GOVERNMENT OF MADHYA PRADESH
WATER RESOURCES DEPARTMENT

SATDHARU MEDIUM PROJECT
PRE FEASIBILITY REPORT

ESTIMATED COST	**:**	**Rs. 315.65 Crores**
DESIGNED IRRIGATION	**:**	**7555 Ha.**
COST PER HACT.	**:**	**Rs. 4.18 Lakhs**

July 2017

"EVERY DROP MORE CROP"

EXECUTIVE ENGINEER
WATER RESOURCE DIVISION
DAMOH (M.P.)

CHIEF ENGINEER
DHASAN KEN BASIN
WATER RESOURCE DEPARTMENT
SAGAR (M.P.)

SATDHARU MEDIUM PROJECT

TEHSIL : DAMOH **DISTRICT : DAMOH**

REPORT

1. INTRODUCTION AND PROJECT DESCRIPTION

The SATDHARU MEDIUM Irrigation Project is proposed to be constructed in Damoh block of Tehsil & District Damoh (M.P.) across the SATDHARU river a tributary of BYARMA river of DHASAN KEN BASIN having a catchment area 145.68 sqkm the proposed Dam site can be seen on Toposheet no. 55M/6 at a longitude $79^0$27'12"E & latitude $23^0$42'36" N respectively. The site is approachable from District Head Quarter at a distance of 20 kms near village Badyau on Hathini-Imaliya road.

The Northern Region comprises low lying areas around Gwalior and the North and North-East of it, extending thence into Budelkhand of which it includes the greater part till it meets Kymore hills in Baghel Khand. The area of this tract is about 47578 Sq. Kms. The Western Plateau takes in most of Malwa, the wide table land with a mean elevation of 487.68m. above sea level and an area of about 89614 Sq. Km. It includes all the country lying between the great Vindhya barrier, and upto the terrain South of Gwalior. The Narmada valley is a long and narrow strip along the Narmada river, walled in by the Vindhyas and Satpuras to the North and South respectively and extending to the length of 1078 Km. from Amarkantak to Saletekdi in Balaghat district and its sides running westwards for about 643.6 Kms. and meeting gradually in Nimar. The general elevation of Satpura range is 609.69 m. and a few to more than 1219.20m. above the mean sea level. The Satpuras from the watershed of the plains lying North and South of them, i.e. the Ganga and the Narnada basin in the North, the Godavari Basin, and the Chhatisgarh plains of the Mahanadi basin in the south and south-east. The Chhattisgarh plains extending along the Eastern face of Satpura range form part of Mahanadi Basin.

The main river borders in the State are the Chambal, Betwa ,Dhasan and Ken (tributaries of Yamuna river), Sone and Tons (tributaries of Ganga river), Narmada, Tapti, Mahanadi and Godavari. The main river of the project is SATDHARU River, tributaries of BYARMA river.

AIMS OF THE PROJECT

There is no water source in the Project area which is a part of DAMOH district. At present irrigation in the project area from all sources is only 08.10 % of net cropped area. Since the area is dependent on rains, scarcity conditions exist all the time. Crop yields are low. People in the area are poor. The Project area needs water for domestic and agriculture purposes. Studies carried out earlier show that the some unutilized flows are available and the physiographical conditions are also suitable for harnessing the water resources.

LOCATION:

The proposed dam site is situated on SATDHARU river, tributary of BYARMA river under Dhasan Ken basin, near Badyau village, at a longitude $79^0$27'12"E & latitude $23^0$42'36" N respectively and can be located on topo-sheet No. 55M/6, The site is situated 20 kms from DAMOH. near village Badyau.

The scheme is proposed under Normal Plan Package. The scheme is under Vidhan Sabha Constituency No. 55 DAMOH. It is proposed to construct a zonal earthen bund of maximum height as 24.80 M to irrigate a total designed area of 7555 Ha. of CCA.

POPULATION

(a) Affected (no.) -

I.	General	-	8
II.	S.C.	-	42
III.	S.T.	-	202
IV.	O.B.C.	-	160
V.	Total	-	412

(b) No.of Houses - 76

(c) No.of Families - 76

(d) Benefited (No.)

(i)	General	-	1535
(ii)	S.C.	-	2135
(iii)	S.T.	-	1790
(iv)	O.B.C.	-	3080
(v)	Total	-	8540

Occupation	No. of people
Agriculture	6340
Other than agriculture etc.	4300

LAND USE AND SOCIO ECONOMIC ASPECTS –

The habitants of the command area are very poor and they totally depend on rain water for their agriculture. The area is drought prone and construction of this project will facilitate them a reliable source of irrigation and thus more production, which will increase their socio economic position. The recently launched Pradhan Mantri Krishi Sichai Yojna says "**every drop more crop**", this project fulfills the meaning of above slogan.

The project was proposed by Hon. Shri **JAYANT MALAIYA, Minister for Finance and Commercial Tax Govt. of M.P.and the** Chief Engineer Shri. **Sudhir Khare** in the year 2016. Necessary survey was carried out and The DPR is approved by E-in-C Bodhi and the Govt. of M.P. Water Resources Department, M.P. Bhopal had accorded Administrative Approval vide No R-493/2017/M/31/411 Dtd. 05.06.17

for Rs 315.65 Lakhs. The best alternative of the dam site has been selected by the authorities. The dam is proposed on SATDHARU river, which is in Dhasan Ken basin, and the command area is in the both side of SATDHARU River. The concerned development authorities like Revenue, Agriculture, Forest, PWD, RES and PHE departments have been intimated regarding this scheme. The local public representatives are well informed with the benefits of the project. There is no inter-state or international aspect of the project.

