Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State

File No.: FP/ MH/HYD/153240/2022

Date of Proposal: 06/03/2022

APPENDIX (SEE RULE 6)

FORM –'A'

FORM FOR SEEKING PRIOR APPROVAL UNDER SECTION 2 OF THE VAN (SANRAKSHAN EVAM SAMVARDHAN) ADHINIYAM. 1980 PROPOSAL BY THE STATE GOVERNMENTS AND OTHER AUTHORITIES

PART-I

(TO BE FILLED UP BY THE USER AGENCY)

1. PROJECT DETAILS:

(i) Short narrative of the proposal and project/ scheme for which the Forest Land is required:

The Hydro Energy Storage Project is an established, proven and cost- effective technology for storing electricity at times of high generation and/ or low demand, which can then be released into peak demand projects. These projects have better reliability with no impact of change in fuel prices and no issues related to emission of fuel gases.

The JSW Energy PSP Two Limited, JSW Centre, Bandra Kurla Complex, Bandra East, Mumbai- 400 051, a Power Business arm of JSW Group- the largest independent Hydro- Power producer in India has taken initiative to construct a Pumped Storage Project of 1500 MW capacity in Thane & Nasik Districts of Maharashtra State.

The Government of Maharashtra has signed a Memorandum of Understanding (MoU) with the JSW Group, on 14th day of September, 2021, for facilitating setting up of a Hydro Energy Project in Thane & Nasik districts of Maharashtra State as per existing policy framework.

The project is proposed to be constructed on 275.00 Ha. of land, including 243.74 Ha. of Forest Land.

(ii) Map showing required Forest Land, boundary of adjoining forest on a 1:50,000 scale map:

Annexed hereto with this proposal.

(iii) Cost of the Project:

Approximately, an amount of Rs. 9058.09 Crores /-is likely to be spent upon the total project, including the part of project inside the Forest Land.

(iv) Justification for locating the Project in Forest Area:

The Pumped Storage Project is essentially a site-specific project because it requires a particular type of topographical and geological conditions. The sites of elevation variance are required to construct reservoirs of desired capacity. The reservoirs are critical for storing water for long duration. Reservoir location should compulsorily fulfil the geo-technical criteria needed for establishing the Pumped Storage Project. Since this project requires water as a means to store energy, the project has to be in close proximity of the water source.

For this project, initially, the proposed site was identified by the Government of Maharashtra. Having examined the site, based on topographical, geological, geo-technical and techno-economic feasibility parameters, the JSW Energy PSP Two Limited has confirmed 275.00 Ha. of land in Jamunde village of Igatpuri Tehsil of Nasik District and Kalbhonde, Kothale villages in Shahapur Tehsil of Thane District as most suitable site for the proposed project. The Government of Maharashtra has entered into an agreement with JSW Group by signing the Memorandum of Understanding for setting up of the said project in Jamunde village of Igatpuri Tehsil of Nasik District and Kalbhonde, Kothale villages in Shahapur Tehsil of Thane District.

The land proposed for the project necessarily involves Reserved Forests, Private (Deemed Reserved Forest) Forests, and Private lands Land. Since, the project is very "site specific", the Forest Land involved in the project cannot be avoided and no alternative can be substituted. Hence, the project is partly located in Forest Land. The barest minimum Forest Land, to the extent of 243.74 Ha., is required/ proposed for the project.

(v) Cost Benefit Analysis (To be enclosed):

The Cost-Benefit Analysis in the extant diversion proposal is worked out in accordance with the parameters prescribed by the Ministry of Environment, Forest & Climate Change, New Delhi.

The B/C Ratio of the project is as below:

Total Benefit (Rs. In Cr.)	**Total Cost (Rs. In Cr.)**	**B/C Ratio**
90413.89	Cost of Forest Diversion: 74.056+ Standard Project Cost: 9058.09 Total: 9132.146	9.90: 1

A detailed report is annexed hereto with the proposal.

(vi) Employment likely to be generated:

The project likely to generate employment to Temporary/ Permanent (skilled/ Semi- Skilled/ unskilled) persons to the extent of 5000 Mandays during execution stage.

Sr. No.	Type of Employment	Permanent		Temporary	
		Direct	Indirect	Direct	Indirect
1	Skilled employment	225	0	1275	0
2	Semi- Skilled employment	150	0	850	0
3	Un- Skilled employment	375	0	2125	0
Total		**750**	**0**	**4250**	**0**

Purpose-wise break-up of the total land required:

