

**Annexure-1**

**Online registration number print out.**


Submitted online Registration Proposal No. **FP/GJ/IRRIG/27326/2017**



Deputy Executive Engineer  
Gulf of Khambhat Development Project (W.R)  
Project Implementation Unit-2  
Vadodara



Executive Engineer  
Gulf of Khambhat Development Project (W.R)  
Project Implementation Unit-2  
Vadodara

 <b>KALPASAR</b>	Office of the Superintending Engineer Gulf of Khambhat Development Project(W.R.), Project Implementation Unit-2, GERI Compound, Race Course, Vadodara.390 007 Telephone No.(O)0265-2323872,(P)2323871
--	---

No.PIU-2/PB-2/Bhadbhut/LAQ/372 of 2017

Dt. 24/07/2017.

To  
The Assistant Conservator of Forests,  
Bharuch

Sub: Acquisition of Forest Land for the proposed barrage project across river Narmada near Bhadbhut village in Dist-Bharuch.

Ref : (1) The Collector, Bhavnagar office's order No. Land/4/Transfer/1503/2013, Dt.23/06/2014.

(2) The Collector, Kutch-Bhuj office's letter No. Land/02/Vashi/3957/2017, Dt.20/07/2017.

Kalpasar Department (Narmada, Water Resources, Water supply & Kalpasar), Government of Gujarat has decided to construct a Barrage across river Narmada near Bhadbhut village (Dist. Ta. Bharuch). The barrage site is about 5.15 km downstream of village Bhadbhut and is about 25.00 km upstream of the river mouth. The main objectives of the proposed project are as:

- Protection of water quality of Narmada river from tidal water influence and checking the problems of salinity ingress and deterioration of ground water quality in the upper Narmada reaches, upstream of Bhadbhut barrage.
- Storage of fresh water for irrigation, domestic and industrial water supply.
- Irrigation of agricultural land through lift system.
- An alternative shorter route from Surat / Hajira to Dahej region via Hansot-Bhadbhut.

A note on features and map of the proposed barrage project are enclosed herewith for reference.


The proposed project components are barrage-cum-bridge construction in the river gorge portion, the approach roads and Flood Protection Embankments on left and right banks connecting Hansot and PCPIR area respectively. The Bhadbhut Barrage project covers total 187.00 ha of forest land and the proposal of that forest land is submitted herewith. As per provisions of Forest Notification, the forest land to be acquired for the proposed project has to be compensated by this department with an allotment of waste land near by any forest area or any reservation for the purpose.

For the required area to be compensated of total 187.00 ha. waste land, out of this 31.40 ha. waste land for compensation of forest land is allotted to the Deputy Conservator of Forest, Forest Department, Bhavnagar as per the order of the Collector, Bhavnagar vide letter No. Land/4/Transfer/1503/2013, Dt. 23/06/2014 of Survey No. 87/A/Paiki-1, Village : Tol Saladi Chotili, Ta:-Jesar, Dist. Bhavnagar which was jointly measured and demarcated with DILR office, Bhavnagar, the Mamlatdar, Jesar, Forest Department, Bhavnagar and this office. The copy of measurement sheet is enclosed herewith.

The required remaining area i.e. 157.00 ha. Compensatory land (Waste land) against 187.00 ha. compensation of forest land is allotted to the Assistant Conservator of Forest, Forest Department, Bhuj as per the Survey No. 86, 87, 250, 251, 252, 291, 292, 293, 328, 329, 331, 332, 333, 334, 336, 338, 339, 340, 341, 343, 344, 349, 350, 359, Village : Nani Dhruvi, Ta:-Abdasa, Dist. Bhuj, Total Area-157.3424 Ha., which was jointly measured and demarcated by DILR office, Kutch-Bhuj the Mamlatdar, Abdasa, Forest Department, Bhuj and representative of PIU-2, office Vadodara on Dt.15/07/2017. The measurement sheet is jointly prepared by DILR office, Kutch-Bhuj and representative of PIU-2, office Vadodara and submitted to the Collector office, Kutch-Bhuj vide DILR office letter No. DSO/39/M.R.No.3/63/16-17, Dt.17/07/2017.

