KALISINDH MULTI PURPOSE PROJECT (Phase-II)

Section - 2

SALIENT FEATURES

1.	Name of the project	KALISINDH Multipurpose Irrigation Project-Phase II
2.	Type of Project (Irrigation or Multipurpose)	Multipurpose
3.	Location	
3.1	River Basin	
	(a) Name	Chambal
	(b) Located in	
	(i) State(s)	M.P. & Rajasthan
	(ii) Countries (if international river)	N.A.
3.2	River/Tributary	Kalisindh river (Chambal basin)
3.3	State(s) District(s) Taluka(s) or Tehsils in which following are located:	Rajasthan, Jhalawar,
	(a) Reservoir	Rajasthan, Jhalawar, Jhalrapatan.
	(b) Headwork	Rajasthan, Jhalawar, Jhalrapatan.
	(c) Command Area	Rajasthan, Jhalawar & Kota, Jhalrapatan, Khanpur, Sangod
	(d) Power house	N.A.
3.4	Name of village near the Head –works	Bhanwarasi.
3.5	Location of Head-works	
	(a) Longitude	76°13'14.2" E
	(b) Latitude	24°29'52.0"N
	(c) Lies in Earthquake Zone No.	II
3.6	Project area reference to:	
	(a) Degree Sheets	54D-1,D-2,D-3,D-5,D-6,D-7 at 1:50000 Scale
	(b) Index Plan	Vol. V Appendix.
3.7	Access to the project Name Distance from project site	
	(a) Airport	Jaipur (350 km)
	(b) Rail head	Jhalawar
	(c) Road head	Jhalrapatan. (9 km)
	(d) River port	N.A.
	(e) Sea port	N.A.
3.8	Rail/ Road transportation limit of	
	(a) Weight (T)	Broad Gauge Railway Rules
	(b) Dimensions (Lx B x H)	Broad Gauge Railway Rules
4.	International / Interstate aspects of the project	Interstate aspects involved.
	(a) Catchments area of the basin	7547 sq. km. (M.P+ Rajasthan.)
	(b) State-wise/country-wise details of catchments area	M.P. (6685 Sq. Km.) Raj. (862 Sq. Km.)
	(c) Submergence due to projects	

	(i) In the state	4052 ha.
	(ii) In other states	Nil
	(iii) In other countries	Nil
	(d) Water allocation for the state (if any)/country	100% water of 862 sq. km. of Raj.+10% of catchment area of 6685 sq. km. of M.P. (148.11)
	(e) Water allocation for other states/countries	Nil
	(f) Committed utilization	Nil
	Upstream Projects	
	Irrigation | Water supply | Thermal | Industrial | Hydel	
	(i) Projects completed	Chauli Medium Irrigation Project
	(ii) Projects under construction	Nil
	(iii) Future Projects	Nil
	(iv) Any other	Nil
	Downstream Projects	Nil
	Irrigation | Water supply | Thermal | Industrial | Hydel	
	(i) Projects completed	Nil
	(ii) Projects under construction	Nil
	(iii) Future Projects	Nil
	(iv) Any other	--
	(g) Proposed annual utilization by the project	
	(i) Irrigation	
	- Kharif	7.16 Mcum
	- Rabi	42.01 Mcum
	- Hot weather	Nil
	Total:	**49.24 Mcum**
	(ii) Water Supply	16.5 MCum
	(iii) Hydel (evaporation losses)	
	(iv) Thermal power	71.28 Mcum
	(v) Industrial & Horticulture College	1.0+ 0.255 Mcum
	Gross annual utilization {sum of (i) to (v)}	139 MCum
	(h) Minimum agreed/ proposed flow in the river for maintaining ecology	--
5.	Estimated life of the project (years)	50 Years
6.	Irrigation (ha.)	By Flow
	1. Gross command area (GCA)	12724 Ha.
	2. Culturable command area (CCA)	10181 Ha.
	3. Area under Irrigation (break up):	
	(i) Kharif	3054 Ha. (30%)
	(ii) Rabi	13826 Ha. (85%)
	(iii) Hot weather	--
	(iv) Two seasonal	--
	(v) Perennial	--
	(vi) Gross irrigated area (GIA)**	