Cost and benefit ratio has been calculated and is within the norms. Also, Provision for drinking water supply to Damoh city and adjacent villages and upstream and downstream utilization of water has been made in the project.

2. SITE ANALYSIS

i. PHYSICAL FEATURES

Geography

SATDHARU Dam is located at 23°42′36’’N &79°27′12’E. in Damoh district of Madhya Pradesh. It has an average elevation of 400 metres .The project is situated in Damoh Block at an average elevation of 400.00 m

Climate

Damoh has a humid subtropical climate, typical of North-Central (Madhya Pradesh and southern Uttar Pradesh) India. Summer starts in late March and last up to June. May is the hottest month with average temperatures reaching up to and beyond 45°C. They are followed by monsoon season, which lasts until early October, with a total precipitation of nearly 48 inch (1200 mm). Winter starts in late November and lasts until early March. The coldest temperatures are in January with average daily temperature near 15.

ii. SURVEY AND INVESTIGATION –

Topographic survey - The topographic survey for Dam, basin, submergence has been done.

Geological survey - The geological survey for dam sheet diamond drilling in sluice, waste weir, nalla for required depth will be done during construction stage.

iii. INTER STATE / INTER NATIONAL ASPECTS

The dam is situated on Satdharu river which is a tributary of Byarma river of Dhasan Ken Basin. The river traversed in Damoh District. There is one minor project in the upstream side of the proposed dam.

3. PLANNING BRIEF:

i. HYDROLOGY:

The proposed SATDHARU Medium project consists of construction of a dam across river SATDHARU in Dhasan Ken Basin. The SATDHARU Project is

situated in Teh. DAMOH of Distt. DAMOH with Longitude as $79^0$27'12"E & Latitude as $23^0$42'36"N. The Total catchment area of SATDHARU dam is 145.68 sq.km.

There is no observed gauge-discharge data available at the proposed dam site or nearby vicinity. Hence data of CWC Gauroulli G&D site have been taken to derive Rainfall-Runoff relationship using the rain gauge data of DAMOH and DAMOH rain gauge stations & applying the same R-R Equation at the proposed SATDHARU dam site.

This yield is arranged in descending order & 75 % dependable yield is worked out. The yield so obtained is 63.03 M Cum which gives a rate of yield as 0.43 mcum/sq.km of the catchment. The yield obtained from R-R equation for SATDHARU dam is quite satisfactory & may be adopted.This rate of yield is also matches with yield rate mentioned in E-ln-C's order no. 373/22/42/2011 dtd 11/08/2011. **Thus the adopted 75 % dependable yield as live storage for the SATDHARU Medium Project is 63.03 Mcum.** The detailed computations of deriving R-R equations, monthly runoff, dependable yield computations etc. are enclosed.

ii. **BASIN AND SUBMERGENCE:**

The Basin is surrounded by semi hillocks. Area of about 294.77 Ha of culturable area, 26.67 Ha of Govt. land and 969.19 Ha. Forest land is coming under submergence. The total submergence area is 1290.63 Ha.

iii. **PRINCIPAL LEVELS;**

There is no observed data of silt rate in river SATDHARU is available. Hence the nearest CWC Gaurolli G&D site silt rate data has been adopted for computation of silt load for proposed Dam site for 100 years is considered to get the silt to be deposited during the life of reservoir.

Assuming the life of reservoir as 100 years and taking the independent C.A. of project as 145.68 sq.km the silt quantity comes out to 5.21 Mcm.

Moody's method to fix L.S.L. (New Zero Elevation) is adopted. Flood lift is taken as 0.00 mts and free board as 3.55 mts. accordingly the principal level are fixed as below:

NaIa bed level	R.L.	:	333.00 M.
L.S.L.	R.L.	:	341.50 M.
F.T.L.	R.L.	:	354.15 M.
M.W.L.	R.L.	:	354.30 M.
T.B.L.	R.L.	:	357.80 M.

CAPACITY:

Dead Storage	:	5.21 Mcum
Live Storage	:	63.03 Mum
Gross Storage	:	68.24 Mcurn

The percentage of gross storage to average annual yield 92.36% and the dead storage is 7.63% of gross storage.

4. PROPOSED INFRASTRUCTURE:

i. TYPE OF DAM:

In accordance with T.C.No. 42/ BODHI/R&C/TC Dated.17-1-2001 a zonal section has been adopted for the dam. The soil is available for construction within the economical lead. While extracting earth from the basin care will be taken to locate quarry at a sufficient distance from the dam.

SALIENT FEATURES OF THE DAM:

(a)	Length of Bund	:	755 M
(b)	Maximum height of bund	:	24.80 M
(c)	Top width of bund	:	6.00 M
(d)	Flood lift	:	0.15 M
(e)	Free Board	:	3.50 M

Side Slopes:

S.No`	Hight Of Dam	Slopes U/S	Slopes D/S
1	0 to 5 M	2:1	2:1
2	5 M to LSL	3:1	--
3	5 M to 9 M	--	2.5:1
4	LSL to GL	4:1	--
5	9 M to 12 M	--	3:1
6	12 M and above	--	4:1

LOCATION OF RIVER:

The river is crossing the dam axis at R.D. 660 Meter.

SHRINKAGE ALLOWANCE:

Shrinkage allowance will be considered as per T.C. No. 40 i.e. of dam (0.625 cm./30 cm. height).

SLOPE PROTECTION:

30-cm. thick stone pitching over 15 cm. thick quarry spalls and 15 cm thick sand filter has been provided up to T.B.L from LSL to protect the U/S slopes from erosion due to wave action etc. The pitching is provided in the reach R.D. 0 M to R.D. 697.50 M of dam and for retaining pitching is U/S slope a 60 cm x 60 cm. base toe of stone is also provided. The D/S slope will be protected with turfing upto boulder Toe and from the top upto boulder toe drains are provided to drain out the water at every 90 Meter.

