

PROJECT INFORMATION

CURRENT STATUS OF MOTIJHEEL

The Motihari town has no sewerage system. The sewage from households and other commercial establishments existing within the vicinity of lake are intermixed and flow through storm water drains into various nallahs and accumulate in the Motijheel Lake. This has led to silting and moss formation in the lake.

Figure 3-1(a): Motijheel Lake



Figure 3-1 (b): Motijheel Lake



Figure 3-1 (c): Motijheel Lake

The existing environmental conditions of the Motijheel Lake are listed as below:

- Water holding capacity of the lake is reduced due to siltation.
- Open defecation at lake premises causing pollution
- Inlet channels are carrying domestic wastewater thereby degrading the lake eco system.
- Solid waste is being dumped in the inlet channels and in the banks of the lake causing inlet blockage and environmental problems

- Burning of solid waste at the banks causing air pollution.
- Total area of the lake is reduced due to encroachments on the Northern side, Western side and eastern side of the bund.
- Continuous disposal of construction debris in the lake resulting in the reduction of water holding capacity of the lake

From the above it is observed that, there is immense possibility of health hazards due to mosquitoes or insect infection in addition to omission of gases leading to bad odour.

Figure 3.3 (a): Environmental Status of Motijheel Lake



1. DESCRIPTION OF PROJECT AREA

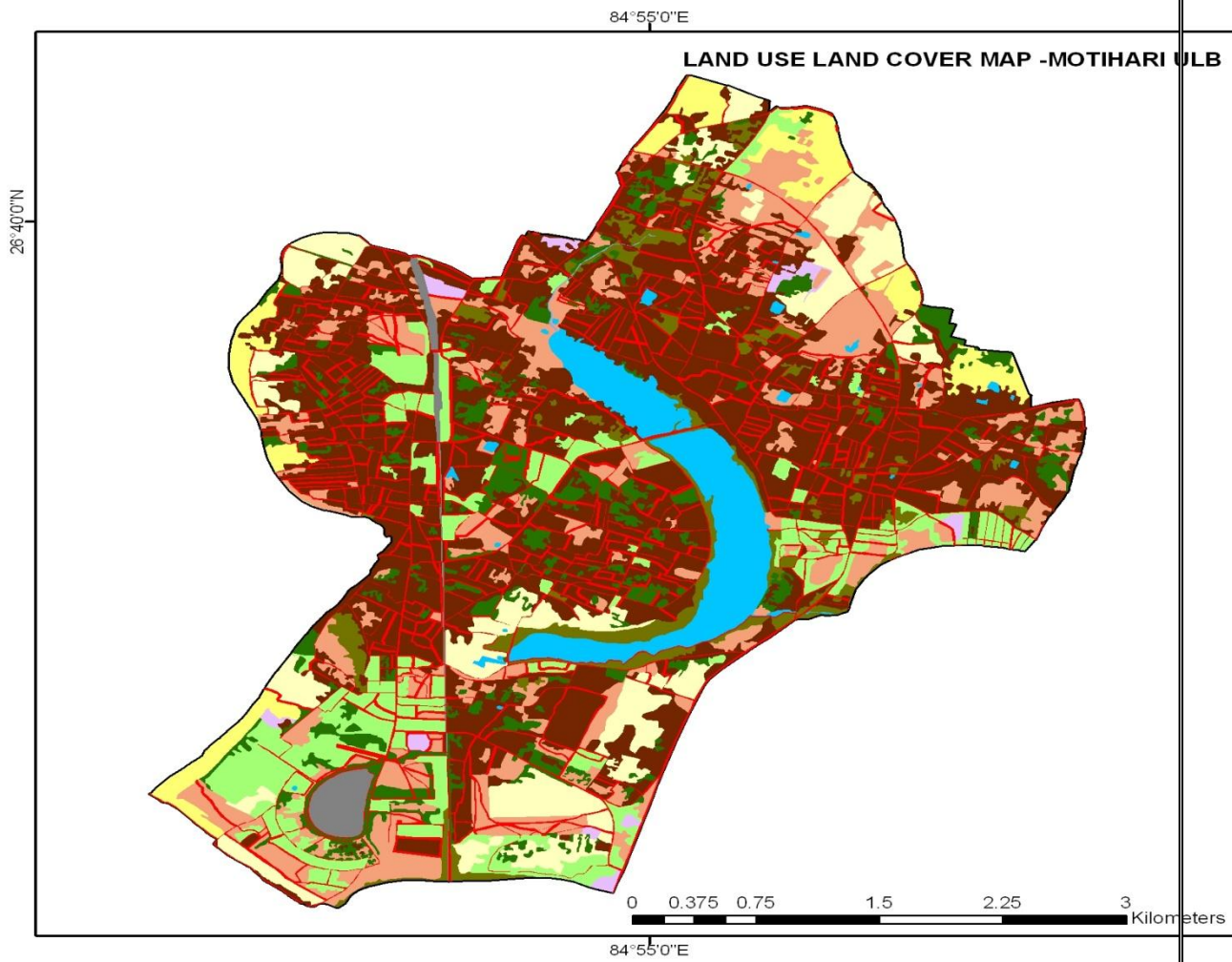
1.1 Land Use Pattern

The site is surrounded predominantly by residential zone including encroachments on the Northern side, Eastern Side and Western Side, residential colonies and institutions on the Western side and the north eastern side has public/semipublic and institutional spaces. Details of the Land Use pattern are given below:

MOTIJHEEL:

- The area is completely developed by Colonies, Schools, Industries, Agriculture lands & fish ponds etc.
- There is a State Highway No 48 through Balachowk to Meena Bazar.
- There are 10 colonies located on the banks of Motijheel namely Belebawa Colony, Miscot Colony, Baluwa Chowk, Sri Krishna Nagar, Madhubhata Chavani Chowk, Block Colony, Bhanmanapuri Colony, Champaran etc
- There are 15 major inlets carrying sewage to the lake from surrounding Colonies, and sugar factory etc.
- Beside the Block Colony there is one medical College named Bahmani Medical Academy.
- Stadium is also situated near Block colony.
- Boating Club is situated Near Bhawanpuri Colony

Figure 3.4: Land Use& Land Cover Map of Motihari



1.2 Road & Rail Connectivity

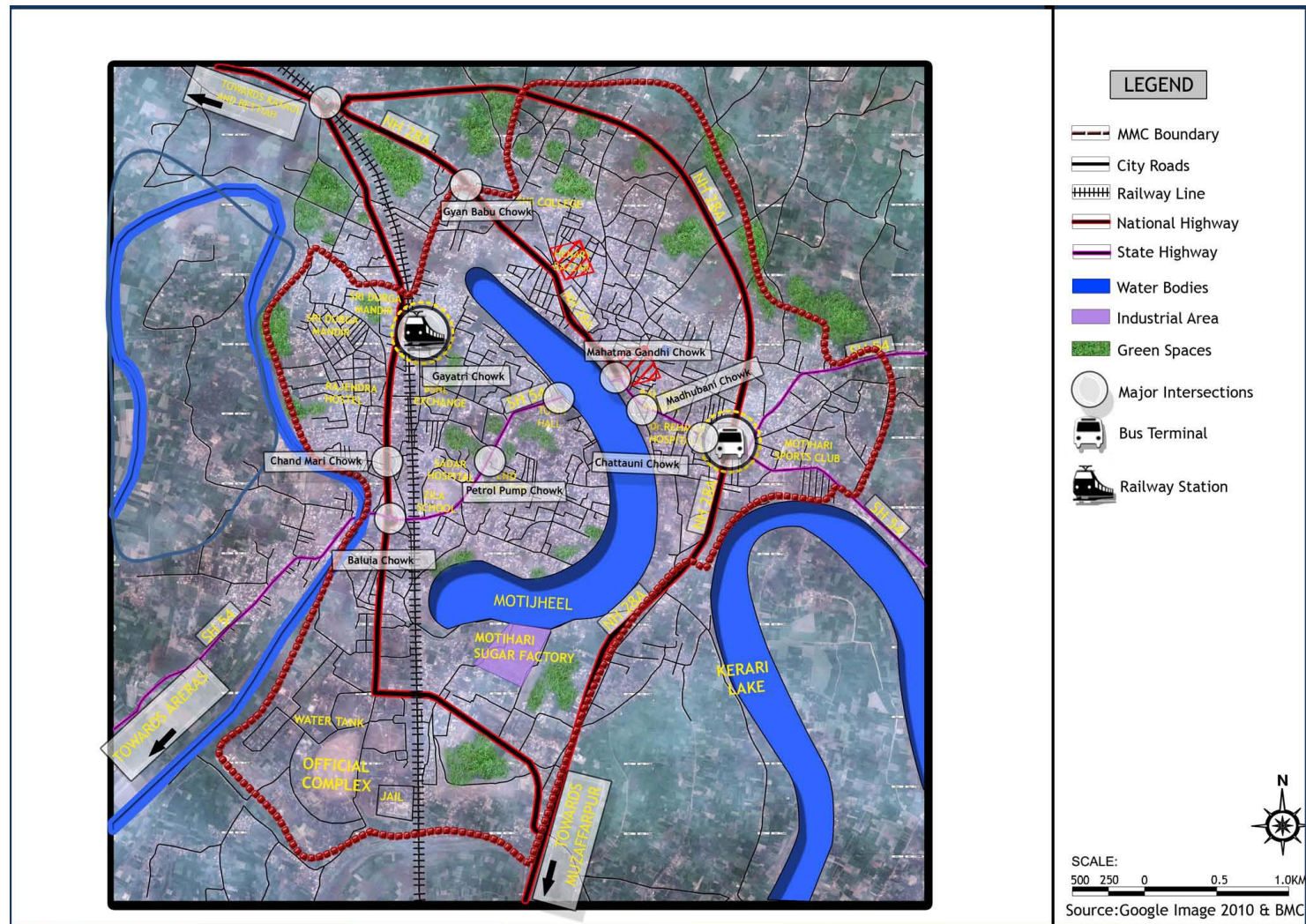
Lake is very well connected on all the four sides by Bitumen road. The following are the road and rail connectivity to the Motijheel.