	(vii) Intensity of irrigation ($\frac{GIA}{CCA} \times 100\%$)	115%
	(viii) District (s) Benefited (if the district benefited is predominantly tribal or drought prone, it may be so indicated against each district). ** Irrigated area under Kharif, two seasonal, perennial, Rabi and hot weather shall be indicated.	Jhalawar
	4. Cost per hectare of gross area irrigated at canal cost	68861/16624.51=4.14 Lacs/Ha
	5. Cost per 1000cum of gross/live storage at canal cost	68861 /(147.69*1000000)*1000 =0.466 Lacs/1000 cum
	6. Cost per 1000 cum of water delivered at the (Canal head/outlet) (38.08 MCM)	68861/(38.08*1000000)*1000 =1.81 Lacs/1000 cum
	7. Water utilization	139 MCM
7.	Flood control	Project is not primarily a flood control project
	(a) Area protected from floods (ha)	-
	(b) Population protected from floods (no.)	-
	(c) Average annual flood damage (Rs. Million)	-
	(i) Without project	-
	(ii) With project (anticipated)	-
	(d) Safe carrying capacity of the river	
	(i) Without project	32411 cumecs
	(ii) With project	32411 cumecs
8.	Navigation	
	(a) Location of the navigable reach	No Navigation Proposed from project
	(b) Length of the navigable reach	
	(c) Minimum draft	
	(d) Total tonnage of goods to be carried annually	
	(e) Expected passenger traffic (annual)	
9.	Water supply	
9.1	Domestic	
	(a) Names of towns/villages served	Jhalawar district
	(b) Size of population served	2,00,000
	(c) Quantum of water made available (Cum)	10 MCum
	(d) Quantum of water per capita (litre)	100
9.2	Industrial	
	(a) Name(s) {location(s)}	Agro food park
	(b) Quantum of water made available (Cum)	1.0 Mcum
10.	Project Performance	No Simulation done
	Period of Simulation	New Project
	(a) Irrigation	Rabi & Kharif
	(b) Power	Thermal
	(c) Flood Control	Nil
	(d) Water Supply	12 Month
	(e) Navigation	Nil
	(e) Industrial	12 Months
	Horticulture & Forestry	12 Months

11.	Hydrology			
11.1	Catchments			
11.1.1	Catchments area at headwork site(Sq. km)			
	(a) Gross (Raj- 862Sq Km & MP-6685Sq Km)			7547 Sq Km
	(b) Intercepted:			Nil
	(i) By existing projects			222 Sq. Km
	(ii) By ongoing projects			Nil
	(iii) By contemplated projects			Nil
	(c) Un intercepted			7325 Sq. Km.
11.1.2	Catchments area classification according to mode of precipitation (sq. km.)			
	(a) Rain fed			Good
	(b) Snow fed			Nil
11.2	Precipitation annual			1000 mm
11.2.1	Catchments			
		Rainfall (weighted mm)		Snowfall (mm) Annual
		Annual	Monsson (June-Oct.)	
	(a) Average	1000 mm	900 mm	-
	(b) Maximum	1551 mm	1551mm	-
	(c) Minimum	480 mm	480 mm	-
	(d) Co-efficient of variation			-

11.2.2 Command

	Cropping Season			
	Annual	Kharif (June-october)	Rabi (Nov-Feb.)	Hot (March-May)
(a) Average	-	3810	10668	-
(b) 80% dependable	-	-	-	-
(c) ETO (mm)	-	-	-	-

11.3 Annual yield calculated at the proposed site (MCum)

		Gross	Net
(a)	Maximum	958.20 MCum (Yr.1996-97)	-
(b)	Minimum	51.60 MCum (Yr.2002-03)	-
(c)	Average	342.29 MCum	-
(d)	Dependable (per cent)		
		Annual	Monssoon (June-October)
	(i) 50	- MCum	- MCum
	(ii) 75%	139.0 MCum	139.00 MCum