It is kindly requested to recommend to the competent authority the proposal for acquisition of forest land of 187.00 ha for the proposed project at the earliest.

D.A.: (1) Check List  
(2) Annexures (1 to 35)

  
Executive Engineer  
Gulf of Khambhat Development Project (W.R.)  
Project Implementation Unit-2  
Vadodara

Copy respectfully submitted to:

- (1) The District Collector, Bharuch for information please.
- (2) The District Collector, Kutch-Bhuj for information please
- (3) The Superintending Engineer, Project Implementation Unit-2, Vadodara.
- (4) The officer on Special Duty(K), Kalpasar Department (Narmada, Water Resources, Water Supply and Kalpasar Department), Government of Gujarat, Block No.8/7, New Sachivalaya, Gandhinagar.
- (5) The Nodal officer, Forest (Conservation), Government of Gujarat, Gandhinagar for information and necessary action please.

Copy Submitted to:

- (1) The Deputy Executive Engineer/AE/AEE, PIU-2, Vadodara for necessary action please.

## Annexure-3

## Form-A

Form for seeking prior approval under section 2 of the proposals by the State Governments and other authorities

## PART – I

1	Project Detail	
i	Short narrative of the proposal & project / scheme for which the forest land is required	Construction of Barrage, Approach Road and Flood Protection works across river Narmada, Near Village: Bhadbhut, District- Bharuch.  A six lane road embankment for the Approach roads of Bhadbhut Barrage for connecting barrage to Hansot- on the left bank and 25 km for Dahej on Bharuch- Dahej road on right bank
ii	Map showing the required forest land, boundary of adjoining forest on a 1:50,000 scale map.	Attached as Annexure-28
iii	Cost of the project	Rs. 4336.944 crore (Annexure -7B)
iv	Justification for locating the project in forest area.	Various alternative of barrage were analysis and finally the best alignment (techno-economical) found is selected after Expert Advisory Group recommendation and government approval.
v	Cost-benefit analysis	2.41 (Annexure 5)
vi	Employment likely to be generated.	6.93 crore mandays (Annexure - 3A)
2	Purpose wise break-up of the Forest land requirement	
	Forest area/Alia Bet Ta: Vagara Survey No. 1	A road alignment passes through the barran / water logged forest area. The area required for six lane road construction is 60 m width in 2.51 km length. i.e. 15.10 ha and Area coming under FPE and Submergence is 36.80 ha. Thus, Total 51.90 ha.
	Survey No. 379 Utaraj Village, Ta: Hansot	The area required for FPE construction and Submergence is 135.06 ha.
	Total Forest area requirement	186.96 ha. Say 187.00 ha. (Out of total 4788.9490 ha. Forest Land in this region.)
3	Details of displacement of people due to the project if any	Nil



i	Number of Families	N.A.
ii	Number of scheduled castes/scheduled tribe families	N.A.
iii	Rehabilitation plan. (to be enclosed)	N.A.
4	Whether clearance under Environment (Protection) Act, 1986 and its amendment required? (Yes/No.)	Yes, NEERI, Nagpur, Central Government premium institute has carried out EIA/SIA detail study report on the basis of Central Government Guidelines and the proposal for Environmental Clearance is under process.
5	Undertaking to bear the cost of raising and maintenance of compensatory afforestation and / or penal compensatory afforestation as well as cost for protection and regeneration of safety Zone, etc. as per the scheme prepared by the State Government (undertaking to be enclosed)	Yes, Annexure-11
6	Details of Certificate /documents enclosed as required under the instructions.	As per checklist.
7	Undertaking for payment of Net present value (NPV) of the land diverted.	Please refer Annexure-12

## Part II to V

To be filled by the Forest Department



Deputy Executive Engineer  
Gulf of Khambhat Development Project (W.R)  
Project Implementation Unit-2  
Vadodara



Executive Engineer  
Gulf of Khambhat Development Project (W.R)  
Project Implementation Unit-2  
Vadodara

## Annexure 3A

### Mandays Calculation

Name of Work : Construction of Bhadbhut Barrage across river Narmada near

Village: Bhadbhut Taluka: Bharuch Dist.: Bharuch.