Forest Division: Shahapur								
Purpose/ Item	**Village / Tehsil /District**	**Forest Land**			**Non- Forest Land**			**Total Area (In Ha.)**
		Suy. Nos.	**Area (In Ha.)**	**Legal Status**	**Suy. Nos.**	**Area (In Ha.)**	**Legal Status**	
Lower Dam & Reservoir	Kothale/ Shahapur/ Thane	40 (GN 25)	9.080	Protected Forest	--	--	--	9.080
Lower Dam & Reservoir	Kothale/ Shahapur/ Thane	51 (GN 24)	0.600	Protected Forest	--	--	--	0.600
		53 pt (GN 23)	35.240	Reserved Forest	--	--	--	35.240
TRC	Kothale/ Shahapur/ Thane	53 pt (GN 23)	1.640	Reserved Forest	--	--	--	1.640
TRT (Underground)	Kothale/ Shahapur/ Thane	53 pt (GN 23)	4.200	Reserved Forest	--	--	--	4.200
Approach Road to Lower Dam	Kothale/ Shahapur/ Thane	53 pt (GN 23)	20.932	Reserved Forest	--	--	--	20.932
HRT (Underground)	Kothale/ Shahapur/ Thane	53 pt (GN 23)	4.500	Reserved Forest	--	--	--	4.500
Power House (Underground	Kothale/ Shahapur/ Thane	53 pt (GN 23)	2.000	Reserved Forest	--	--	--	2.000
ADIT/ MAT (Underground)	Kothale/ Shahapur/ Thane	53 pt (GN 23)	0.230	Reserved Forest	--	--	--	0.230
Cable & Ventilation	Kothale/ Shahapur/ Thane	53 pt (GN 23)	0.084	Reserved Forest	--	--	--	0.084
Dumping Area and Job Facilities	Kothale/ Shahapur/ Thane	53 pt (GN 23)	27.030	Reserved Forest	--	--	--	27.030
Service Corridor	Kothale/ Shahapur/ Thane	53 pt (GN 23)	2.064	Reserved Forest	--	--	--	2.064
Total			**107.600**		**--**	**--**	**--**	**107.600**
Lower Dam & Reservoir	Kalbhonde/ Shahapur/ Thane	62 66/2 66/1 67/4 71/1 71/7 71/6 71/2 70/3 72/3 72/2 70/2 70/1 73/2	36.180	Private Forest (Deemed RF)	--	--	--	36.180

		72/1 73/1 86						
ADIT/ MAT (Underground)	Kalbhonde/ Shahapur/ Thane	86	0.760	Private Forest (Deemed RF)				0.760
Dumping Area and Job Facilities	Kalbhonde/ Shahapur/ Thane	86 75/1 75/2 75/3 75/4 75/5 75/6 74	13.880	Private Forest (Deemed RF)				13.880
Working Space	Kalbhonde/ Shahapur/ Thane	86 77/1 77/2	4.800	Private Forest (Deemed RF)				4.800
Approach Road	Kalbhonde/ Shahapur/ Thane	68/16 68/14 68/12 68/13 68/6 68/1 68/3 70/4 67/3 71/3 71/5 69/3 70/2 70/3 86 78/1,2,3 73/1 76 77/1 77/2 80/2	18.230	Private Forest (Deemed RF)				18.230
Total			**73.850**	--	--	–	–	**73.850**
Grand Total			**181.45**					**181.45**

Forest Division: West Nasik								
Purpose/ Item	**Village / Tehsil /District**	**Forest Land**			**Non- Forest Land**			**Total Area (In Ha.)**
		Suy. Nos.	**Area (In Ha.)**	**Legal Status**	**Suy. Nos.**	**Area (In Ha.)**	**Legal Status**	
Upper Dam & Reservoir	Jamundc/ Igatpuri/ Nashik	42	58.42	Reserved Forest	53 52 28 51 50 48 49 46	0.980 0.087 0.386 2.240 2.700 0.095 2.240 2.950	Private	87.57

					47 43 45 44	4.390 4.620 3.540 5.260		
Approach Road to Upper Dam	Jamunde/ Igatpuri/ Nashik	42	0.77	Reserved Forest	21 22 26 28 52	0.040 0.109 0.080 1.687 0.014	Private	2.70
HRT (Underground)	Jamunde/ Igatpuri/ Nashik	42	2.18	Reserved Forest				2.18
Saddle Dam	Jamunde/ Igatpuri/ Nashik	42	0.11	Reserved Forest				0.11
Service Corridor	Jamunde/ Igatpuri/ Nashik	42	0.81	Reserved Forest				0.81
Total			62.29	--		--	31.08	93.37

Component- wise Area Statement:

Sr. No.	Purpose/ Component	Shape	Forest Land (In Ha.)	Non-Forest Land (In Ha.)	Total Area (In Ha.)
1	Upper Dam & Reservoir	Irregular	58.42	29.15	87.57
2	Approach Road to Upper Dam	Linear	0.77	1.93	2.70
3	Lower Dam & Reservoir	Irregular	81.1	0	81.1
4	Approach Road to Lower Dam	Linear	37.83	0	37.83
5	HRT (Underground)	Linear	4.77	0	4.77
6	Power House (Underground)	Polygon	1.853	0	1.853
7	TRT (Underground)	Linear	4.2	0	4.2
8	TRC	Linear	1.64	0	1.64
9	Adit/ MAT (Underground)	Linear	0.99	0	0.99
10	Cable & Ventilation	Linear	0.084	0	0.084
11	Dumping Area and Job Facilities- 1	Polygon	22.3	0	22.3
12	Dumping Area and Job Facilities- 2	Polygon	22.6	0	22.6
13	Working Space	Polygon	4.8	0	4.8
14	Pothead Yard	Polygon	0	0	0
15	Fire Fighting Tank	Polygon	0	0	0