11.4 Climatic Data (Command)

11.4.1 Name of Station(s) and period of record

Sl. No	Names	Period of Record	
		From	To
1.	Jhalawar	1971	2008
2.	Jhalrapatan	1971	2008
3.	Raipur	1971	2008

11.4.2	Data (average of all stations in command area)	Normal	Maximum	Minimum
	(a) Air temp. (^{0}C)		114^0 F	38^0 F
	(b) Humidity (Per cent)		91	12
	(c) Wind (Km/hr)		128 kmph	

11.5	Seismic Coefficients			
	(a) Horizontal			0.01
	(b) Vertical			0.005
11.6	Utilization within the State (MCum)			148.11 MCum
11.6.1	Water availability (State's share in case of interstate river)			Free catchment of Rajasthan (862-222)Sq. Km.+10% of Chauli (22.2) + 10% of M.P. 668.50 = 1330.70 Sq km Say 1331.00Sqkm
11.6.2	Committed Utilization			
	Upstream Projects	Major	Medium	Minor
	(i) Projects completed	-	-	-
	(ii) Projects under construction	-	-	-
	(iii) Future Projects	-	-	-
	(vi) Any other	-	-	-
	Down Stream Projects			
	(i) Projects completed	-	-	-
	(ii) Projects under construction	-	-	-
	(iii) Future Projects	1	-	-
	(vi) Any other	-	-	-

11.6.3	Proposed utilization by the project	148.11MCum
	Irrigation	
	(i) Kharif	3562.51 Ha.
	(ii) Rabi	12825.02 Ha
	(iii) Hot Weather	-
	(iv) Perennials	-
	Total :-	16387.52 Ha.
	(b) Water Supply	10 MCum
11.7	Flood near the headwork site	32411 Cumecs
11.7.1	Historical-Period of record form …to …… (a) Maximum water level (El-m) (b) Maximum Discharge estimated (M^3/s.) (c) Year of occurrence, date	Location(s) 1 2 3 ---
11.7.2	Observed-period of record from …… to (a) Maximum water level (El-m) (b) Maximum Discharge (M^3/s.) (c) Year of occurrence, date	Location(s) 1 2 3 ---
11.7.3	Estimated Flood	Magnitude (M^3/S.)
	(a) 50 year return period	-
	(b) 100 year return period	15402

	(c) 1000 year project period	32411
	(d) Standard project flood	-
	(e) Maximum probable flood	32411 Cumecs
11.7.4	Design flood (M^3/s.)	
	(a) Dam	32411 Cumecs
	(b) Weir/Barrage	N.A.
	(c) Construction Diversion	N.A.
	(d) Flood Control Works	N.A.
11.7.5	River flows (minimum observed)	No Gauge site data available for this river.
	(a) Water level (El-m)	--
	(b) Discharge (m^3/s.)	--
	(c) Months of 'nil' flow, if any.	--
12.	Reservoir	
12.1	Water levels (El-m)	
	(a) Maximum Water Level (MWL)	319.25 M
	(b) Full Reservoir Level (FRL)	319.25 M
	(c) Minimum Draw Down Level (MDDL)	306.00 M
	(d) Outlet levels	
	(i) Irrigation	--
	(ii) Power	--
	(iii) Others (Please specify)	--
	(i) Dead Storage Level	306.00 M
12.2	Free board (m)	4.25 M
12.3	Wave height (m)	
12.4	Live storage (Mm^3)	
	As per FRL	147.69 MCum
	Utilization	147.69 MCum
12.5	Capacity (Mm^3) at:	
	(a) Maximum water level	147.69 MCum
	(b) Full reservoir level	147.69 MCum
	(c) Minimum draw down level	306.00 M
	(d) Dead storage level	0.42 MCum
12.6	Flood absorption capacity (Mm^3)	148.11 MCum

	(a) Below FRL	148.11 MCum
	(b) Between FRL & MWL	Nil
12.7	Sedimentation (Mm^3) and levels after	Years 50 100
	(a) Above MDDL	
	(b) Below MDDL	
	(c) Encroachment of live storage (per cent)	
	(d) New Zero elevation	

