecates into the open field. No sewerage treatment facility is there in the town and the drains having combined drainage and sewage are having outfall discharge in open fields of the town. In the absence of any sewerage facility, the major mode of disposal is through individual septic tanks and low cost sanitation.

56. Drainage: The existing drainage system in Bharatpur is piece-meal construction of open *nallah* as per local and temporary requirements. The town has mainly open drains that is irregular and mismanaged. The improper construction and maintenance of open drains cause spillage of rain water mixed with sewage and gets collected in local depressions at following core places of the town and requires pumping for several days.The waste water, along with sewage, is discharged into the fields towards west of the town through open drains. The storm water drains in each of the cities have been identified under three broad categories: open *pucca*, closed *pucca*, and *kutcha*. The proportion of each of these categories to the total road length gives a picture of the existing level of storm water drain coverage in the town. The storm water drain length as per the type of drain is given in **Table 3.15 .**

Table 3.15 Drain Length as per Drain type

Sl No.	Drain Type	Length in Km.
1	Open Pucca	53.56
2	Closed Pucca	44.55
3	Kutcha	NA
Total		**98.11**

Source: Respective Agencies – UIT / MC

57. Industrial Effluents: Industries are located outside the town area and small amount of effluent disposed scattered in local *nallahs*. As reported by the local municipal council, effluent disposal 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.

Solid Waste: The total waste generation in the town is about 129.25 tons per day and only 96.93 tons per day is collected by the Municipal Board/Council. Presently most of the town wastes are dumped without any treatment in depressions, ditches, or by the sides of the road. Waste is not segregated at household level. The residents dump the waste in the nearby collection points or on the nearest vacant land. The waste is kept open at the collection points, which leads to subsequent foul smell, water, air pollution and unhygienic conditions. It also chokes the drains during rainy season and lead to water logging in the low lying / surrounding area. The local body

does not have suitable vehicles for the collection of waste or garbage in terms of timely lifting and transportation. There are 50 open points within the town demarcated by Bharatpur municipal board/council for garbage disposal in the wards.

D. Social and Cultural Resources

1. Demography

58. The population of Bharatpur Municipality is 205,235 per 2001 Census. Of the total population, males constitute 110,500 and females 94,735 with sex ratio of 857 females per 1000 males. The town experienced highest decadal growth rate between1981-1991. The average density is 3,644.22 persons per square kilometer. The high growth is induced by industrial development and activities like establishments of more government offices, trade and commerce, services, and residential colonies **(Tables 3.16** and **3.17).**

Table 3.16: Population Growth in Bharatpur town

Year	Population	Variation	Growth Rate
	Bharatpur town		*(%)*
1961	49,776	-	
1971	69,902	20,126	40.43
1981	105,274	35,372	50.60
1991	150,042	44,768	42.53
2001	205,235	55,193	36.79
2011	273,916	68,681	33.46
2021	366,799	92,883	33.91
2031	491,651	124,852	34.04
2041	659,519	167,868	34.14

Source: Census of India, 2001.

Table 3.17 Density Growth in Bharatpur

	Density in persons / Sq.Km.
1961	972.57
1971	1361.02
1981	2042.40
1991	3053.88
2001	3644.22

Source: Census of India, 2001

2. Health and Educational Facilities

59. There are good educational facilities in Bharatpur district, which serve towns people, inhabitants of surrounding villages, and those from the hinterland. There are 1,249 primary schools, 243 secondary and higher secondary schools, plus 11 general degree colleges and 7 industrial training institutes. **Table 3.18** shows education facility in the district.

Table 3.18: Educational facility of Bharatpur District

Primary Schools	1,249
Middle Schools	889
Higher Secondary and Secondary Schools	243
Colleges	11
ITIs and Polytechnics	7

Source: Official Website of Bharatpur district

60. There are 430 hospitals and dispensaries located in Bharatpur. There are 7 general hospitals, 59 primary health centers, 2 maternity and pediatric centers, 1 tuberculosis hospital, 2 leprosy hospitals, 36 dispensaries, and 323 sub-centers (per 2001 Indian census). There are also 3 ayurvedic, 3 homeopathic, and 4 Yunani hospitals.