16	Service Corridor	Linear	2.27	0	2.27
17	Saddle Dam	Polygon	0.11	0	0.11
Total			**243.737 Say: 243.74**	**31.08**	**274.82 Say: 275.00**

2. Details of displacement of people due to the Project, if any:

(i) No. of families: Please refer to note furnished herein below
(ii) No. of Scheduled Caste/ Scheduled Tribes families: Please refer to note furnished herein below.
(iii) Rehabilitation Plan (To be enclosed): Please refer to note furnished herein below.

Note: The project consists of construction of two dams & reservoirs. A survey & study of the people likely to be displaced/ affected by the project, is being carried out and the claims, if any, will be processed expeditiously in conformity with the policy of JSW Group or the National Rehabilitation and Resettlement Policy and applicable laws.

3. Whether clearance under Environment (Protection) Act, 1976 required? (Yes/ No):

Yes. Application is under process, vide File No.: J-12011/08/2022-IA. I (R)

4. 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):

The necessary undertaking to bear the cost of raising and maintenance of CA and/ or Penal CA as well as the regeneration of Safety Zone, etc. as per Scheme prepared by the State Government is furnished to this effect and annexed hereto.

5. Details of Certificates/ documents enclosed as required under the instructions:

As per Check List.

JSW Energy PSP Two Limited

Date: 06 / 02/2025
Place: Mumbai
Office Seal:

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

Address of User Agency:
JSW Energy PSP Two Limited,
JSW Centre, Bandra Kurla Complex,
Bandra East, Mumbai- 400 051

State Sr. No. of the proposal:
(To be filled by Nodal Office with receipt)

Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State
File No.: FP/ MH/HYD/153240/2022
Date of Proposal: 06/03/2022

(Sr. No. 2 of Checklist)

JUSTIFICATION

Of Site Specificity

The Pumped Storage Project is essentially a "site-specific" project as it requires a particular type of topographical and geo- technical conditions with availability of water source at a close proximity to the identified project site. The sites of elevation variance are required to create upper & lower reservoirs of desired capacity. The reservoirs are critical for storing water for long duration. Their location should compulsorily be fulfilling the geo-technical criteria needed for establishing the Pumped Storage Project. Since this project requires water as a means to store energy, a techno-commercially viable water source, with sufficient capacity, to fill up the reservoir one time at the beginning of its operation and to supply for losses during its operation (mainly evaporation loss, quarterly or semi-annually or annually) has to be available in close proximity of project.

The proposed site has initially been identified by the Government of Maharashtra. Attempts were also made to explore the possibilities for alternate sites based on topographical, geological, geo-technical and techno-economic feasibility parameters. However, the JSW Energy PSP Two Limited has found proposed 275.00 Ha. of land, including Forest & Non-Forest, in Jamunde village of Igatpuri Tehsil of Nasik District and Kalbhonde, Kothale villages in Shahapur Tehsil of Thane District as most suitable site for the proposed project. The Government of Maharashtra has entered into an agreement by signing the Memorandum of Understanding for setting up of the extant project in Jamunde village of Igatpuri Tehsil of Nasik District and Kalbhonde, Kothale villages in Shahapur Tehsil of Thane District.

A detailed alternative study to find out the best optimized alignment of water conductor system on left bank of the upper reservoir along with other appurtenant structures was carried out. The location of powerhouse has also been selected based on the due consideration being given to topographical and Geological features. An attempt to optimize the orientation of PH on account of Geo- logical requirements viz-a-viz angle of deviation w.r.t. to the flow direction along the WCS has been done. The location of powerhouse is positioned in such way as to avoid the requirement of upstream surge shaft on the Headrace tunnel.

Underground power house is more suitable as compare to surface powerhouse. Therefore, the **following three "alternative layouts" of the project have been developed for techno economic comparison** and the pros and cons of all the alternatives are discussed below: -

Alternative I:

This alternative envisages the construction of following Major Components:

- Construction of Upper and lower dam of Height 47.0 m and 70.0 m respectively from the lowest natural surface level.
- Construction of Upper and Lower intake.
- one number of 11m dia water conductor system comprising of about 475.0 m long Head Race Tunnel (HRT) bifurcated into two penstocks of 7.7m dia of 647.107m length and each penstock is trifurcated into 3 branch penstocks of 4.0m dia and 135.32m long, 6 No's of each 5.0m TRT of length 90m is connected to the surge chamber in the downstream end in-turn connected to one number of tail race tunnel (TRT) of 11m dia and 808.75 m long.
- Downstream underground surge chamber on Tail Race Tunnel

- An underground power house and Transformer cavern, the arrangement of powerhouse is positioned under high cover zone of about 365m or more.