12.8 Average monthly evaporation losses from the reservoir (Mm^3)

Month	Average Evaporation Loss (Mm^3)
January	
February	

March April May June July August September October November December	In All yearly 13% of storage evaporation considered			
12.9	Seepage in the reservoir		New Project, Normal seepage anticipated	
13.	Submergence			
13.1	Land and property submerged		MWL	FRL
	(a) Villages affected (No.)			31 No's
	(i) Fully			Nil
	(ii) Partially			27 Nos.
	(b) Land affected (ha.)			4052 Ha.
	(a) Gross			4052 Ha.
	(b) Culturable			4014 Ha.
	(c) Irrigated			4014 Ha.
	(d) Forest			67.029 Ha.
	(e) Other (specify) Govt. Land			
	(f) Buildings/house (No.)			
	(i) Private		-	800
	(ii) Community's		-	All
	(iii) Govt.		-	30
	(g) Wells (No.)		-	320
	(h) Road/rail (km)		Rail = Nil Road=10.00Km	Nil 10.00 Km
	(i) Transmission lines (km.)		10 Km	
	(j) Any other		Nil	
13.2	Submergence ratio (with reference to culturable command areas)			
13.3	Number of families / persons affected		Families	Persons
	(a) Total		800	3640
	(b) Scheduled Castes		-	-
	(c) Other Backwards Castes		-	-
	(d) General		-	-
13.4	Anticipated back water levels at important places along the periphery of the reservoir			
	S.No.	Name of Place	Back water level (El-m)	
		No	-	
14.	Headworks			
14.1	Dam			
14.1.1	Embankment Dam		N.A.	
	(a) Type of dam (Homogenous/Zoned/Rock-fill/Concrete		N.A.	

	faced	
	(b) Length of the dam at top (m)	N.A.
	(i) Right Flank	N.A.
	(ii) Left Flank	N.A.
	(c) Top which (m)	N.A.
	(d) Maximum Height above G.L. (m)	N.A.
	(i) Right Flank	N.A.
	(ii) Left Flank	N.A.
	(e) Dyke(s)	N.A.
	(i) Number	N.A.
	(ii) Total length (m)	N.A.
	(iii) Maximum height (m)	N.A.
	(f) Type of cut off and maximum depth (Upstream blanket/open trench/diaphragm/grout curtain/combination of alternatives)	N.A.
14.1.2	Masonry and Concrete Dam (Nov-over flow section)	Left side Right side
	(a) Type of Dam (Masonry/Concrete/Composite any other)	Concrete
	(b) EL of top (m)	325.00 M 325.00 M
	(c) EL of deepest foundation (m)	294.50 M 294.50 M
	(d) Length at the top (m)	230.00 M 118.00 M
	(e) Length at the river bed (m)	- -
	(f) Width at top (m)	6.00 6.00
	(g) Width at deepest bed level (m)	18.75 18.75
	(h) Maximum height above deepest foundation level (m)	29.00 29.00
14.1.3	Spillway (overflow section)	
	(a) Type of spillway (Ogee/chute/side channel/tunnel/syphon/any other type (specify)	Ogee
	(b) Full reservoir water level (EL-m)	319.25 M
	(c) Maximum water level (EL-m)	319.25 M
	(d) Length (m)	607.00 M
	(e) Maximum height above the deepest foundation (m)	24.75 M
	(f) Crest level (El-m)	306.00 M
	(g) Number of gates	33
	(h) Type of gate	Radial Gate
	(i) Size of gate (El-m)	15 x 13.25 M
	(j) Maximum discharging capacity (m3/s.) at	
	(i) FRL	32411 Cumecs
	(ii) MWL	32411 Cumecs
	(k) Flood lift (m)	13.25 M
	(I) Tail water level (EL-m)	
	(i) Maximum	311.20 M
	(ii) Minimum	302.00 M
	(m) Type of energy dissipation arrangement	Stilling Basin