3. History, Culture and Tourism

61. 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. The historical Lohagarh fort or the 'Iron Fort' and other places like Keoladeo National Park, Kamra Khas, Palace, Deeg Fort, and Purana Mahal attract tourists. Other famous monuments and sites in Bharatpur are listed in **Table 3.19**.

Table 3.19: Famous monument/ site for tourist interest at Bharatpur

Sl. No.	Name of monument/site	Locality	District
1.	Akbar's Chhatri	Bayana	Bharatpur
2.	Ancient fort with its monuments	Bayana	Bharatpur
3.	Brahmabad Idgah	Bayana	Bharatpur
4.	Islam Shah's Gate	Bayana	Bharatpur
5.	Jahangir's Gateway	Bayana	Bharatpur
6.	Jhajri	Bayana	Bharatpur
7.	Saraj Sad-ullah	Bayana	Bharatpur
8.	Usa Mandir	Bayana	Bharatpur
9.	Lodhi's Minar	Bayana	Bharatpur
10.	Delhi Gate outside the Bharatpur Fort	Bharatpur	Bharatpur
11.	Fateh Burj near Anah Gate	Bharatpur	Bharatpur
12.	Jawahar Burj and Ashtadhatu Gateway inside the Bharatpur Fort	Bharatpur	Bharatpur
13.	Moat surrounding the Fort wall	Bharatpur	Bharatpur
14.	Fort walls including Chowburja gate and approach bridges at the Chowburja and Ashtadhatu gates	Bharatpur	Bharatpur
15.	Deeg Bhawan (Palaces)	Deeg	Bharatpur
16.	Looted gun	Deeg	Bharatpur
17.	Marble Jhoola	Deeg	Bharatpur
18.	Kaccha Bag	Deeg	Bharatpur
19.	Chaurasi Khamba temple	Kaman	Bharatpur
20.	Ancient mound	Malah	Bharatpur
21.	Ancient mound	Noh	Bharatpur
22.	Colossal image of Yaksha	Noh	Bharatpur
23.	Lal Mahal	Rupvaa	Bharatpur

Source: Official website of Bharatpur district

62. Bharatpur is regular and frequent destination of tourists in Rajasthan. It is lagging behind as compared to other places in Rajasthan but over a period of time it is slowly increasing. **Table 3.20** shows the statistics on local and foreign tourists.

Table 3.20: Tourist Inflow of Bharatpur

Year	Inland Tourist	Foreign Tourist	Total
2001	101,181	9,553	110,734
2002	61,361	5,181	66,542
2003	70,336	8,949	79,285
2004	73,691	33,525	107,216
2005	87,427	24,052	111,479

Source: Tourism Department Bharatpur

IV. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: LOCATION AND DESIGN

63. 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 IV and V above and no other impacts are expected.

64. 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.

65. However in the case of this subproject, there are no considerable 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 localized 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

66. 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.

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

Table 5.1: Fields in which construction is not expected to have significant impacts

Field	Rationale
Climate	Short-term production of dust is the only effect on atmosphere
Geology and seismology	Excavation will not be large enough to affect these features
Fisheries & aquatic biology	No rivers or lakes will be affected by the construction work
Wildlife and rare or endangered species	There is no wildlife or rare or endangered species located nearby the drain
Coastal resources	Bharatpur is not located in a coastal area
Population and communities	Construction will not affect population numbers, location or composition

68. These environmental factors have thus been screened out presently but will be assessed again before starting of the work.

69. **Appendix V-1** shows Rapid Environmental Assessment (REA) Checklist for the said subproject. The overall impact on environmental features is shown in **Appendix V-2**. As such no impact is expected on biological environment.

B. Main Drains

1. Construction Method

70. The total length of the new drain will be constructed in random rubble masonry channel with cement concrete bed to increase the velocity of water in the drain which will consequently increase the water carrying capacity of particular section. Each will be located alongside main roads, on government land on which a ROW has been granted for this work.