CUT OFF TRENCH:

Cut off Trench from R.D.30 M to RD. 750 M is provided with a depth of 1/2 (M.W.L-G.L.) with base width of 4.00 M. and side sloped 1:1 & minimum depth 2 meter.

The depth of Cutoff Trench will be decided at the time of construction on the basis of permeability tests.

BENCHING AND DAM SEAT CLERANCE:

Proper benching and clearance of dam seat will be done to achieve bund between dam seat and work. The nalla will have to be cleared fully and banks to be cut in proper slopes before starting the work.

SEEPAGE DRAINS & BOULDER TOE:

Seepage drains of size 90 cm x 90cm. at 15 M. Interval at an inclination of 45° has been provided. Boulder toe as per T.C. has been provided RD. 30 M to RD. 750 M. (minimum height 1.0 Mts.) and maximum Height H/5.

OGEE WEIR:

A Ogee Spill way of 57.50 Mts. length in the left flank of bund is provided to pass the discharge 1243 Cumecs. Design of Ogee spill way is as per technical circular & ISI Code.

SUBMERGENCE:

3 villages are affected by this scheme. Water spread area at F.R.L. is 1290.63 Ha. Submergence area covers 294.77 Ha of culturable area, 26.67 Ha of Govt. land and 969.19 ha Forest land is coming under submergence. Thus the submergence percentage is 17.08% for cultivated land to annual irrigation area. The total submergence percentage is 17.08% to C.C.A. As per collector guideline for year 2016-17 has been taken for private culturable & uncultivable land compensation.

FOREST LAND:

There is 969.19 Ha. Forest land coming under submergence and Rs 15.00 lakhs/Ha. is taken for compensation and catchment area treatment plan.

Design Features and Criteria for different river valley structures

A separate volume discussing in details relevant to the projects' structural and design calculation for the important components of the project like, earthen dam, spillway, canal sluice and pressurized pipe irrigation system is adopted for the project. The proposed Irrigation to Damoh and Banda block will be done by a Common pressurized Piped Canal system originating from the dam.

Reservoir:

Details of dam

(i)	Type of dam	:	Earthen with gated side spillway
(ii)	Length of dam	:	755 mts
(iii)	Max. height of dam	:	24.80 mts.
(iv)	Type of spillway flush bar/	:	Ogee Weir (Gated)
Nala bed level R.L.		:	333 M.
L.S.L. R.L.		:	341.50 M.
F.T.L. R.L.		:	354.15 M.
M.W.L. R.L.		:	354.30 M.
T.B.L. R.L.		:	357.80 M.

CAPACITY:

Dead Storage	:	5.21 Mcum
Live Storage	:	63.03 Mcurn
Gross Storage	:	68.24 Mcurn

The percentage of gross storage to average annual yield 92.36 % and the dead storage is 7.63 % of gross storage.

IRRIGATION PLANNING:

The scheme will irrigate the area of Wheat Ord.- 1555 Ha, Gram - 2300 Ha. and 1000 Ha by Lift from submergence. Total Rabi of 7555 Ha and so Annual Irrigation as 7555 Ha with Irrigation Intensity as 100 %.

The project has been designed for Piped canal system up to 5 Ha area and 85% efficiencies have been adopted.

COMMAND AREA

The villages under the command are as follows:

S No	Piped Canal System	GCA (Ha)	CCA (Ha)	Name of Villages
1	Main Pipe	11623	7555	Hardua, Patna Bujurg, Barbata, Jujharghat, Dasonda, Arthkheda, Sagoni Khurd, Gamire, Tori, Dhamara, Kanker, Gudri, Mahuwakheda, Salaiya, Deori, Gurha, Amtara, Vijaypura, Bhainskhar, Katangi, Mahuaghat, Arthkheda, Bajaura, Khamariya, Patna, Murari, Mundi, Imaliya Nayak, Adhurata, Barkheda, Numuapatti, Kaniyaghat Pati, Gandhigram, Rampura, Jhinna, Gopalpura, Semra, Patna Khurd, Abhana, Hanumat Dongri, Bishna Khedi, Talagaon, Lakhnakheri, Hatri, Datla, Bijadongri, Jaruwa, Nayagaon.

Gross Command Area	11623 Ha
Cultural Command Area	7555 Ha
Proposed Rabi Area	7555 Ha
Annual Irrigation	7555 Ha

CANAL SYSTEM:

Ample command is available in side wise valley of dam, so provision is made for construction of Rising main, 3.00 kms RBC Rising main and 20.00 kms RBC Gravity main for Pressurized Piped canal system in this valley which is part of the Dhasan Ken Basin.

FLOOD CONTROL

The dam is proposed on SATDHARU River near village Badyau which is a tributary of Dhasan River. No historical flood data or flood damage has been observed in

last 30 years. Peak flood at dam site for 100 years frequency comes out as 1284.74 Cumecs which is under safe carrying capacity of the river.

DRAINAGE

Depending on the slope of the land, underline rock structure and climate of the area the river channel develops dendritic drainage pattern.

5. RESSETLEMENT AND REHABILITATION PLAN:

Sufficient provision, as per the latest norms, for the Rehabilitation and Resettlement plan and all other clearances has been made in the project estimates. Details of land coming under submergence are as follows:

1.	Government Land:	26.67 Ha
2.	Private Land:	294.79 Ha
3.	Forest Land:	969.19 Ha
		1290.63 Ha

6. COST ESTIMATE & PROJECT SCHEDULE:

The estimate is prepared based on C.S.R. of M.P. Water Resources Department in force since 01.04.2016 Total cost works out to **Rs. 315.65 Lacs.** Including 3% for establishment charges (except cost of 'B' Land) has been included in the estimates.