Sr. No.	Particular	Cost
1	Cost of the Project	Rs. 4336.944 Cr
2	Labour component (40% of the Cost)	Rs. 1734.777 Cr
3	Average daily wage of labour day	Rs.250 Per Day
4	No. of Days (Mandays)	6,93,90,108



Deputy Executive Engineer  
Gulf of Khambhat Development Project (W.R)  
Project Implementation Unit-2  
Vadodara



Executive Engineer  
Gulf of Khambhat Development Project (W.R)  
Project Implementation Unit-2  
Vadodara

**Note on the Project: Construction of Bhadbhut Barrage on River Narmada****1.0 Project Objectives**

It is planned to construct a barrage across the River Narmada at a site downstream of village Bhadbhut in Bharuch district of Gujarat. It is a "stand alone project" with the under mentioned objectives.

- (a) The Gulf of Khambhat has the highest tide (11 m) in India. During the high tide, the sea water enters river Narmada up to village Shuklatirth. While the quantum of the sea water ingress in the Narmada river does not change, Narmada river fresh water flow from the upstream catchments has greatly reduced because of various upstream hydropower and /or irrigation projects, more particularly of full/partial completion of major irrigation projects such as India Sagar, Omkareshwar, Maheshwar and Sardar Sarovar Project (SSP) in recent times. The SSP is the terminal major multipurpose project on the Narmada River. The tail reach of Narmada river up to about 64 km upstream from the river mouth in the Gulf is affected by tidal water during high tide. As a result, water has deteriorated to the extent that it has become unusable for domestic, industrial and irrigation purposes. Also, the ground water of the adjoining areas along the tidal affected stretch has become salinized and cannot be used for agricultural and any other productive purpose. In view of the social repercussions arising from these ill consequences, there have been numerous public representations from various social streams to segregate the Narmada river water from the tidal water so as to check salinity ingress and ground water deterioration. Taking a view of such imperative, the Government of Gujarat has decided to carry out the feasibility studies to construct a barrage across river Narmada with the underlying objectives of checking the problem of salinity ingress and deterioration of ground water quality in the affected areas and creating storage of fresh river water for irrigation, domestic and industrial water supply and providing convenient road connectivity for the left bank and the right bank.
- (b) The rain water inflow from free catchments area of 8649.08 sq km between SSP dam and Bhadbhut barrage is estimated as 3307 MCM at 50% dependability. The fresh water reservoir of 450 Mm<sup>3</sup> is likely to extend up to about 85 km on upstream side of barrage. The fresh water supplies to domestic and industrial water users will get revived from the original sources of Narmada River. Also the fresh water availability will be within the vicinity of the industries developed and planned to be developed.
- (c) Dahej port on the right bank of Narmada River at the Gulf of Khambhat is one

of the fastest growing ports in Gujarat. Further, huge development will take place due to PCPIR at Dahej. The traffic between Surat and Ahmedabad and particularly between Surat and Bharuch is very heavy. Even with the existing six-lane National Highway road, traffic jam scenario is common every day. There is a pressing requirement for an alternative shorter route from Surat (Hajira) to Dahej region subject to connectivity on Narmada river. Bhadbhut barrage will create connectivity of Surat (Hajira) - Olpad-Hansot - Bhadbhut - Dahej (coastal road).

- (d) In pursuit of the objectives defined in the preceding section, project planning is directed towards establishing technical feasibility along with environmental, socio-economic and financial viability.

## 2.0 Progress:

- 2.1 The following studies, investigations and surveys along with preliminary design, costing etc. have been carried out.

1. Topographic survey
2. Geotechnical investigation for foundation of the structure.
3. Project hydrology for design flood and water availability
4. Traffic survey
5. Fisheries development study with its social impact on fishermen in the area
6. Construction material survey
7. Domestic and industrial water demand survey
8. Land requirement survey
9. Preliminary design of barrage, flood embankment and approach embankment including Hydrology i.e. design flood calculations, water availability calculations etc.
10. Cost estimate of the project
11. Assessment of revenue generation out of the project benefits
12. Financial analysis of the project
13. Draft Tender papers for inviting bids.