71. 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 4 x 2 m cavity has been created with the required gradient, random rubble stone masonry side walls in drain and 62-millimeter RCC flooring will be constructed. To attain better flow condition inside the drains, plastering of the random rubble masonry wall will be done. Loose soil will then be shoveled in to fill any space remaining between the wall and the edge of the trench.

2. Physical Resources

72. 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.

73. There is generation of waste soil for construction of drain. There will therefore be quite large 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 almost certainly be conducted in the dry season, so 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, in particular sand, as well as bricks and cement.

74. 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:

- Silt from the dredged drainage may be hazardous. Contact town authorities to analyze the sludge for hazardous components. Coordinate with town authorities for appropriate disposal facilities for hazardous sludge and silt;

- 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;

- 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 sand is only brought to site when needed;

- Cover or damp down sand and soil stockpiled on site to reduce dust in windy weather; and

- Use tarpaulins to cover loose material when transported to and from the site by truck.

75. 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.

76. 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

77. There is no environmental sensitive area near the proposed drain, so no impact is expected. 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

78. 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; and

- 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.

79. 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; and
- Consulting affected businesspeople and informing them in advance when work will occur.

80. 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 Bharatpur Municipal Board (BMB) of the nature and location of all infrastructure, and planning the drain routes to avoid any conflict or damage;
- Integrating construction of the various Bharatpur subprojects (in particular water supply, drainage and sewerage) so that different infrastructure is located on opposite sides of the road wherever feasible; and
- Roads and inhabitants are not subject to repeated disturbance by construction in the same area at different times for different purposes.

81. 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; and

- Increase the workforce in any such areas so that work is completed quickly.

82. 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; and

- 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

83. 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 Bharatpur 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; and

- 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, and calling in the state archaeological authority if a find is suspected, and taking any action they require ensuring its removal or protection in situ.

84. 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 Bharatpur, 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); and
- Using modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions, and ensuring they are maintained to manufacturers' specifications.

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

- Excluding the public from the site;
- Ensuring that all workers are provided with and use appropriate Personal Protective Equipment;
- Health and Safety Training for all site personnel;
- Documented procedures to be followed for all site activities; and
- Accident reports and records among others.

86. An additional, particularly acute health risk derives from the fact that, as mentioned above, the existing water supply system comprises mainly asbestos cement (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.

87. 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)[1] [1]and amongst other things, should involve:

- Training of all personnel (including manual laborers) to enable them to understand the dangers of AC pipes and to be able to recognize them in situ;
- Reporting procedures to inform management immediately if AC pipes are encountered; and
- 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;
    - Usage of appropriate breathing apparatus and protective equipment by persons delegated to deal with the AC material; and
    - Procedures for the safe removal and long-term disposal of all asbestos-containing material encountered.

[1] 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

88. 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 labor 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. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: OPERATION AND MAINTENANCE

A. Screening Out Areas of No Significant Impact

89. 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 by this system when it 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 discussed 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 is no wildlife or rare or endangered species in the town or on the government owned areas Only near water supply subproject site protected National Park is located
Coastal resources	Bharatpur is not located in a coastal area

B. Operation and Maintenance of the Improved Drainage System

90. 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 drains 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 under the solid waste management subproject to help reduce the blockage of drains by discarded refuse.

91. 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 and 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.

92. 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

93. 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 town. In combination with the repair of leaks in the water supply system under the water supply subproject, the new nallahs should also help to ensure that similar pools do not form in the future. With these projects implemented the quality of the town environment would improve significantly.

94. 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.

95. 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 BMB to end this practice by ensuring that persons employed to clean drains are provided with suitable equipment (such as shovels and wheelbarrows) and are instructed to ensure that all removed material must be deposited in the municipal waste storage bins, provided under the solid waste management subproject.

96. 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, through purpose-drilled recharging boreholes, or by simply being allowed to collect in an area of pervious ground. The water may have to be treated before directing into boreholes otherwise it might contaminate a scarce resource. However consideration should therefore be given to including this additional design feature in this subproject.