Alternative II:
This alternative envisages the construction of following Major Components:
Upper and Lower dam is similar to Alternative-1.
Construction of Upper intake, the location of lower intake is same as Alternative-1.
one number of 11m dia water conductor system would comprise of about 1605.302 m long Head race tunnel bifurcated into two numbers of 7.7m dia penstocks of length 169.90m in which each penstock intern trifurcated into small branch penstock of 4.0m dia and tail race tunnel (TRT) 358.52m long
Underground Powerhouse location is similar to Alternative-1 but positioned under optimized top cover to avoid problems related to high cover zone on the underground caverns.

Alternative III:
This alternative envisages the construction of following Major Components:
- Upper and Lower dam is similar to Alternative-1.
- Construction of Upper intake, the location of lower intake is same as Alternative-1.
- One number of HRT of 11m dia 653m long bifurcated into two numbers of 7.7m dia with a length of 1704.11m at the upstream surge chamber of 25m dia and each penstock is divided into branch penstock of 4.0 m dia and 76m long and tail race tunnel (TRT) 213.5m long.
- Surface Powerhouse location shifted downstream towards lower reservoir but involves deep surface cut

Conclusion
- Both the alternative for underground scheme has similar arrangement except minor changes in the length of various tunnels. In Alternative 2 the Power House location is located such that D/S Surge Chamber get eliminated. The overall impact is reduction in the overall cost. Hence Alternative-2 has been selected for the further studies as compare to Alternative-1.
- Also, based on Techno-Economic comparison of all the alternatives, Alternative-2 has less Levellised Tariff as compared to Alternative-1 & 3.

Hence, considering Techno-Economic Parameter underground power house with Alternative-2 is chosen for the development of the proposed PSP.

The above layout was received by the CEA/ CWC and further modification in Water Conductor System was suggested; like, instead as one HRT and Pressure Shaft, three HRT(s) & PS(s) were suggested. Accordingly, further layout was optimized and details of the same are given in the Salient Features mentioned in this note.

The proposed site involves 243.74 Ha. of Forest Land and 31.08 Ha. of Non- Forest Land. Attempts have been made to minimize the use of Forest Land for the project. However, the Forest Land cannot be avoided or no alternative can be substituted. The Forest Land proposed for diversion is, thus, unavoidable. The barest minimum Forest Land, to the extent of 243.74 Ha., is proposed to be diverted in the extant proposal.

Date: 06 /02/2025
Place: Mumbai
Office Seal:

JSW Energy PSP Two Limited

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State
File No.: FP/ MH/HYD/153240/2022
Date of Proposal: 06/03/2022

(Sr. No. 3 of Checklist)

ITEM WISE BREAK UP
Of Forest Land & Non- Forest Land

Sr. No.	Item	Shape	Forest Land (In Ha.)	Non-Forest Land (In Ha.)	Total Area (In Ha.)
1	Upper Dam & Reservoir	Irregular	58.42	29.15	87.57
2	Approach Road to Upper Dam	Linear	0.77	1.93	2.70
3	Lower Dam & Reservoir	Irregular	81.1	0	81.1
4	Approach Road to Lower Dam	Linear	37.83	0	37.83
5	HRT (Underground)	Linear	4.77	0	4.77
6	Power House (Underground)	Polygon	1.853	0	1.853
7	TRT (Underground)	Linear	4.2	0	4.2
8	TRC	Linear	1.64	0	1.64
9	Adit/ MAT (Underground)	Linear	0.99	0	0.99
10	Cable & Ventilation	Linear	0.084	0	0.084
11	Dumping Area and Job Facilities- 1	Polygon	22.3	0	22.3
12	Dumping Area and Job Facilities- 2	Polygon	22.6	0	22.6
13	Working Space	Polygon	4.8	0	4.8
14	Pothead Yard	Polygon	0	0	0
15	Fire Fighting Tank	Polygon	0	0	0
16	Service Corridor	Linear	2.27	0	2.27
17	Saddle Dam	Polygon	0.11	0	0.11
Total			**243.737 Say: 243.74**	**31.08**	**274.82 Say: 275.00**

JSW Energy PSP Two Limited

Date: 06/02/2025
Place: Mumbai
Office Seal:

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State
File No.: FP/ MH/HYD/153240/2022
Date of Proposal: 06/03/2022

(Sr. No. 4 of Checklist)

ATTEMPTS TO FIND OUT NON-FOREST LAND

The Pumped Storage Project is essentially a site-specific project because it requires a particular type of topographical/ geological conditions and such site needs to be tested on geo-technical and techno- economic parameters.