UNIT-I (Head Works):

'A' Preliminary':

The provision of **Rs. 0.25** Crores has been kept in this estimate for survey and investigation of the scheme.

'B' Land:

An amount of **Rs. 182.31** Crores had been provided under this sub-head for payment of compensation of private land, forest land tower line etc. coming under submergence in dam seat and basin.

'C' Works:

An amount of **Rs. 24.69** Crores has been kept for construction of central spillway and scouring sluice.

'K' Buildings:

An amount of **Rs. 0.12** Crores has been kept for construction.

'M' Plantation:

An amount of **Rs. 0.045** Crores.

‘O’ - Miscellaneous:

An amount of **Rs. 0.10** Crores has been kept under this sub head.

'P' Maintenance:

An amount of **Rs. 0.26** Crores has been kept under this sub head.

'R' - Communication:

An amount of **Rs. 1.25** Crores has been kept under this sub head.

'X' - Environment, Ecology:

An amount of **Rs. 0.17** Crores has been kept under this sub head.

UNIT-II (Canals):

'A’ Preliminary:

The provision of Rs**. 0.25** Crores has been kept in this estimate for command area survey and investigation of the scheme.

‘B’ Land:

An amount of **Rs. 1.70** Crores had been provided under this sub-head for payment of compensation of private land etc. coming under acquisition of Piped canal width.

‘K’ Buildings:

An amount of **Rs. 0.60** Crores has been kept for construction of Pump Houses & Store sheds.

‘L’ Earth Work:

An amount of Rs**. 24.62** Crores has been provided for earthwork, transmission line, pump house, rising main, earthwork for rising main, CD works, surge protection and valves.

‘P’ - Maintenance:

An amount of **Rs 3.69** Crores has been kept under this sub head.

'R' - Communication:

An amount of **Rs. 01.88** Crores has been kept under this sub head.

'U' - Distributory:

An amount of **Rs. 69.88** Crores has been kept under this sub head which includes cost of Pipe Distribution network such as distributaries minors & subminors.

Total cost of the scheme is worked out to **Rs. 315.65** Crores for 7555 hectare CCA irrigation area. The cost per hectare works out to **Rs. 4.18** Lakh per ha.

i. REVENUES

Irrigation : The water rates for per hectare of irrigation is Rs.350.00 and irrigation Cess is Rs.25.00 per Ha for rabi irrigation, The total Rabi irrigation of the project after completion will be 7555 Ha. The production of fishing in the basin is estimated to 550 Qt. per year.

ii. **BENEFIT COST RATIO**

B.C. Ratio of the project is -

For 5% rate of Return is - 3.02% without Power Plant

For 10% rate of Return is - 1.76% without Power Plant

iii. CONSTRUCTION PROGRAMME AND MAN POWER AND PLANT PLANNIG

The stipulated time of completion of the project is 24 months. The detail construction programme will be prepared during fixation of the agency.

The dam section proposed is Homogeneous type as good quality of soil is available for hearting and casing in sufficient quantity & sand is available at a distance of 150 kms. from the dam site. Pitching stone, Quarried Boulder and quarry spalls are available at a distance of 5 km. from the site.

Depending on the schedule of construction various facilities and assets ,as required in the project, will be developed in different phases .During the planning stage a judicial planning will be done as per the requirements so as to avoid wasteful expenditure and thus maximum utilization of the resources.

7. RECOMMENDATION:

Peoples of the command area, especially of DAMOH District which is a DPAP Blocks of DAMOH district, are in acute need of water for irrigation. The water table of nearby area will be raised after construction of dam. Seepage water will be useful for D/S area. It will generate employment for a period of 24 months during construction period. The total cost of the project works out to Rs. **315.65** Crores for **7555** hectare Designed Irrigation area. The cost per hectare works out to Rs. **4.18** Lakh per Ha.

Looking to the current price, the cost of scheme is reasonable. Therefore the scheme is feasible and suitable for construction.

Due to above facts the project is strongly recommended to accord the Administrative approval for the project for irrigation benefits in **7555** Ha of Rabi designed Irrigation area of Damoh & Jabera and Damoh block of DAMOH district.

SATDHARU MEDIUM PROJECT
SALIENT FEATURES

1	Name of Project	-	**SATDHARU MEDIUM PROJECT**
2	Block /Tahsil	-	Damoh / DAMOH
3	District	-	DAMOH
4	Assembly	-	Damoh
5	Name of M.L.A.	-	Hon. Shri Jayant Malaiya Ji
6	Name of River	-	SATDHARU River
7	Basin	-	Dhasan Ken Basin
8	Location of Dam	-	Near Village Badyau
9	Toposheet No. Latitude Longitude	- - -	55-M/9 23º42'36" N 79º27'12" E
10	Catchment Area		145.68 Sqkm
	1. Estimated Total cost (in Rs. Crores)	-	Rs. 315.65
	(a) 1. Construction cost		Rs. 127.63 Crores
	(b) Land Area cost	-	Rs. 177.02 Crores
	(i) irrigated cost	-	15.61 Crores
	(ii) Unirrigated cost	-	14.33+0.65 Crores
	(iii) Forest cost	-	145.38+1.05 Crores
	(c) Properties cost under submergence	-	0.95 Crores
	(d) R and R Cost	-	
	(e) Other cost	-	4.00 Crores
	(f) 1. Cost per ha (Rs. In Lakhs)	-	4.18 Lacs./Ha.
	HYDROLOGICAL DATA		
(c)	Average Rainfall	-	1233.35 mm
(d)	75% dependable rainfall	-	
12	**FLOOD**		
	Maximum flood calculated by synthetic unit hydrograph	-	1284.76 Cumsec
13	**RESERVOIR DATA**		
	Gross Storage	-	68.24 Mcum
	Live storage	-	63.03 Mcum
	Dead Storage	-	5.21 Mcum