2. Ecological Resources

97. 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. If water from the drains was discharged into the *nallah* near the STP there could be some small ecological benefits if there was enough water to allow colonisation by marsh plants and animals. However the benefits of helping to recharge the aquifer would be more significant, so it would be more appropriate to forego the very minor ecological gain in favour of the enhancement suggested above.

3. Economic Development

98. 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

99. 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 V.C.5) to protect workers and the public.

100. 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

101. **Table 7.1** lists the potential adverse impacts of the Bharatpur 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

102. 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.

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

Figure 7.1: Institutional Responsibly- RUSDIP

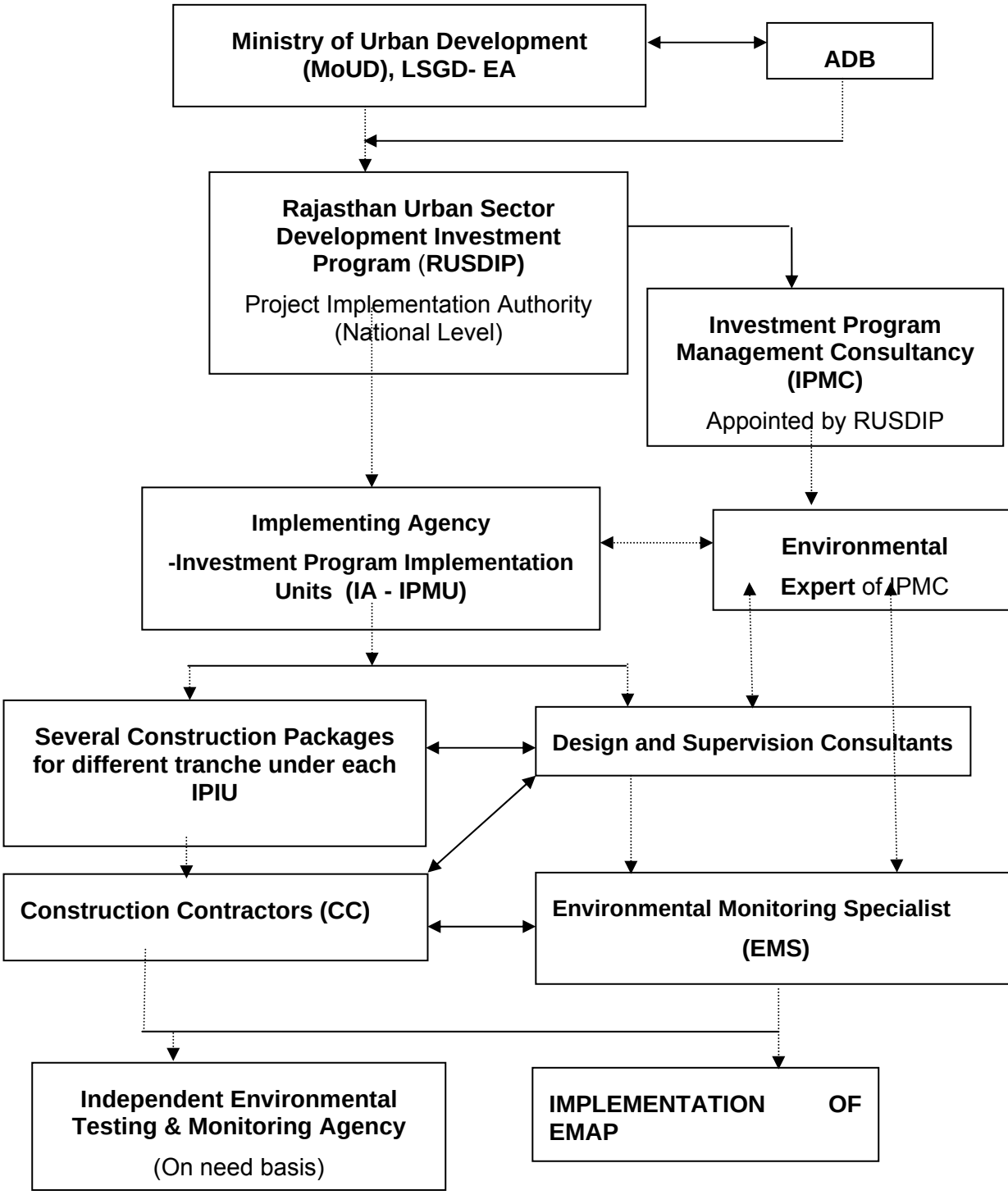


Table 7.1: Environmental impacts and mitigation for the Bharatpur Drainage Subproject (Black = continuous activity; Grey = intermittent)