The land parcel, including Forest & non- Forest Land, having total area of 275.00 Ha. of land in Jamunde village of Igatpuri Tehsil of Nasik District and Kalbhonde, Kothale villages in Shahapur Tehsil of Thane District, initially identified by the Government of Maharashtra, which subsequently was subsequently found suitable based on topographical, geological, geo-technical and techno-economic feasibility parameters has been considered for setting up of the project at the proposed site.

Attempts have been made to identify the non- forest land for alternative layouts. However, no suitable alternate non- forest land is available for the project. The proposed layout, which involves minimum Forest Land, is found to be suitable for the project.

JSW Energy PSP Two Limited

Date: 06 / 02/2025
Place: Mumbai
Office Seal:

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State
File No.: FP/ MH/HYD/153240/2022
Date of Proposal: 06/03/2022

(Sr. No. 5 of Checklist)

UNDERTAKING

FOR PAYMENT OF NET PRESENT VALUE OF FOREST AREA

Certified that the Project Authority agrees to defray the Net Present Value of Suy. No. 62, 66/2, 66/1, 67/4, 71/1, 71/7, 71/6, 71/2, 70/3, 72/3, 72/2, 70/2, 70/1, 73/2, 72/1, 73/1, 86, 75/1, 75/2, 75/3, 75/4, 75/5, 75/6, 74, 77/1, 77/2, 68/16, 68/14, 68/12, 68/13, 68/6, 68/1, 68/3, 70/4, 67/3, 71/3, 71/5, 69/3, 70/3, 78/1 ,78/2, 78/3, 73/1, 76, 80/2 of village Kalbhonde, Suy. No. 40, 51, 53 pt. of village Kothale, Tehsil Shahapur, District Thane and Gat No. 42 of village Jamunde, Tehsil Igatpuri, District Nasik of Shahapur and West Nasik Forest Divisions, respectively as fixed by Forest Department for area 243.74 Ha. proposed for acquisition for the project of construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State.

JSW Energy PSP Two Limited

Date: 06 /02/2025
Place: Mumbai
Office Seal:

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State
File No.: FP/ MH/HYD/153240/2022
Date of Proposal: 06/03/2022

(Sr. No. 6 of Checklist)

UNDERTAKING

FOR PAYMENT OF COST OF COMPENSATORY AFFORESTATION

Certified that the Project Authority is agree to defray the cost of Compensatory Afforestation, as determined by the Forest Department for ten years period.

Date: 06 / 02 /2025
Place: Mumbai
Office Seal:

JSW Energy PSP Two Limited

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State
File No.: FP/ MH/HYD/153240/2022
Date of Proposal: 06/03/2022

(Sr. No. 7 of Checklist)

CERTIFICATE

REGARDING TREE FELLING

Certified that the Project Authority fully agrees to bear the cost clearance/ removal of the vegetation growth from the Forest Land proposed to be released for non- forest use for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State.

Date: 06/02/2025
Place: Mumbai
Office Seal:

JSW Energy PSP Two Limited

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State
File No.: FP/ MH/HYD/153240/2022
Date of Proposal: 06/03/2022

(Sr. No. 8 of Checklist)

UNDERTAKING
REGARDING CERTIFICATE UNDER FRA, 2006

The JSW Energy PSP Two Limited, JSW Centre, Bandra Kurla Complex, Bandra East, Mumbai- 400 051 has applied under Sec. 2 of the Van (Sanrakshan Evam Samvardhan) Adhiniyam. 1980 for seeking prior approval of the Central Government for diversion of 243.74 Ha. of Forest Land, as described below, for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State.

Thane District:

Purpose	Village / Tehsil /District	Forest Land		
		Suy. Nos.	Area (In Ha.)	Legal Status
Lower Dam & Reservoir	Kothale/ Shahapur/ Thane	40 (GN 25)	9.080	Protected Forest
Lower Dam & Reservoir	Kothale/ Shahapur/ Thane	51 (GN 24)	0.600	Protected Forest
		53 pt (GN 23)	35.240	Reserved Forest
TRC	Kothale/ Shahapur/ Thane	53 pt (GN 23)	1.640	Reserved Forest
TRT (Underground)	Kothale/ Shahapur/ Thane	53 pt (GN 23)	4.200	Reserved Forest
Approach Road	Kothale/ Shahapur/ Thane	53 pt (GN 23)	20.932	Reserved Forest
HRT (Underground)	Kothale/ Shahapur/ Thane	53 pt (GN 23)	4.500	Reserved Forest
Power House (Underground	Kothale/ Shahapur/ Thane	53 pt (GN 23)	2.000	Reserved Forest
ADIT/ MAT (Underground)	Kothale/ Shahapur/ Thane	53 pt (GN 23)	0.230	Reserved Forest
Cable & Ventilation	Kothale/ Shahapur/ Thane	53 pt (GN 23)	0.084	Reserved Forest
Dumping Area and Job Facilities	Kothale/ Shahapur/ Thane	53 pt (GN 23)	27.030	Reserved Forest
Service Corridor	Kothale/ Shahapur/ Thane	53 pt (GN 23)	2.064	Reserved Forest
Total			107.600	
Lower Dam & Reservoir	Kalbhonde/ Shahapur/ Thane	62 66/2 66/1 67/4 71/1 71/7	36.180	Private Forest (Deemed RF)