- 2.2 In addition, following related studies have also been carried out/taken up by other Govt. Institutes /agencies.

1. EIA and SIA studies by NEERI, Nagpur
2. CRZ related study by CWPRS, Pune
3. Physical modeling of the project by GERI, Vadodara.
4. Legal Opinion by GNLU, Gandhinagar

The engineering survey listed at above, are at the stage of completion. As per the preliminary report the cost of Bhadbhut barrage is about Rs. 4336.944 crore.

The EIA-SIA studies for the barrage has been entrusted to the National Environment Engineering Research Institute (NEERI). The proposal for Environment



Clearance for the proposed Bhadbhut Barrage Project is submitted to State level Environment Appraisal Committee (SEAC) of Government of Gujarat along with the Environmental Impact and Risk Assessment report prepared by National Environmental Engineering Research Institute (NEERI). The SEAC has discussed ToR and report submitted. On notification from GPCB, this office has completed Public Hearing and SEAC has made discussion on Dated 31.07.2014 issues raised during Public Hearing and the compliance is made by NEERI. So, now this office has waiting for Environment Clearance.

In context of provisions in Coastal Regulatory Zone Act-2011, a proposal for CRZ clearance to the proposed project prepared by the Department. The proposal for CRZ Clearance for the proposed Bhadbhut Barrage Project was discussed by Gujarat Coastal Zone Management Authority (GCZMA) on 11.06.2013 and they have recommended to Grant the CRZ Clearance. An online CRZ clearance application has been filed on dated 14-07-2017.

To know the hydrodynamic behavior of the river, and to study the functional operation of the structure, the work of Physical Model Study has been entrusted to Gujarat Engineering Research Institute (GERI), Vadodara. The model is constructed with a scale of 1:250 (horizontal) and 1:50 (vertical) covering about 700 sq km area of river and its banks starting from Shuklatirth up to Luvara near river mouth. The physical model was run at different flood velocities without barrage condition and the outcomes shows the shifting of the Narmada river towards left side. The physical model was also run with Barrage and the impact of flood on u/s and d/s of barrage have been monitored. Thereafter, the model has been run with barrage as well as left bank flood protection embankment between Hansot and golden bridge (24 km long) and the outcome have been monitored at various flood frequencies. It is proposed to construct Re-in forced Earth wall for both Left & Right Bank of Narmada River having total length of 55 Km. The physical model is useful for locating and designing the left bank flood protection embankment as well as constructing right bank protection in d/s of barrage. The physical model is the most scientific and standard approach for deciding various issues like operation of gates, providing fish passage and ship-lock etc.

The construction of barrage is planned to commence by 2017-18 and will be completed by 2020-21.

### 3.0 SALIENT FEATURES :

#### BARRAGE LOCATION

Sr. No.	Description	Details
1	State	Gujarat
2	District	Bharuch
3	Taluka	Bharuch
4	Village	Bhadbhut
5	River	Narmada
6	Distance from Bharuch	22 km D/s
7	Distance from sea mouth	25 km U/s
8	Latitude	21° 39' 47.36"
9	Longitude	72° 47' 54.89"
10	River gorge width at Bhadbhut Barrage location	1708 mt
11	Bed material property	Silty Sand
12	Type of Barrage	Weir on permeable foundation
13	Water Availability	1708.00 MCM
14	Storage Capacity	599.059 MCM
15	Design Flood (SPF)	35.77 Lac Cusecs (101300 Cumecs)
16	Discharge through Barrage	28.86 Lac Cusecs (81717 Cumecs)

#### BHADBHUT BARRAGE

17	Type	Gated Concrete Structure
18	Length	1670 mt
19	FRL	7.50 mt
20	HFL	10.07 mt
21	Crest Level	(-) 2.0 mt
22	Crest Level of Under Sluices	(-) 3.0 mt
23	Top of Road at Barrage	14.50 mt
24	Top of Road at Extreme end	11.0 mt
25	Type	Vertical Lift Gate
26	Size	15.50 mt x 9.50 mt
27	No. of Gates	90 Nos.
28	Height of Gate	7.50 mt
29	Pier Thickness	2.50 mt
30	No. of Piers	89 Nos.
31	Span Width	15.50 mt
32	Navigation Lock	15.50 mt
33	Fish Ladder	5.00 mt
34	H.R. for Flood Diversion	1 No.
35	Proposed Road	6 Lane Road
36	Top road bridge width	30.00 mt