14	**DAM DETAILS**	-	
	Length of Main Dam	-	755 M
	Nalla Bed level	-	333 M
	LSL	-	341.50 M
	FTL	-	354.15 M
	TBL	-	357.80 M
	Maximum height of bund	-	24.80M
	Length of Waste weir	-	57.50 M OGEE WEIR
	Water spread area of L.S.L.	-	97.14 Hec.
	Water spread area at F.T.L.	-	1290.63 Hec.
15	**CANALS**	-	
	RBC Rising main	-	1630 M.
	LBC Rising main	-	6000 M.
	U- Distributaries	-	20200 M.
16	**BENEFITS**		
	Culturable Command Area	-	7555 Ha.
	Area proposed for Irrigation	-	
	Wheat (Ord.)	-	1555 Ha.
	Wheat (Hyv.)	-	3700 Ha.
	Gram	-	2300 Ha.
	Total	**-**	**7555 Ha**
17	a. Cost per Ha.	**-**	**4.18 Lakhs**
	b. Cost per Ha.	-	
18	Name of village benefited by this scheme	-	45 Village - Hardua, Patna Bujurg, Barbata, Jujharghat, Dasonda, Arthkheda, Sagoni Khurd, Gamire, Tori, Dhamara, Kanker, Gudri, Mahuwakheda, Salaiya, Deori, Gurha, Amtara, Vijaypura, Bhainskhar, Katangi, Mahuaghat, Arthkheda, Bajaura, Khamariya, Patna, Murari, Mundi, Imaliya Nayak, Adhurata, Barkheda, Numuapatti, Kaniyaghat Pati, Gandhigram, Rampura, Jhinna, Gopalpura, Semra, Patna Khurd, Abhana, Hanumat Dongri, Bishna Khedi, Talagaon, Lakhnakheri, Hatri, Datla, Bijadongri, Jaruwa, Nayagaon.

(C.B.Dubey)	**(D.K.Jain)**	**(R.C.Tiwari)**
Sub Engineer	Sub Divisional Officer	Executive Engineer
W.R. Sub-Division Damoh	W.R.Sub-Division Damoh	Water Resources Division Damoh

FORM-1			
Basic Information's			

S.No.	Item		Details
1.	Name of Project		SATDHARU MEDIUM PROJECT
2.	Project Sector		River Valley
3.	Location of the project		DAMOH
4.	Shape of the project land		Block (Polygon)
	Uploaded GPS file		Annexure - GPS file
	Uploaded copy of survey of India Toposheet		Annexure - Survey of India Toposheet
5.	Brief summary of project		Annexure - Brief summary of project
6.	State of the project		Madhya Pradesh
7.	Town / Village		Damoh / Badyau
8.	Plot / Survey / Khasra No.		Latitude 23^0-42'-36" E, Longitude 79^0-27'-12" N
9.	S. No. in the schedule		1(c)
10.	Proposed capacity/ area/ length/ tonnage to be handled/ command area/ l ease area/ number or wells to be drilled		Live capacity- 63.03 Mcum Culturable Command Area – 7555 ha; Catchment Area – 145.68 sq km. Dam Length – 755 M (Earth Dam – 697.50 m. with spill way- 57.50 M of C.C.) Maximum height of Dam – 24.80 M.
11.	New/Expansion/Modernization		New
12.	Category of project		A
13.	Does it attract the general condition? If yes, please specify		The Project or its part are located within 10 kms from the boundary of : (a) Yes, Protected area notified under the wild life (protection) Act – 1972 (Noradehi Sanctuary) at 4.50Km distance. (b) No Critically polluted areas as notified by the Central Pollution Control Board from time to time. (c) No, Notified Eco-Sensitive Areas (d) No, Inter-state boundaries & International Boundaries
14.	Does it attract the specific condition?		No
15.	Is there any litigation pending against the project?		No
16.	Nearest railway station along with distance in kms.		Damoh - 22 km
17.	Nearest airport along with distance in kms		Jabalpur- 110 km

S.No.	Item		Details
18.	Nearest Town / City / District Headquarters along with distance in kms		Damoh/ Damoh - 20 km
19.	Distance of the project from nearest Habitation		2.00 km
20.	Details of alternative sites examined shown on a Toposheet		No
21.	Whether part of interlinked projects?		No
22.	Whether the proposal involves approval/clearance under the Forest (Conservation) Act, 1980?		Yes
	Status		Application for Forest Clearance is in progress
23.	Whether the proposal involves approval/clearance under the wildlife (Protection) Act, 1972?		No
24.	Whether the proposal involves approval/clearance under the C.R.Z notification, 2011?		No
25.	Whether there is any Government Order/Policy relevant / relating to the site?		No
26.	Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?		No
27	Project Cost (in lacs)		Rs 31565.00 Lakhs.