	(a) Type of hoisting arrangement and its capacity Note:- Similar details shall be furnished for subsidiary and auxiliary spillway, if any.	
14.1.4	River sluice(s), Irrigation/Power outlet(s)	
	(a) Purpose	Irrigation
	(b) Number	3
	(c) Size(M)	1.80x2.25 m
	(d) Sill level (El-m)	LMC I - 314.10, RMC - 314.05 & LMC II- 306.00
	(e) Discharging capacity at (Cum /s.)	0.78 , 0.901 & 4.5771
	(i) Full reservoir level	319.25 M
	(ii) Minimum draw down level	306.00 M
	(f) Number of gates	3 nos
	(g) Type of gate	Vertical
	(h) Size of gate (mxm)	1.80x2.25
	(i) Type of hoisting arrangement and its capacity Note: The above details shall be furnished for al the sluices provided for different purposes.	Vertical Hoisting
14.2	**Barrage for irrigation**	Not Provided
14.2.1	Location with respect to dam, if any	--
14.2.2	Length (m)	--
14.2.3	Spillway bays	
	(a) Total length (m)	--
	(b) Full Pond level (El-m)	--
	(c) Maximum water level (El-m)	--
	(d) Maximum height of spillway crest above deepest foundation (m)	--
	(e) Length of bay (m)	--
	(f) Crest level (El-m)	--
	(g) Number of gates	--
	(h) Type of gates	--
	(i) Size of gate (mxm)	--
	(j) Type of energy dissipation arrangement	--
	(k) Maximum discharging capacity (m3/s.)	--
	(l) Tail water level (El-m)	
	(i) Maximum	--
	(ii) Minimum	--
	(m) Type of hoisting arrangement and its capacity	--
14.2.4	Under Sluice Bays	Left Side Right side
	(a) Total length (m)	Not Provided
	(b) Crest level (El-m)	
	(c) Maximum height of under sluice crest above deepest foundation –(m)	
	(d) Length of bay (m)	

	(e) Sill level (El-m)	
	(f) Number of gates	
	(g) Type of gates	
	(h) Size of gate (mxm)	
	(i) Type of energy dissipation arrangements	
	(j) Maximum discharging capacity of under sluices (m3/s.)	
	(k) Silt excluder tunnel(s)	
	(i) Number	
	(ii) Length	
	(iii) Size (m)	
	(iv) Floor level (El-m)	
	(l) Type of hoisting arrangement and its capacity	
14.2.5	Guide bunds/afflux bunds Left Side	Right side
	Length top level	Length top level
	(El-m)	(El-m)
	(a) Guide bunds	Not Provided
	(i)Upstream Nil	Not Provided
	(ii)Downstream Nil	Not Provided
	(b) Affludx bunds	Not Provided
	(c) Other protective works (if any)	Not Provided
14.3	**Weir** Type of weir Length of weir (m) Deepest foundation (El-m) Type of Energy dissipation arrangement Crest level (El-m) Maximum water level (El-m) Tail water level (El-m) (i) Maximum (ii) Minimum Maximum discharging (m3/sec) capacity Note:- For gated weir, information as asked under 14.2 Barrage shall be furnished.	Not Provided
14.4	Head Regulator(s)	
	(a) Total length (Km)	
	(b) Height above deepest foundation (m)	
	(c) Length of bay (m)	
	(d) Sill level (El-m)	
	(e) Number of gates	
	(f) Types of gates	
	(g) Size of gate	
	(h) Number of silt excluder bays	
	(i) Type of energy dissipation arrangement	
	(j) Type of hoisting arrangement and its capacity	