### APPROACH EMBANKMENT

37	Type	Zoned Embankment
38	Top width/ Base width	30.00 mt. / 60.00 mt.
39	Length (1) Left Side (2) Right Side	7.29 Km. 6.48 Km. Total 13.77 Km.( Excluding Barrage)
40	Side slope	2.5:1
41	Average Height	6.50 mt
42	Protection of side slopes	Rubble pitching on both side slopes

### FLOOD PROTECTION EMBANKMENT

43	Type	Re-in forced Earth Wall
44	Top width	30.00 mt.
45	Length (Barrage to NH-8 Bridge)	55.00 Km
46	Side slope	2.5:1
47	Average Height	6.50 mt
48	Protection of side slopes	Rubble pitching on both side slopes

### COST OF BARRAGE (APPROX.)

49	Cost of Barrage	4336.944 Crore
----	-----------------	----------------

## 4.0 Benefits :

### 4.1 Social Benefits:

- Checking of salinity ingress due to tidal water flow
- Storage of fresh river water to be available for irrigation, domestic and industrial purposes
- Improvement in ground water quality
- Improvement in ecological conditions
- Boost in agricultural production due to development of lift irrigation in surrounding areas

### 4.2 Commercial Benefits of the project:

The project is planned to store fresh water for domestic, industrial, irrigation, diversion to Kalpasar reservoir and to have shorter transport route. Thus Traffic revenue and industrial water sale are the two major areas for revenue generation which may attract the project. Based on the data in the draft reports, the eligibility of the project has been examined by carrying out financial analysis of the project.



#### 4.2.1 Assessment of Traffic Toll and Toll Revenue:

The traffic assessment survey was conducted during May-2011. The traffic survey envisaged classified traffic volume counts, classified turning movement counts, origin-destination (O-D) survey, and willingness to pay survey.

To forecast the traffic on barrage, three growth scenarios, namely, optimistic, most likely and pessimistic scenario are considered in the traffic study. To be on safer side, estimated traffic for next 30 years for pessimistic scenario is considered as under.

Estimated traffic for next 30 Years for pessimistic growth scenario

Year/ Vehicles	Motor Cars/ Jeep, Taxi	Bus	LCV	2-Axle Trucks	3-Axle Trucks	MAV	Total Vehicles	Total PCUs
2011	1887	212	299	1689	1412	987	6487	16719
2015	2460	267	386	2164	1810	1267	8354	21464
2020	3381	353	643	3035	2556	1825	11792	30388
2025	4576	459	830	4004	3370	2400	15639	40120
2030	6101	588	1047	5199	4372	3102	20409	52108
2035	8023	745	1270	6631	5567	3927	26162	66427
2040	10406	932	1598	8435	7079	4988	33437	84586
2041	10956	974	1582	8756	7336	5142	34746	87666

It is revealed that by considering the Capacity instead of Design Service Volume, As per the tables of the report, according to Optimistic and Most Likely Traffic Growth Scenarios, a minimum of 6 lane divided carriageway is recommended.

#### 4.2.2 Assessment of Water Demand and Revenue from Sale of Water to Industries:

##### Water Demand Survey and Sources of Revenue

- (i) Due to construction of the barrage fresh water reservoir will be formed which shall have capacity to store about 450 MCM fresh water. The industrial development on the right bank of the barrage along with upcoming PCPIR will be attracted to avail fresh water from the source in the vicinity of the industries. The barrage will prove to be beneficial for the industrial development.
- (ii) Further due to salinity ingress in the river length up to Shukaltirth, domestic water supply to nearby urban and rural areas are affected. The barrage will provide fresh water supply for domestic uses. However revenue from domestic supply is not considered as the income generation source of the project.

##### Water demand:

The quantum of present domestic water demand in 2011 and projected demand in 2040 works out to 53.23 MCM and 139.46 MCM respectively.