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	08	2009				
Construction						D	1	2	3	Op	2
Excavation of trenches 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
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 STP 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,	M	T	Identify buildings at risk from vibration damage and avoid using heavy vehicles nearby	Contractor	All sites						0

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	08	2009				[2]
Construction						D	1	2	3	Op	
vibration and impeded access			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
			- Ensure that workers use Personal Protective Equipment								0
			- Provide Health & Safety Training 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	Network sites						0
			- immediate reporting of any occurrence to management	Contractor							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 Untreated drainage water can damage ground water resource	M	P	Discharge drain water into boreholes or porous ground Proper treatment to be done for drainage water before recharging ground water.	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

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
[2]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

104. 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.

105. 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

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

107. 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 operate.[1]

108. 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.

[1] 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)

109. 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

110. 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.

111. The remaining actions in the EMP 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 0.74 million, ie US$ 17210.

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[1]	390,000	
Survey Expenses	Lump Sum	200,000	200,000	590,000
2. Environmental mitigation measures- plantation along nallah	Lump sum	150,000	150,000	150,000
TOTAL				740,000

[1]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 (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[1]
*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
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 (safety of workers/public)	All sites	Contractor	Site observations; CC records	Monthly	EMS
Exclude public from the site	All sites	Contractor	Site observations; CC records	Monthly	EMS
Ensure that workers wear Personal Protective Equipment	All sites	Contractor	Site observations; CC records	Monthly	EMS
Provide Health and Safety training for all personnel	All sites	Contractor	CC records; worker interviews	Monthly	EMS

Mitigation Activities and Method	Location	Responsible for Mitigation	Monitoring Method	Monitoring Frequency	Responsible for Monitoring
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 Treatment of drain water before recharging boreholes in a must to avoid contamination of groundwater resources.	From *nallahs*	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	

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

VIII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Project Stakeholders

112. 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 artifacts; and
- State and local tourism authorities.

113. 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 and the Government of India, Ministry of Finance

B. Consultation and Disclosure to Date

114. 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;
- Labor availability in the Project area or requirement of outside labor 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; and
- Movement of wild animal if any near project site.

115. 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 VIII-1**. Summary of the consultation is also shown in **Appendix – VIII-1.**

116. The public Consultation and group discussion meeting were conduct by RUIDP on Date 25 June, 2008 after advertising in Local newspapers. 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 Bharatpur, the environmental and social impacts of the proposed subprojects under Tranche 2 in Bharatpur were discussed.

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

Major Issues discussed during Public consultation are: (i) proposed storm water drain subproject is to ensure to proper dispose of rain water from the busy roads of town 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 EA; and (viii) local people have appreciated the storm water drain proposal of the government and they have ensured that they will cooperate with the EA during project implementation.

C. Future Consultation and Disclosure

118. 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; and
    - 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; and
    - 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 town 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; and
    - 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

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

120. 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.

121. The process described in this document has assessed the environmental impacts of the infrastructure proposed under the Bharatpur 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; and

- 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.

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

123. 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.

124. 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; and
- Planning work to minimise disruption of traffic, business and communities.

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

126. 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; and
- Developing a protocol for use in conducting all excavation to ensure that any chance finds are recognised, protected and conserved.

127. Special measures were also developed to protect workers and the public from exposure to carcinogenic asbestos fibers in the event that AC 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; and
- 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).

128. 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; and

- 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.

129. 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.

130. 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; and

- Ensure that blockages are cleared and repairs are conducted promptly and effectively.

131. 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.