Activity

1.	**Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)**

S.No.	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	Yes	The submergence area at FRL is 1290.63 ha. The private land under submergence area is 294.77 ha; Govt. land 26.67 ha. and forest land 969.19 ha. which will be converted in to water body (Reservoir). The CCA is 7555 ha. and the intensity works out to be 100 %.
1.2	Clearance of existing land, vegetation and buildings?	Yes	Total area affected in project is 1290.63 ha and the details are as below :- i. Forest land – 969.19 ha. ii.Culturable land – 117.92 ha. iii.Unculturable land – 176.85 ha. iv. Revenue land- 26.67 Ha
1.3	Creation of new land uses?	Yes	Main pressure pipe RBC A-1is 6.00 km. long along with 3 nos Distributaries about 20.20 Km long will irrigate 7555ha by pressure pipe system.
1.4	Pre-construction investigations e.g. bore houses, soil testing?	Yes	Bore hole drilling, construction materials testing, soil sampling etc. have been completed as a part of investigation-activities.
1.5	Construction works?	Yes	The project comprises of the following: - 697.50 m. long earthen dam with 57.50 m central spillway having 6 Nos. gates Maximum height of dam 24.80m; pressure pipe canal system and other infra -structure facilities.
1.6	Demolition works?	No	Not required
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	About 1 ha for construction of housing for construction workers and related activities by concerning contractor deputed for construction of dam.
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations and fill or excavations.	Yes	The project will involve cutting, filling, excavation and also involves construction of main dam and pressure pipe canal system. The project

			comprises of the following: - 697.50 m. long earthen dam with 57.50 m. central spillway having 6 Nos. gates. Maximum height of dam 24.50 m; network with pressure pipe canal system and other infra -structure facilities.
1.9	Underground works including mining or tunneling?	No	Not applicable here.
1.10	Reclamation works?	No	Reclamation of land, if required, will be done as per site specific requirement to integrate with natural surroundings.
1.11	Dredging?	No	-
1.12	Offshore structures?	No	-
1.13	Production and manufacturing processes?	Yes	This will enhance the agricultural productivity and fish cultivation in the project area.
1.14	Facilities for storage of goods or materials?	Yes	Facility for temporary storage of cement, steel, E&M HM equipment, aggregate/ sand, etc. shall be created.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	-
1.16	Facilities for long term housing of operational workers?	No.	-
1.17	New road, rail or sea traffic during construction or operation?	No	During construction stage, road traffic will increase for transportation of construction material, equipment, machines and laborers and to cater for this, temporary roads shall be provided to the minimum extent possible. However, most of the sites are nowadays connected with PWD roads
1.18	New road, rail, air water borne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No	As per details given in para 1.17
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	No road is coming under submergence of Satdharu Medium Project, hence no need of diversion of road.
1.20	New or diverted transmission lines or pipelines?	No	Transmission lines for villages will be provided separately, if required.
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	Yes	Anticipated adverse changes in the hydrology of watercourses/aquifers will be bare minimum being non-perennial river.

1.22	Stream crossings?	No	The same shall be identified during the detailed investigations and stream crossings will be provided accordingly as per requirement.
1.23	Abstraction or transfers of water from ground or surface waters?	Yes	In the project, conjunctive use of water shall be insured.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	Yes	The proposed project will change the water bodies on account of reservoir formation as a result of construction of dam. The land use will also change on account of increased water availability for irrigation. Green cover will improve on account of increased soil-moisture availability. The probability of water-logging in the nearby lands is remote as good natural drainage already exists. This aspect will be covered in detail as a part of the EIA/EMP study.
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	The construction materials will be brought from the local sources in trucks/dumpers. The workers required for construction activities are available in the vicinity of the project area and will be using existing mode of communication i.e. bus, two wheelers, three wheelers, tempo etc.
1.26	Long-term dismantling or decommissioning or restoration works?	No	N.A.
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	N.A.
1.28	Influx of people to an area in either temporarily or permanently?	No.	About 25 technical and 100 construction laborers will be employed during construction phase. The workers required for construction activities are available in the vicinity of the project area. Technical staff shall stay in various camps or colonies close to the major construction sites.
1.29	Introduction of alien species?	No	-
1.30	Loss of native species or genetic diversity?	Yes	The existing floral and faunal species in the specified zone will be affected. The nature, extent and magnitude of such losses will be covered in detail as a part of the EIA/EMP study.

1.31	Any other actions?	No	Losses incurred due to construction shall be recovered through compensatory afforestation and other measures as given in EMP.
2.	**Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):**		
S.No.	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	Yes	Land will be acquired for construction of various project appurtenances including submergence area. Land coming under submergence is revenue land, forest land, and agricultural land. The details of the land to be acquired for project shall be assessed as a part the EIA study.
2.2	Water (expected source & competing users) unit: KLD	Yes	The quantity of water required during construction would be 20 kld. During construction and operation phases, potable water for laborers and technical staff would be provided from local territory.
2.3	Minerals (MT)	No	Construction material in the form of metal manufactured from basaltic rocks and sand will be used in concrete dam. The quantum of the minerals is given below :- Metal 36191 Cum Sand 35702 Cum
2.4	Construction material – stone, aggregates, sand / soil (expected source – MT)	Yes	The quantity of aggregate / rock required to be produced for the construction of Earthen dam and other estimated structures of the project. (i) Earthen dam Material Quantity Sand (Cum) 357502, Metal (Cum) 36191, Boulder (Cum) 8555, Pitching stone (sqm.) 52320.00 (ii) Spillway and Irrigation sluice Material Quantity Cement (Cum) 8250.00
2.5	Forests and timber (source – MT)	No	The work force is local hence there will be no use of timber as fuel wood. But unavoidable timber use for fuel wood, if needed, will be procured from forest