Gujarat Industrial Development Corporation (GIDC) has planned for Petroleum, Chemical, Petrochemical, investment Region (PCPIR) in Dahej Industrial area.

A meeting was held under the Chairmanship of Chief Secretary on 30/09/2011 for working out industrial water demand in Dahej PCPIR area in which PS (I & M Dept), Joint Managing Director (Fin) SSNNL, VC & MD (GIDC), Secretary (WR), CE (GIDC) & others remained present. The present demand of GIDC for PCPIR is 25 MGD which is estimated to be increased to 110 MGD by 2015, 250 MGD by 2020 and 300 MGD after 2020.

#### Present water source

- Domestic: The main source of water supply for domestic use for most of the villages is through bore wells/hand pumps etc. while very few of them are provided with surface water through GIDC schemes. Ground water being saline, most of the villages are provided with RO plant.
- Industrial: The main source of water for industrial consumption in the study area is Narmada river. As the river water is saline up to 30 to 40 km tail river length, water is fetched from about 50 km upstream near village Nand.

GIDC had its own water supply scheme for Dahej and Bharuch GIDC estate Ankleshwar and Panoli GIDC gets their supply from Ukai right bank canal system.

#### Water availability:

The water availability for the Bhadbhut project has been worked out by Central Designs Organization with different dependability. The study report is vetted by National Institute of Hydrology, Roorkee. During the 7<sup>th</sup> SAC & 5<sup>th</sup> DT meeting held at Ahmedabad from 27<sup>th</sup> Feb 2017 to 3<sup>rd</sup> March 2017, committee of experts have finalized 1708 MCM water availability for Bahdbhut Barrage Project.

The projected maximum water demand for domestic and industrial usages are assessed as 139.46 mld (domestic)+710 mld (industrial) = 849.46 mld, say 850 mld i.e. 310.25 MCM (annual). Further the evaporation loss for the projects in South Gujarat is to be considered as 27% annually. Hence the evaporation loss will be about 121.5 MCM. Thus total water requirement will be 445 MCM. Against the total water available is 3307 Mm<sup>3</sup> at 50% dependability and 2065 Mm<sup>3</sup> at 75% dependability.



Deputy Executive Engineer

Gulf of Khambhat Development Project (W.R)

Project Implementation Unit-2

Vadodara



Executive Engineer

Gulf of Khambhat Development Project (W.R)

Project Implementation Unit-2

Vadodara

Name of Work : Construction of Bhadbhut Barrage across river Narmada near village Bhadbhut, Taluka : Bharuch Dist : Bharuch.

### BENEFIT - COST RATIO

#### 1.0 Following data are used in calculation of B.C Ratio

Based on water demand study report and as discussed during 9th EAG Meeting, 200 MCM of the stored water will be utilize for supply of water to various industries/GIDC estates in Dahej - PCPIR region. The average revenue assessed is to the tune of Rs. 936 Crore per year based on 20 years concession period as under:

#### B.C. Ratio Calculation

<b>(A)</b>	<b>Annual Benefit</b>	
(1)	Average Revenue Assessed for utilization of water to various industries/GIDC estates in Dahej - PCPIR region	Average Rs. 936 Crore (year 2020 to year 2040)
(3)	Benefit of drinking water	Not quantitative analysis at this stage
(4)	Benefits of irrigation water	
(5)	Benefits of groundwater quality improvement	
(6)	Benefits of Narmada water (salinity ingress)	
(7)	Benefits of Fishery production	
	Total	Rs. 936 Crore
	Say	Rs. 940 Crore
<b>(B)</b>	<b>Expenditure</b>	
(1)	Construction cost of the project (Barrage only)	Rs. 2516 Crore
Annual expenditures		
(i)	Interest @ 12 % of estimated cost	Rs. 302 Crore
(ii)	M & R charges 1.5 % of estimated cost	Rs. 37.74 Crore
(iii)	Depreciation 2% of estimated cost	Rs. 50.32 Crore
	Total	Rs. 390.06 Crore
	Say	Rs. 390 Crore

Benefit cost ratio = 940/390

Benefit cost ratio = 2.41

- 2.0 We have also calculated the Internal Rate of Return and its work out between 15 % to 20% (Annexure - 5 A).
- 3.0 Six lane bridge over barrage is ignored for this calculations.