- 1) Meenabazar to Motihari Railway Station Road (Near Bridge)
- 2) Motihari to Muzaffarpur Road NH-28 (Near Durga Circle)
- 3) Madhuvan Ghat to Motihari Bus Stand (Near Kerarijheel)
- 4) Motihari to Jnapool Road

Road and Rail connectivity map is given below:



Figure 3.5: Road & Rail Connectivity Map of the Project Site



1.3 Storm water Drainage System in the project Area

The town lacks an efficient drainage system and this is a key case of flooding even in case of short spells of rain. The total length of drains in the town area is approximately 97.2Km. All drains converge in the Motijheel that is located in the centre of the town. The main drains leading to this jheel are as follows: Rowing club drain, Cold storage drain, Maduban Chowk Drain, Main road drain at Bhavanipu, Roxy Cinema Drain, Gyan Babu chowk Nala, Jaun pul Nala, Nala from old Bus Stand, Nala Near Sugar Factory, and Nala from L.N.D College. There are no drains leading to Kerarijheel, as surplus water from Motijheel will go to Kerarijheel Lake.

1.3.1 Location of drains in the project area:

Detailed Map showing drains to Motijheel is attached in drawing section.

1.4 Sewerage System in the project area

The town has no sewerage system. Some households have their own septic tanks to handle domestic sewage. The sewage from remaining households and other commercial establishments are intermixed and flow through storm water drains into various nallahs and accumulate in the low lying areas and the Motijheel. Approximately 3.8 MLD sewage flows into these various nallahs daily or has been accumulated in the low-lying areas and Motijheel, which is creating unhygienic living conditions for the local residents. About 19.6% of the households practice open defecation. The sewage of the city is disposed into septic tanks, soak pits and finally into the Motijheel and Dhanuti river. The town has 7 public toilets and 4 community toilets but all are poorly maintained. The surplus water from Motijheel goes to Kerarijheel. There are no inlets to carry wastewater to Kerarijheel Lake.