			depot legally.
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT),energy (MW)	No	Power requirement of this project is 3956 KW and including losses it will be 4351 KW or 4.350 MW.
2.7	Any other natural resources (use appropriate standard units)	No	-
3.	**Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health**		
S.No.	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies	No	Use of substance or materials, hazardous to human health or the environment is not envisioned in this project.
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	Yes	Normally an irrigation project increases the incidence of water-borne diseases due to increased water availability, owing to stagnant pools of water in command area, canals, etc. It may result in preponderance of mosquitoes, leading to increased frequency and incidence of water-borne diseases, especially malaria. This aspect will be studied as a part of EIA and adequate measures to be implemented during project construction and operation phases.
3.3	Affect the welfare of people e.g. by changing living conditions?	Yes	The details of various welfare schemes for locals shall be outlined as a part of area development activities and the details will be outlined in the EIA report.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.	Yes	vulnerable groups/individuals will be identified and suitable protection measures will be taken to insulate them from any plausible adverse effects.
3.5	Any other causes	Yes	Majority of people living in the proposed project area belong to BPL, whose primary livelihood is sustenance farming/ daily wagers. So relocation of these people on the adjoining government land will not be a problem and extra care will be taken

			for their rehabilitation.
4.	**Production of solid wastes during construction or operation or decommissioning (MT/month)**		
S.No.	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	Yes	In this project, it is proposed to collect the construction waste from various construction sites, and disposed at sites identified in consultation with the district administration. Various construction sites would be properly leveled. The leveling or reclamation of various construction sites, shall be made mandatory for the contractor, involved in the construction work. The details of the same shall be covered as a part of EMP to be presented as a part of the EIA report.
4.2	Municipal waste (domestic and or commercial wastes)	No	About 100 labour and 25 technical staff is likely to congregate in the area during construction phase. The average per capita solid waste generated is of the order of 210 gm/day/person. The solid waste likely to be generated from camps shall be of the order of 0.026ton/day. Adequate facilities for collection, conveyance and disposal of solid waste will be developed. For solid waste collection, number of masonry storage tanks will be constructed at appropriate locations in camps.
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	No	No hazardous waste will be generated.
4.4	Other industrial process wastes	No	No Industrial waste will be generated
4.5	Surplus product	No	NA
4.6	Sewage sludge or other sludge from effluent treatment	Yes	During construction phase, sludge generated from secondary settling tank will be dried in sludge drying beds. The dried sludge will be disposed at land filling sites or sold to the farmers, to be used as fertilizers. Sewage generated from camps will be treated in septic tanks and soak pits.

4.7	Construction or demolition wastes	No	Construction waste from various construction sites will be disposed at sites identified in consultation with the district administration.
4.8	Redundant machinery or equipment	Yes	Redundant machinery equipments will be taken out from the project sites, after completion of construction activities.
4.9	Contaminated soils or other materials	No	No contamination of soil is foreseen in the project.
4.10	Agricultural wastes	Yes	The proposed project envisages enhancement of irrigation intensity in the CCA of 7555 ha in Damoh district, Madhya Pradesh, which will increase agriculture-production, thereby increasing agricultural waste. Appropriate measures for the reuse and recycling of agricultural waste will be suggested as a part of the EIA study.
4.11	Other solid wastes	No	-
5.	**Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr)**		
S.No.	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	Yes	The major air-pollutant, emitting from diesel-combustion are SPM, SO2 and NOX. The SPM emission is minimum due to low ash content in diesel. The short-term increase in SO2 is expected to be quite low, even assuming all the equipments are operating at a common point. Thus no adverse impacts on ambient air quality are anticipated. Emission from labour camps, due to use of fuel wood, will also add to emissions.
5.2	Emissions from production processes	No	Production process of concrete / mortar and earthwork are mostly emission-free except feeble emissions from diesel operated machineries.
5.3	Emissions from materials handling including storage or transport	Yes	During construction phase vehicular movement will increase. Construction materials will be brought and stored at various sites. Prevailing wind may carry these materials in the

			atmosphere, especially during dry environment. However, its scale is not expected to be significant.
5.4	Emissions from construction activities including plant and equipment	Yes	The operation of various construction equipments requires combustion of fuels, commonly diesel. The major pollutant, emitting from diesel-combustion is SO2. The SPM emission will be minimum due to low ash content in diesel. The short-term increase in SO2 is expected to be quite low, even assuming all the equipments are operating at a common point. Thus no adverse impacts on ambient air quality are anticipated.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	Yes	Dust will be generated additionally during excavation, blasting, drilling and construction works .appropriate measure will be adopted as per EIA study.
5.6	Emissions from incineration of waste	No	No burning of any construction-waste is required.
5.7	Emissions from any other sources	No	N.A.
6.	**Generation of Noise and Vibration, and Emissions of Light and Heat:**		
S.No.	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	The operation of various construction equipments will generate noise. The location of silent DG sets and crushers etc. will be planned in a manner to have bare minimum noise pollutions. However increase in noise level shall be nominal.
6.2	From industrial or similar processes	No	At present there is no generation of noise and vibration, and emissions of light and heat but it may change after the availability of water through this project.
6.3	From construction or demolition	Yes	Noise level due to various construction activities (like operation of various construction equipments, increased vehicular traffic etc.) are expected from construction and demolition. Appropriate steps will be