Deputy Executive Engineer

Gulf of Khambhat Development Project (W.R)

Project Implementation Unit-2

Vadodara



Executive Engineer

Gulf of Khambhat Development Project (W.R)

Project Implementation Unit-2

Vadodara

Calculations for financial analysis of water sale and toll tax revenue from Bhadbhut barrage project

Annexure – 5A

Year	Demand mld	Rate (Basic) Rs/kl	Incream- ental Rate	New rate Rs/kl	cash flow water sale RsCrores	cash flow toll tax RsCrores	Total cash flow RsCrores	Overhead charges Rs Crore	Net cash flow Rs in Crore	NPV 0.13 0.1828	Cumulative Rs. Crore	No of year
2012							-100		-100	-100	-250	0
2013							-1000		-1000	-884.96	-1134.96	1
2014							-1200		-1200	-939.78	-2074.73	2
2015					0.00	40.88	-100.00	0.00	-59.12	-40.97	-2115.70	3
2016	370	19.48	0.1	19.48	263.08	49.18	303.96	30.00	273.96	139.97	-1975.73	4
2017	370			21.43	289.39	55.43	338.57	30.00	308.57	133.29	-1842.45	5
2018	370			23.57	318.32	61.88	373.75	30.00	343.75	125.54	-1716.91	6
2019	370			25.93	350.16	69.46	412.04	30.00	382.04	117.96	-1598.95	7
2020	550			28.52	572.55	145.34	642.01	30.00	612.01	159.76	-1439.19	8
2021	550			31.37	629.81	164.66	775.15	30.00	745.15	164.45	-1274.74	9
2022	550			34.51	692.79	184.17	857.45	60.00	797.45	148.80	-1125.94	10
2023	550			37.96	762.07	206.36	946.24	60.00	886.24	139.81	-986.14	11
2024	550			41.76	838.27	231.56	1044.63	60.00	984.63	131.32	-854.81	12
2025	550		0.05	43.84	880.19	259.14	1111.75	60.00	1051.75	118.59	-736.22	13
2026	550			46.04	924.20	290.57	1183.33	60.00	1123.33	107.09	-629.13	14
2027	550			48.34	970.41	325.66	1260.98	90.00	1170.98	94.38	-534.75	15
2028	550			50.76	1018.93	364.40	1344.59	90.00	1254.59	85.49	-449.26	16
2029	550			53.29	1069.87	407.45	1434.27	90.00	1344.27	77.45	-371.81	17
2030	550			55.96	1123.37	456.09	1530.82	90.00	1440.82	70.18	-301.63	18



2031	550				58.76	1179.54	506.10	1635.63	90.00	1545.63	63.65	-237.98	19
2032	550				61.69	1238.51	563.81	1744.61	90.00	1654.61	57.61	-180.38	20
2033	550				64.78	1300.44	630.21	1864.24	90.00	1774.24	52.22	-128.15	21
2034	550				68.02	1365.46	701.88	1995.67	90.00	1905.67	47.42	-80.73	22
2035	550				71.42	1433.73	783.87	2135.61	90.00	2045.61	43.04	-37.69	23
2036	550				74.99	1505.42	875.04	2289.29	90.00	2199.29	39.12	1.43	24

(1) The estimated cost of the work is Rs. 2400 Crore. The bank interest is considered as 13% on investment

(2) The water rate of Rs. 19.48 for year 2016 with 10% annual increment over previous year rate is considered as per Water Resources

Department G.R dated 03/02/2007 up to rate of Rs. 40 per m3 and there after annual increment at 5% is considered.

(3) The water demand is considered on the basis of demand projected by GIDC and confirmed by I & M Department

Water demand for 2016 to 2019 is considered as 50% demand of 737 MLD in 2016 and 2020 onward 50% of the Bhadbhut based demand of 1100MLD.

(4) The traffic toll rates are considered as 25% saving on VOC for first five years and thereafter as per NHAI guidelines (about 50% on VOC)

(5) The concession period after completion of the project is considered as 20 years.

(6) Internal Rate of Return works out to 18.28 %.