		71/6 71/2 70/3 72/3 72/2 70/2 70/1 73/2 72/1 73/1 86		
ADIT/ MAT (Underground)	Kalbhonde/ Shahapur/ Thane	86	0.760	Private Forest (Deemed RF)
Dumping Area and Job Facilities	Kalbhonde/ Shahapur/ Thane	86 75/1 75/2 75/3 75/4 75/5 75/6 74	13.880	Private Forest (Deemed RF)
Working Space	Kalbhonde/ Shahapur/ Thane	86 77/1 77/2	4.800	Private Forest (Deemed RF)
Approach Road	Kalbhonde/ Shahapur/ Thane	68/16 68/14 68/12 68/13 68/6 68/1 68/3 70/4 67/3 71/3 71/5 69/3 70/2 70/3 86 78/1,2,3 73/1 76 77/1 77/2 80/2	18.230	Private Forest (Deemed RF)
Total			73.850	--

Nasik District:

Purpose	Village / Tehsil /District	Forest Land		
		Suy. Nos.	Area (In Ha.)	Legal Status
Upper Dam & Reservoir	Jamunde/ Igatpuri/ Nashik	42	58.42	Reserved Forest
Approach Road to Upper Dam	Jamunde/ Igatpuri/ Nashik	42	0.77	Reserved Forest
HRT (Underground)	Jamunde/ Igatpuri/ Nashik	42	2.18	Reserved Forest
Saddle Dam	Jamunde/ Igatpuri/ Nashik	42	0.11	Reserved Forest
Service Corridor	Jamunde/ Igatpuri/ Nashik	42	0.81	Reserved Forest
Total			62.29	--

2. To comply with provisions of the FRA, 2006, the JSW Energy PSP Two Limited, JSW Centre, Bandra Kurla Complex, Bandra East, Mumbai- 400 051 has applied to the Collector, Thane & Collector, Nasik for necessary enquiry and issue of the certificate under FRA, 2006 for the Forest Areas falling within their respective jurisdictions.

3. The JSW Energy PSP Two Limited do hereby undertake to produce the certificate under FRA, 2006, before the Forest Department/ other concerned Authorities, as and when issued by the Collector, Thane & Collector.

4. This supersedes our undertaking dated 03/03/2022

Date: 06 /02/2025
Place: Mumbai
Office Seal:

JSW Energy PSP Two Limited

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State
File No.: FP/ MH/HYD/153240/2022
Date of Proposal: 06/03/2022

(Sr. No. 9 of Checklist)

CERTIFICATE
REGARDING NON-VIOLATION OF VSSA, 1980

This is to certify that that no violation of any provision of Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 or its guidelines has been committed in construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State.

JSW Energy PSP Two Limited

Date: 06/02/2025
Place: Mumbai
Office Seal:

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

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Date of Proposal: 06/03/2022

(Sr. No. 10 of Checklist)

COST BENEFIT ANALYSIS

COST BENEFIT ANALYSIS
FOR
BHAVALI PUMPED STORAGE PROJECT

Name of Project:
Bhavali Pumped Storage Project (1500 MW), Maharashtra State

Project Proponent:
JSW Energy PSP Two Limited, Mumbai

Area of the Project:
The proposal involves surface as well as underground components. The certain Surface Components have overlaps with other Surface Components. Similarly, few underground Components have overlaps with other Underground Components. The certain Underground Components also have overlaps with the Surface Components. An analysis of an effective area involved in the proposal has been carried out and shown in the table annexed hereto as Annexure- I.

About 275.00 Ha. (Includes 243.74 Ha. Forest Land) in Igatpuri & Shahapur Tehsils of Nasik & Thane Districts, respectively.

Cost of the Project:
Rs. 9058.09 Cr.

Expected Project Life:
50 Years

Computations for Net Present Value (NPV) of Forest Land proposed for diversion:

Sr. No.	Eco- Value Class	Density Class	Area (In Ha.)	Rate of NPV (In Rs.)	NPV (In Rs.)
1	Eco- Class I Tropical Moist Deciduous Forest	Open Forest (OF)	174.478	11, 16, 900.00	19, 48, 74, 478.2
2	Eco- Class I Tropical Moist Deciduous Forest	Dense Forest (DF)	57.359	14, 36, 670.00	8, 24, 05, 954.53
3	Underground/ Notional Forest Land	Underground	11.90	5, 58, 450.00 (50% of normal NPV)	71, 87, 251.50
Grand Total			**243.737 Say: 243.74**		**28, 44, 67, 684.23 Say: 28.45 Cr.**