STORM WATER& WASTE WATER MANAGEMENT PLAN

2.1 CATCHMENT AREA OF THE LAKE & DRAINAGE PATTERN IN THE PROJECT AREA

The Catchments area of the Motijheel lake is estimated as 928 Hectares (9.28 Sq.Km). Kerarijheel is also having an independent catchment area of 789 Hectares (7.89Sq.Km). As there are no records available regarding Catchment area of the lakes, it is estimated based on the topography of the surrounding areas and as per storm water drains profile. The Catchment area of the Lake and drainage pattern in the project area is given in Figure 4-1.and the details are given in the Table 4-1.

Figure 4-1: Drainage Pattern and Catchment Area of the Lakes

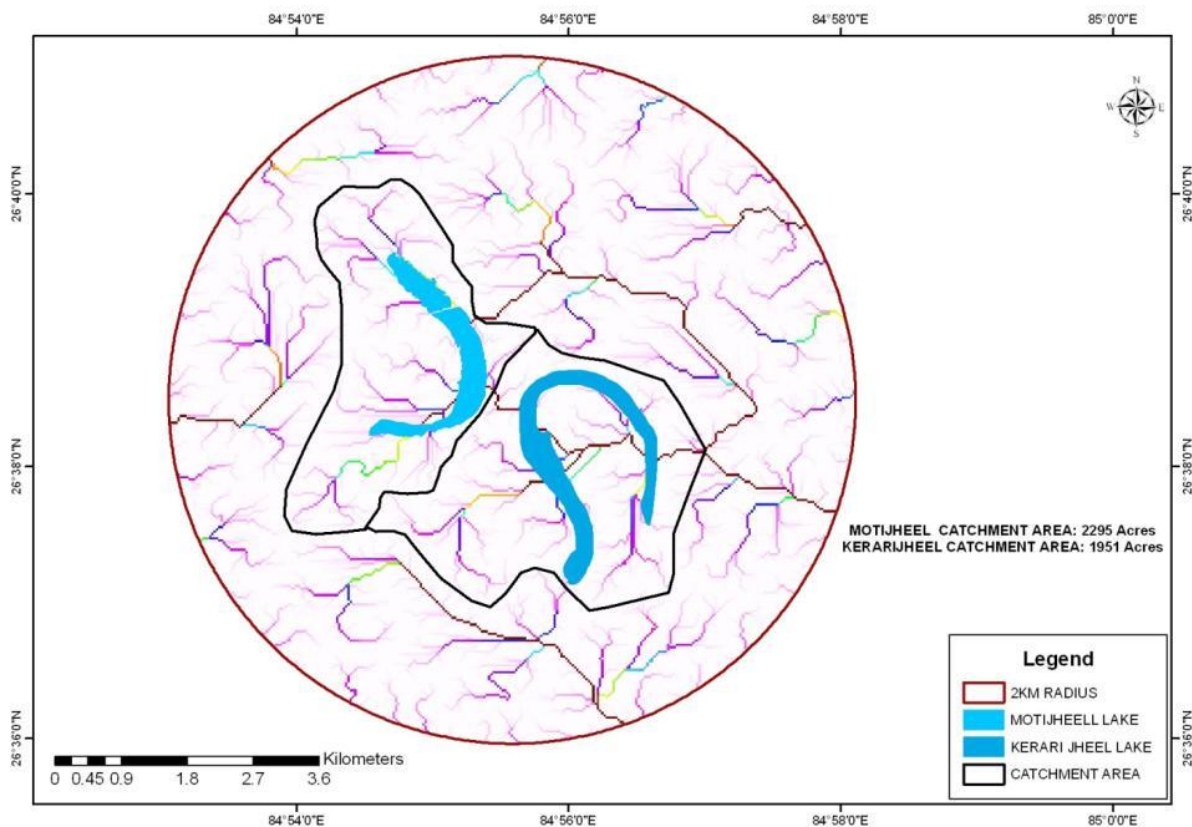


Table 4-1: Details of Catchment Area of Motijheel

Motijheel		
S. No	Inlet Channel	Catchment area (km ²)
1	Drains at East	
	Inlet 1	0.97
	Inlet 2	0.39
	Inlet 3	0.64
	Inlet 4	0.62
	Inlet 5	0.68
	Inlet 13	0.39
	Inlet 13 a	0.21
	Inlet 14	0.26
	Inlet 15	0.91
2	Drains at West	
	Inlet 6	0.28
	Inlet 7	0.78
	Inlet 8	1.00
	Inlet 9	0.77
	Inlet 9a	0.21
	Inlet 10	0.65
3	Drains at North	
	Inlet 11	0.28
	Inlet 12	0.27
	Inlet 13	0.39
	Inlet 13a	0.21