			taken to minimize such levels as per the prevailing rules and regulations.
6.4	From blasting or piling	Yes	During blasting or pilling operations noise levels of 80 to 90 DB (A) will be generated. To minimize generation of noise levels, blasting will be restricted only to a very limited period in morning and will be mostly controlled blasting.
6.5	From construction or operational traffic	Yes	During construction, there will be an increase in vehicular movement due to transportation of construction materials. Based on past experiences, impacts on ambient noise levels due the operation of construction equipment, and increased vehicular movement is not expected to be significant. Though this aspect is only temporary, it will be covered in detail as a part of the EIA.
6.6	From lighting or cooling systems	Yes	For lightening purpose at the project sites, small units of silent DG sets will be installed. The project does not envisage involvement of any cooling systems.
6.7	From any other sources	No	N.A,
7.	**Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:**		
S.No.	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	Yes	Hazardous waste like used oil, generated from the use of diesel in DG sets, will be handled as per the norms and specifications of MPPCB guidelines.
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	Yes	Sewage generated from camp will be treated through aerated lagoons, secondary setting tank, and disposed on land or water (post treatment) at sites identified in consultation with the respective district administration.
7.3	By deposition of pollutants emitted to air into the land or into water	Yes	The solid waste generated from the camps shall be suitably collected, disposed by land filling as mentioned earlier. The details of the solid waste disposal facilities will be covered as a

			part of the EIA.
7.4	From any other sources	No	No pollutants are expected from any other sources.
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No	Since the gestation period is confined to 24 Months, during which pollutants from make-shift arrangements will be disposed as per the prevailing rules and regulations. Hence, there is no potential risk of any long-term build up of pollutants in the environment.
8.	**Risk of accidents during construction or operation of the Project, which could affect human health or the environment**		
S.No.	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	Yes	Explosives will be used carefully by the experienced licensed persons. Blasting will be done in accordance with the existing provisions of Indian Explosives Act 1884, and all necessary precautions, will be taken as per aforesaid law. First-Aid centers/Health camps, with qualified medical professionals will be held from time to time.
8.2	From any other causes	No	All mandatory safety provisions for labour work-force, technical staff and villagers inhibiting nearby areas will be strictly enforced.
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	Yes	The proposed project is located in ZONE II, as per Seismic Zoning Map of India (IS 1893:2002) and thereby falls in least risk zone or safe zone. There are no records of earthquakes, landslides etc. in the area.
9.	**Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality**		
S.No.	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting. laities, ancillary development or development stimulated by the project which could have impact on	Yes	The development of supporting facilities, ancillary development or development stimulated by the project having impacts on the environment,

	the environment e.g.: Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) housing development extractive industries supply industries Other		will be a part of Environment Management Plan, especially the issues of subsequent pollution from the use of chemicals in farming and salinity & water-logging due to increased irrigation.
9.2	Lead to after-use of the site, which could have an impact on the environment	No	Mostly make-shift arrangements will be made at the site during the construction phase which will be dismantled after completion of the project as per the prevailing norms and guidelines. Very little permanent creation will be done and that will be utilized for post-construction operation and management.
9.3	Set a precedent for later developments	Yes	Increase in agriculture production, Fluoride Mitigation, Improvement in live stock, Employment generation, Urbanization, Industrialization, and Other Changes
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	No	No other project has been planned in vicinity of this project.
(III)	**Environmental Sensitivity**		
S.No.	Areas	Name / Identity	Aerial distance (within 15 km.) Proposed project location boundary
1.	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	No	There are no sites in the proposed project under international conventions, national or local legislation for their ecological, landscape, cultural or other related value.
2.	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	No	N.A.
3.	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	No	Identified during the process of detailed investigation.
4.	Inland, coastal, marine or underground waters	No	There is no coastal or marine water body. Underground water table in the area specified exists at 60-70 meters

			depth. There are no natural lakes, springs or any other water bodies.
5.	State, National boundaries	No	No state or national boundary exists within 15 km radius of proposed project location boundary. UP State boundary is at a distance from 190km.
6.	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	No	Routes or facilities to recreation or other tourist, pilgrim areas do not fall within 20 km zone of the proposed project location boundary. Furthermore, the proposed creation of reservoir will not obstruct any routes or facilities even beyond 15 km zone of the proposed project location boundary.
7.	Defense installations	No	There are no defense installations within 15 km zone of the proposed project location boundary.
8.	Densely populated or built-up area	No	There are no densely populated or built up areas, within 15 km zone of the proposed project location boundary. However, nearest Gudi village falls within the specified zone of 15 km. The village Badyau & Patna Khurd has a very low population density.
9.	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	No	The village Patna Khurd within 15 km zone has hospitals, schools, places of worship, community facilities but they will not be affected by the proposed project. Furthermore, the creation of water body will improve the prevailing overall ecological and environmental situation, thereby addressing the environmental sensitivity of the area. Land of Villages DAMOH, will be in submergences of proposed dam.
10.	Areas containing important, high quality or scarce resources.(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)	No	The groundwater table in the specified zone of 15 km area is at 60-70 meters depth. The creation of reservoir will address the scarcity of groundwater through natural recharge. The mother surface resource i.e., the land, in the specified 15 km radius at present is under-productive: feeble humus content, low agricultural yield, devoid of major natural vegetation,

			rocky outcrops, etc. Creation of water body will immensely improve the land quality and its 'land use capability'
11.	Areas already subjected to pollution or environmental damage.(those where existing legal environmental standards are exceeded)	No	The specified area of 15 km of proposed project location boundary does not have any polluted or environmentally damaged patch. Due to lack of water resources there is no major industry in the area, which is considered a 'backward' area. So no existing legal environmental standards are exceeded. The recurring droughts and famine pose a severe threat of spilling over excessive fluoride to other areas in the district.
12.	Areas susceptible to natural hazard which could cause the project to present environmental problems (earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions) similar effects	No	The area falls in the 'Seismic Zone II' considered as one of the safest seismic zones. Furthermore, the site-specific seismic investigations will be conducted and appropriate seismic safety measure will be incorporated in the project design, after the seismic investigation and specific requirement.