\COST OF FOREST DIVERSION:

Sr. No.	Parameters	MoEF&CC Guidelines	Statistics for Bhavali PSP	Total Cost (Rs.in Cr.)
1	Ecosystem Services losses due to proposed forest diversion	Ecosystem Services losses due to proposed forest diversion shall be the NPV of the Forest Land being diverted as prescribed by the MoEF&CC	The NPV of the Forest Land proposed to be diverted for the project is: NPV = Rs. 28.45Cr. Ecosystem Services losses= NPV = Rs. 28.45Cr.	28.45
2	Loss of Animal Husbandry productivity, including loss of fodder	To be quantified & expressed in monetary terms or 10% of NPV applicable, whichever is maximum	The NPV of the Forest Land proposed to be diverted for the project is: NPV = Rs. 28.45Cr. Loss of Animal Husbandry productivity, including loss of fodder= 10% of NPV = Rs. 2.845 Cr.	2.845
3	Cost of human re-settlement	To be quantified and expressed in monetary terms as per approved R&R Plan	The proposed project involves construction of upper and lower reservoirs. Based on the studies carried out, the project will involve in acquiring small portion of private land. Detailed socio-economic analysis of the people, property loss likely to be impacted by the construction of the project is planned in DPR stage.	NIL
4	Loss of Public Facilities and Administrative Infrastructure (Road, Buildings, Schools, Dispensaries, Electric Lines, Railway, etc.) on Forest Land, which would require Forest Land if these facilities were diverted due to the project.	To be quantified and expressed in monetary terms on actual cost basis at the time of diversion	The project does not envisage loss of public facilities and administrative infrastructure which would require Forest Land if these facilities were diverted due to the project.	NIL
5	Possession Value of the Forest Land diverted	30% of the Environmental Costs (NPV) due to loss of forests or Circle Rates of adjoining area in the district should be added as a cost component as possession	The NPV of the Forest Land proposed to be diverted for the project is: NPV = Rs. 28.45Cr.	8.535

		value of the Forest Land, whichever is maximum	Possession Value of the Forest Land diverted (PV) is: PV= 30% of NPV = Rs. 8.535 Cr.	
6	Cost of suffering to oustees	The Social Cost of rehabilitation of oustees (in addition to the cost likely to be incurred in providing residence, occupation and Social Services as per R&R Plan) be worked out as 1.5 times of what oustees should have earned in two years had he not been shifted.	The project does not envisage displacement of any individual or settlement or rehabilitation of oustees. However, the detailed socio-economic analysis of the people, property loss likely to be impacted by the construction of the project is planned in DPR stage.	NIL
7	Habitat Fragmentation Cost	While the relationship between fragmentation and forest goods & services is complex. For the sake of simplicity, the cost due to fragmentation has been pegged at 50% of NPV applicable as a thumb rule.	The NPV of the Forest Land proposed to be diverted for the project is: NPV = 28.45 Habitat Fragmentation Cost (HFC)= 50% of NPV HFC= Rs. 14.22 Cr.	14.22
8	Compensatory Afforestation and Soil & Moisture Conservation Cost	The actual cost of Compensatory Afforestation and Soil & Moisture Conservation and its maintenance in future at present discounted value.	The actual cost of Compensatory Afforestation and Soil & Moisture Conservation and its maintenance in future at present discounted value is: Rs. 0.0829 Cr. per Ha. = 243.74 x 0.0829 = 20.21 Cr.	20.21
Total				74.26

BENEFITS OF FOREST DIVERSION:

Sr. No.	Parameters	MoEF&CC Guidelines	Statistics for Bhavali PSP	Total Benefits (Rs. in Cr.)
1	Increase in productivity attribute to the specific project	To be quantified & expressed in monetary terms avoiding double counting.	The Bhavali PSP (1500 MW) would contribute planned peak power generation, there would be direct revenue to the State of Maharashtra and the Government of India. • Total energy generation units: 4044.06 MU • Total energy consumption: 5120.53 MU	84550

			• Rate of saleable energy: Rs. 7.98/- per Unit • Rate of pumping energy: Rs. 3.0/- per Unit • Cost of saleable net energy: Rs. 1691 Cr. per Annum	
2	Benefits to economy due to the specific project	The Incremental Economic Benefit in monetary terms due to the activities attributed to the specific project.	Power is among the most critical components of infrastructure development; crucial for the economic growth and welfare of developing nations like India. The existence and development of adequate infrastructure is essential for sustained growth of the economy. Investment in hydel project, which produces the cheapest, cleanest and environment friendly energy, brings in several benefits to Agriculture, Industry, commerce, health, education, environment, etc sectors. The Incremental Economic Benefits, in monetary terms, due to the activities attributed to this project are hereby worked out on the basis of statistics published by the RBI & World Bank for India for FY 2019-20. The details are furnished below: i. Gross Investment Rate of India (GIR)= 27.3% ii. Growth Rate of India, which is GDP= 8.68% which Therefore, the ICOR= GIR/ GDP = 27.3/ 8.68 = 3.14 The Increment to Output would be: = Investment/ ICOR = 9050 Cr./ 3.14= 2882.17 Cr.	2882.17
3	No. of population benefited due to specific project.	As per the detailed Project Report.	The project falls within territorial limits of Kothale, Kalbhonde & Jamunde villages. The all villages having total population of 2819 (2011 Census Data) The Work Profile of these villages is as under: About 1619 workers engaged in Main Work (Employment or Earning more than 6 Months), 429 were cultivators (Marginal activity providing livelihood for less than 6 months-owner or co-owner) while 330 were Agricultural labourer.	2819 + nos.