132. 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 the water supply subproject should ensure that similar pools do not 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 which is an important 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.

133. 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).

134. 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

135. 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; and

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

X. CONCLUSIONS

136. The environmental status of the proposed improvements in urban drainage system of Bharatpur Town has been assessed. Issues related to Involuntary Resettlement were assessed by a process of resettlement planning and will be compensated by measures set out in detail in the Resettlement Framework for the subproject.

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

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

Appendix 1: Photographs

Appendix 2: Rapid Environmental Assessment (REA) Checklist

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the project area…			
Densely populated?	X		Population density at Bharatpur is high.
Heavy with development activities?		X	Bharatpur is a big town- development activity continued
Adjacent to or within any environmentally sensitive areas?		X	There is a bird sanctuary located in Bharatpur. However, the subproject components would not be adjacent to this area.
• Cultural heritage site		X	There are historical sites, forts, and religious sites located in Bharatpur but these are 500 meters away from the sites of the subproject components
• Protected Area		X	Keoladeo Ghana National park is located in Bharatpur but this is more than 500 meters from the sites of the subproject components
• Wetland		X	Wetland exists within Bharatpur bird sanctuary but the subproject components will not be affecting the area. No work will be done within 500 meters of the bird sanctuary
• Mangrove		X	no such area exist in Bharatpur
• Estuarine		X	no such area exist in Bharatpur
• Buffer zone of protected area		X	Away from the sub-project site
• Special area for protecting biodiversity			Keoladeo Ghana National park is located in Bharatpur but this is more than 500 meters from the sites of the subproject components
• Bay		X	none
B. Potential Environmental Impacts Will the Project cause…			
Impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services.		X	Sanitation and solid waste disposal system will also be considered in further development of subprojects
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?		X	
Degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?		X	The subproject components will be developed in right-of-way.
Dislocation or involuntary resettlement of people		X	Temporary displacement due to the construction activities. People may lose their access for short period. People will be informed about the activities well in advance during the pre construction consultation. Compensation will be paid as per R&R policy.
Degradation of cultural property, and loss of cultural heritage and tourism revenues?		X	No such impact anticipated.
Occupation of low-lying lands, floodplains and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to pollutive industries?		X	NA
Water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality, and pollution of receiving waters?		X	The proposed drainage work is to improve the Ram Nagar Damora Nalla which Start from NH-11 and ends at Life Line Institute. It is not discharging into any receiving water

SCREENING QUESTIONS	Yes	No	REMARKS
			body.
Air pollution due to urban emissions?	X		Short term impact will be mitigated by application of EMP
Social conflicts between construction workers from other areas and local workers?		X	No as such expected
Road blocking and temporary flooding due to land excavation during rainy season?	X		Partial impact during monsoon- no excavation permitted during monsoon
Noise and dust from construction activities?	X		Mitigation measures to be provided & will be taken care in EMP
Traffic disturbances due to construction material transport and wastes?	X		Mitigation measures to be provided & will be taken care in EMP
Temporary silt runoff due to construction?	X		Mitigation measures to be provided & will be taken care in EMP
Hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation?		X	NA
Water depletion and/or degradation?		X	NA
Overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization?		X	NA
Contamination of surface and ground waters due to improper waste disposal?		X	Waste disposal of drainage work will be taken care in EMP
Pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems?		X	The proposed drainage work is to improve the Ram Nagar Damora Nalla which Start from NH-11 and ends at Life Line Institute. It is not discharging into any receiving water body.