15.	Canal System	
15.1	Main Canal (Name)	
15.1.2	Type	
	(a) Flow/lift	
	(b) Lined-unlined	
	(c) Discharging capacity of the channel above which lining is proposed	
	(d) Type of lining	Cement concrete lining
15.1.3	Design data	
	(a) Length (km)	
	(b) Full supply level at head/tail (El-m)	
	(c) Full supply depth at head/tail (El-m	
	(d) Bed width at head/tail (El-m	
	(e) Side slope at head/tail (El-m)	
	(f) Bed slope (range)	
	(g) Maximum discharging capacity at head/tail(El-m)(m^3/s.)	
	(h) Total number of canal structures	
	(i) Total assumed head losses across the structure (m)	
	(j) Gross Command Area (ha)	
	(k) Culturable Command area (ha)	
15.1.4	Distribution System	
	Distribution Minors Sub-minors Water Courses (a) Number (b) Total length (km)	
15.2	Efficiencies (percent)	
	(a) Conveyance	
	(b) Field application	
16.	Cropping Pattern	
	Percentage area (CCA)	
	Existing	Proposed
16.1	Name of crop (seasion-wise)	
	Kharif	
	(a) Maize	10%
	(b) Jowar	
	(c) Pulses	
	(d)Ground Nut	
	(e)Soyabean	15%
	(f)Others	
	Rabi	
	(a)Wheat	20%
	(b)Gram	10%
	(c)Mustard	30%
	(d)Coriander	15%
	(d) Oranges	10%
	(e)Others	5%
	Note: If there are different cropping patterns in different reaches of the canal information for each	

	reach shall be given separately.	
17.	Power	2520 MW Thermal power
17.1	Type-Conventional /Pumped storage	N.A.
17.2	Installed capacity (MW)	N.A.
17.3	Load factor	0.8
17.4	Annual energy (kwh) (a) Firm (b) Seasonal (c) Total	18322 M KWH
17.5	Off peak requirement for pumping	N.A.
17.6	Cost per kW installed	N.A.
17.7	Cost per kWh at the bus bar	N.A.
17.8	Head Race Channel /Tunnel	
	(a) Length (m)	N.A.
	(b) Shape	N.A.
	(c) Size)m)	N.A.
	(d) Rock type reach-wise-RMR/Q values	N.A.
	(e) Rock cover reach-wise	N.A.
	(f) Free/Pleasure flow	N.A.
	(g) Lining type-PCC/RCC/Steel	N.A.
	(h) Reach-wise Design Internal & External pressures	N.A.
	(i) Thickness of lining (m)	N.A.
	(j) Designed discharge (m3/s.)	N.A.
	(k) Invert level at (El-m)	N.A.
	(l) Gates-No., type & size For pumped storage project only.	N.A.

17.9	Balancing Reservoir (a) Capacity (Mm^3) (b) Full reservoir level (El-m) (c) Maximum Drawdown Level (El-m) (d) Minimum Drawdown Level (El-m) (e) Live Storage (Mm^3) (f) Balancing period (hrs.)	N.A.
17.10	Forebay Size of forebay (m) Sill level of forebay (El-m) Full reservoir level (El-m) Maximum reservoir level (El-m) Minimum drawdown level (El-m) Duration of storage Number of off-takes Size of off-takes Invert level at off-take (El-m) Capacity of each off-take (m^3/s.) Escape arrangement - Location - Length	N.A.

	- Discharging capacity (m3/s.)	
17.11	Intakes (a) Upper Intake Type & size of intake (ii) Entry profile with details of transition (iii) Stability of the slope/cuts around intake (iv) Design Valocity through trash rack and bellmouth (v) Submergence of the entry below water level (vi) Intake gates-number, type size (vii) Details of anti-vortex arrangements (viii) Type of hoisting arrangement and its capacity (b) Lower Intake (for pumped storage scheme) (i) Type & size of intake (ii) Entry profile with details of transition (iii) Stability of the slope/cuts around intake (iv) Design velocity through trash rack and bellmouth (v) Submergence of the entry below water level (vi) Intake gates-number type size (vii) Details of anti-vortex arrangements	N.A.
17.12	Surge tank/shaft (a) Nos. & location (HRT/TRT or both) (b) Type height & size (c) Orifice – size & position (or any other relevant detail) (d) Top level (El-m) (e) Bottom Level (El-m) (f) Steady state level (El-m) (g) Capacity (Mm^3) (h) Lower expansion chamber-size & location (i) Upper expansion chamber-size & location (j) Maximum surge level (El-m) (k) Minimum surge level (El-m) (l) Size of gates and capacity of hoists	N.A.
17.13	Penstocks/ pressures shafts: (a) Number, diameter & length (b) Inclination (c) Liner type (d) Grade of steel (e) Reach wise rock cover (f) Reach wise rock properties-RMR/Q (g) Reach wise rock participation factors-computed & adopted (h) Reach wise liner thickness (i) Necessity for heat treatment if any, (j) Bifurcation/trifurcation (k) Gate-Number, Type & Size (l) Size gates and capacity of hoists	N.A.
17.14	Power House: (a) Type:- (Surface or underground) (b) Orientation	N.A.