2.2 INLETS AND OUTLETS OF MOTIJHEEL

There are 15 major inlets & 2 minor inlets and one outlet drain to the lake. The cross sectional dimensions and length of drains are given in Table 4-2. Apart from the inlets and outlet, there are some intermediate and discontinued channels along the roads.

Table 4-2: Existing Details of Inlet and Outlet Drains

S. No	Inlet/Out let Details	Dimensions L x W (m)	Length (m)
1	INLET -1	1 x 0.50	208
2	INLET -2	1 x 0.50	100
3	INLET -3	1 x 0.50	321
4	INLET -4	1 x 0.50	267
5	INLET -5	1 x 0.50	344
6	INLET -6	1 x 0.50	358
7	INLET -7	1 x 0.50	107
8	INLET -8	1 x 0.50	155
9	INLET -9	1 x 0.50	334
10	INLET -10	1 x 0.50	399
11	INLET -11	1 x 0.50	112
12	INLET -12	1 x 0.50	277
13	INLET -13	1 x 0.50	160
14	INLET -14	1 x 0.50	64
15	INLET -15	1 x 0.50	70

2.3 DETAILS OF OUT LET DRAINS FOR MOTIJHEEL LAKE

There is one outlet for the lake at Southern side of the Lake. The out let is without any weir/gate arrangements. The entry point of outlet is not blocked by silt deposition. Surplus water from Motijheel will go to Kerarijheel.

Figure 4-2: Outlet drain of Motijheel Lake



2.4 EXISTING DRAINAGE SYSTEM IN LAKE CATCHMENT AREA

Areas in Lake Catchment have no proper drainage system and no proper alignment of drains. The roads are not provided with side drains. In some areas road side drains exist but discontinued at some locations due to encroachments, expansion of roads and other development.

2.5 DISCHARGE MEASUREMENTS IN INLET DRAINS

As the lake is mainly rain fed, the inlets and outlets are carrying water out in monsoon season during rainy days. However sewage is continuously coming from the nearby colonies. During monsoon sewage is being intermixed with storm water and entering into the lake. There are total of 15 Inlets carrying water to the lake. The flow measurements have been done for these drains. And the estimated discharge in the drains is given in Table 4-3.

Table 4-3: Inlet Flow Measurements

Inlet. No	Flow (MLD)
1	0.01
2	0.01
3	0.01
4	0.03
5	0.31
6	0.05
7	0.01
8	0.01
9	0.01
10	0.02
11	2.12
12	1.33
13	0.06
14	0.02
15	0.01
Total	4.0 MLD

2.6EXISTING SEWERAGE SYSTEM IN THE CATCHMENT AREA

The town has no sewerage system. Some households have their own septic tanks to handle domestic sewage. The sewage from remaining households and other commercial establishments are intermixed and flow through storm water drains and accumulate in the Motijheel. Approximately 3.8 MLD of sewage is entering into Motijheel. The estimated sewage generation for Motijheel Lake area ward wise is given below in Table 4-4.

Table 4-4 : Estimation of Sewage Generation

Ward Number (1)	Total Population as per 2011 Census (2)	Total water requirement (3) (2) * 135 LPCD	Sewage Generation (80% of column3)
7	3213	433755	347004
8	2348	316980	253584
9	1407	12663	10130
21	2909	392715	314172
22	3279	442665	354132
23	3174	428490	342792
24	2038	275130	220104
30	3983	537705	430164
31	5101	688635	550908
32	4308	581580	465264
37	4238	572130	457704
38	4437	598995	479196
	Total Sewage		4225154 Liters
			4225 KLD
			4.22 MLD

2.6.1 Estimation of the pollution load discharged into the water body

Based on the data collected from CDP-Motihari the flow is estimated as 3.8 MLD. But as per the field measurement the flow was found as 4.0 MLD.