Appendix 3: Impacts on Environmental Components

Impact on Environmental component		
Affected Trees/Crops	No Tress getting affected.	No impact
Temple/Mosques	1 nos of temple may loss access	Temporary
Heritage Structures	No Heritage getting affected.	No impact
Ponds/water body	No Ponds/Water body affected.	No impact
Forest land	No Forest land getting affected.	No impact

Appendix 4: Public Consultations

PUBLIC CONSULTATION- ENVIRONMENT
Sub Project-: Drainage (Bharatpur)

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 if any

1. **Date & time of Consultation: 21.06.08 at 16.30 PM**
2. **Location; Birnarayan Gate**

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community
1	Awareness of the project – including coverage area	People are aware of the project. DSC consultant informs the people about the proposed projects and invest plan on different component of the project.
2	In what way they may associate with the project	• They demand that local people of the area should be engaged during implementation of the same. • Local ward members should be informed during the implementation they will provide all types of assistance during implementation
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	During consultation it was found that no such sensitive area get affected

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
4	Presence of historical/ cultural/ religious sites nearby	No historical or religious building comes on the proposed drain. During improvement of the drain one temple may loss access. DSC consultant assures that the problem will be taken care as per project safeguard policy.	
5	Unfavourable climatic condition	May –to- June there is very hot season; otherwise the condition of climate is favourable for work.	
6	Occurrence of flood	Due to poor drainage condition people suffer from water stagnancy in their area especially in the market area and road side areas. No report of Flood in the project area.	Drainage system has to be improved
7	Drainage and sewerage problem facing	Due to poor drainage condition people suffer from water stagnancy in their area especially in the market area and road side areas. No sewerage system in the project area.	Drainage system has to be improved Sewerage system has to be improved

8	Present drinking water problem – quantity and quality	People get water supply from PHED. Quantity is not sufficient and quality is not good – hard water with high TDS. To meet the demand local people exploring ground water through hand pumps and wells.	Water supply system to be implemented with supply of treated water from surface water source.
9	Present solid waste collection and disposal problem	Municipality takes care of the Solid waste collection, which is manually & disposed off in disposal site.	
10	Availability of labour during construction time	Sufficient labour will be available in this area.	
11	Access road to project site	Road available.	
12	Perception of villagers on tree felling and afforestation	It has been explained that during up gradation of the drainage no tree is going to be affected.	

Sr. No.	**Key Issues/Demands**	**Perception of community**
13	Dust and noise pollution and disturbances during construction work	People are aware of the problem. It has been explained that as per safeguard policy of the project for abatement of pollution measures will be taken to minimize it. Vehicles movement will be controlled & appropriate measure will be taken to combat the same.
14	Setting up worker camp site within the project locality	Mainly engaged labours will from the nearby locality. No worker camp will be set up.
15	Safety of residents during construction phase and plying of vehicle for construction activities	People are aware of the problem. It has been explained that as per safeguard policy of the project vehicles movement will be controlled & appropriate measure will be taken to combat the same
16	Conflict among beneficiaries down stream users – water supply project using of river water	Na
17	Requirement of enhancement of other facilities	Yes they want. They want the conservation of the heritage structures, conservation of Sujan Ganga
18	Whether local people agreed to sacrifice their lands (cultivable or not) for beneficial project after getting proper compensation	Not required

NAME AND POSITION OF PERSONS CONSULTED:

Pratap Singh Saini : Water Supplier
Jagjit Singh : shop owner Building Material
Dr.Anurag Sharma : Pratap Nursing Home
Aman deep : owner Hero Honda showroom
Suresh Chand : owner General Store
P.N.Khatri : ; owner Tent house
Mukesh Garg : owner Music Shop
Tirloki : Local resident
Mehboob : Mehboob furniture
Mukesh : owner Yogesh Electronics
Om Prakash : owner Reg Picker
Gaurav : owner Welding Works
Ganesh : owner Pathology Lab
Dr.Dinesh : owner Dental Clinic

Prayag : owner X-Ray Clinic
Manu : owner General Shop
Tittu : owner Shyam Provisonal Store
Jawahar : owner Tea Stall
Jawahar : owner Tea Stall
Gulshan : owner Photastate Shop
Manju : owner General Store

Summary of outcome:

People are well aware about the project through different sources. People are suffering from drainage problem. Main drainage channels are silted and also functioning as sewerage channel. Improvement of the only one channel will give relief to the people of some area but it will not solve the problems of the town. People are ready to extend all types of support to during execution of the project. They also want that sewerage, water supply and solid waste management projects should be taken up as early as possible. People are highly concerned on the issue of the rehabilitation of the Sujan Ganga.