	(c) Rock types encountered-RMRO/Q Values (d) Major wedge formations, if any (e) Rock ledge dimension between cavities (f) Maximum head (m) (g) Minimum head (m) (h) Average head (m) (i) Head loss in water conductor system (j) Design head (m (k) Dimensions (m) (l) Unit capacity (m) Installed capacity (MW) (n) Type of turbine (o) Type of generator (p) Type of power house crane (q) Number and size of draft gates/bulk head and capacity hoists	
17.15	Switch yard (a) Type (b) Voltage level (c) No. of incoming and outgoing bays	N.A.
17.16	Transformer Cavern Dimension Orientation Rock types encountered – RMR/Q Values Major wedge formations, if any Rock ledge-dimension between cavities	N.A.
17.17	Tail Race Channel Shape & Size Length Recovery slope Side slope Maximum tail water level (El-m) Minimum tail water level (El-m) Average tail water level (El-m) Tail Water level corresponding to one unit discharge. Tail water level corresponding to maximum flood condition/one in thousand years flood. HFL of recipient river channel at outfall Draft tube gates – number, type, size	N.A.
17.18	Tail Race Tunnel (a) Number, Size and shape Length Reach wise rock cover Reach wise rock properties-RMR/Q Type of lining Maximum tail water level (El-m) Minimum tail water level (El-m) Average tail water level (El-m) Tail water level corresponding to one unit discharge. Tail water level corresponding to maximum flood	N.A.

	condition/one in thousand year flood. HFL of recipient river channel at outfall Draft tube gates number, type, size	
18.	Construction facilities	
19.	Cost	1415.1 crores
19.1	Cost of the project (Rs. Lakh) Unit wise (Refer Part II Section-3 Para 18)	214865 Lacs
19.2	Allocated cost (Rs. Lakh)	
	(a) Irrigation	106574 Lacs
	(b)Power	93729 Lacs
	(c) Flood control	-
	(d) Navigation	-
	(e) Water Supply	13131 Lacs
	(f) Any other	1431.28

20. Benefits/ Revenue

20.1 Benefits

Item	Benefit		
	Quantity	Unit Price	Value Rs. Lakh
Food Production (tone)	--	--	15670.81 Lacs
Power (Kwh)	2520 MW	--	78054 Lacs
Flood Protection (ha)	--	--	N.A.
Navigation (tonnage)	--	--	N.A.
Water supply (Population served)	10 Mcum	--	2 Lacs villagers
Any other (fisheries)	--	--	Yes

20.2 Benefits

Item:	Revenue		
	Quantity	Unit Price	Value Rs. Lakh
Betterment levy			--
Water Rates			--
Irrigation Cess			--
Pisciculture rights auction			-
Power Rates			-
Navigation			
(i) Cargo Rates			-
(ii) Regd. Charges			-
(iii) Passenger Tax			-
Others.			
Total:			

21.	Benefit Cost Ratio	
	B.C. Ratio	
	(i) Irrigation	
	-With cost of CAD works	3.33: 1
	-Without cost of CAD works	NA
	(ii) Flood control	N.A.
	(iii) Power	N.A.

	Internal Rate Return (IRR)	
	-With cost of CAD works	
	-Without cost of CAD works	
	B.C. Ratio with discounted cash flow method Irrigation	
	-With cost of CAD works	N.A.
	-Without cost of CAD works	
	Financial Rate of Return (FRR) (After 15 Yr. of completion)	
	-With cost of CAD works	
	-Without cost of CAD works	NA