			The entire population of these villages will be directly & fully benefitted from the extant project. The other surrounding Revenue Villages in the Nasik & Thane District will also have access to the resources and infrastructure facilities developed for the project. The people not only from the State, but also from the country will have privilege to draw the socio- economic benefits from the project and its ancillary activities, during pre-construction, construction, operational and maintenance periods till the validity of O & M life of the project. The benefits considered under this category, though worth millions of Rupees, cannot be expressed in monetary term as they depend on the State/ National Policies and other circumstances, prevailing from time to time. The detailed facts & figures of population likely to be benefitted by the construction of the project are to be worked out at DPR stage.	
4	Economic benefits due to direct and indirect employment due to the project	As per the detailed Project Report.	The all villages having total population of 2819 (2011 Census Data) will be directly & fully benefitted from the extant project. 1. For at least 8 months direct employment: 2819 x 8 = 22552 Mandays per Annum 22552 x 1200 = Rs. 2, 70, 62, 400.00. Per Annum. Say Rs. 2.71 Cr. Per Annum 2. The people from the other part of the State/ Country, having special skills, expertise will have privilege to draw the economic benefits from the project and jobs ancillary to it, during pre-construction, construction, operational and maintenance periods till the validity of O & M life of the project.	135.50 + "n" no. of employment benefits.

			The benefits considered under this category, though worth millions of Rupees, cannot be expressed in monetary term as they depend on the State/ National Policies and other circumstances, prevailing from time to time	
5	Economic benefits due to Compensatory Afforestation	Benefits from such CA accruing over next 50 years monetized and discounted to the present value should be included as benefits of CA. *For benefits of CA, the guidelines of the Ministry for NPV estimation may be consulted.	Forest Land proposed for diversion: 243.74 Ha. The CA will be done on equivalent area i. e. 243.74 Ha. and about 2, 70, 795 trees will be planted. The NPV rate considered for the land is Rs. 11, 16, 900.00 per Ha.	27.22
Total				90413.89

BENEFIT/ COST RATIO:

Total Benefit (Rs. In Cr.)	Total Cost (Rs. In Cr.)	B/C Ratio
90413.89	Cost of Forest Diversion: 74.056+ Standard Project Cost: 9058.09 Total: 9132.146	9.90: 1

Date: 06/02/2025
Place: Mumbai
Office Seal:

JSW Energy PSP Two Limited

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

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Date of Proposal: 06/03/2022

(Sr. No. 11 of Checklist)

CERTIFICATE
REGARDING ENVIRONMENTAL CLEARANCE

Certified that the Project Authority has applied for obtaining Environmental Clearance for the extant proposal and will start the work only after clearance is granted by the Environmental Wing of MoEF & CC, New Delhi and Environment Impact Assessment Notification of 1994. Application is under process. TOR has been granted to the project; vide File No.: J-12011/08/2022-IA. I (R)

Date: 06 /02/2025
Place: Mumbai
Office Seal:

JSW Energy PSP Two Limited

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

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Date of Proposal: 06/03/2022

(Sr. No. 12 of Checklist)

CERTIFICATE
OF NON-INDEMNITY TO FOREST DEPARTMENT

I, Lalit Parab , Authorized Signatory, JSW Energy PSP Two Limited, Mumbai do hereby undertake to indemnify the Forest Department, Government of Maharashtra in the matter pending for inquiry under Sec. 22 (A) of the Maharashtra PrivateForest (Acquisition) Act, 1975 pertaining to all such land, which stands acquired as Reserved Forests under the said Act and, in the event of restoration of such land or the part thereof to the owner under the provision of Sec. 22 (A) of the said Act, if the area is diverted for the project of construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State. The liability of such an event shall be with JSW Energy PSP Two Limited, Mumbai.

Date: 06/02/2025
Place: Mumbai
Office Seal:

JSW Energy PSP Two Limited

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

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Date of Proposal: 06/03/2022

(Sr. No. 13 of Checklist)

NO OBJECTION CERTIFICATE

From Private Owner

Not applicable.

Date: 06/02/2025
Place: Mumbai
Office Seal:

JSW Energy PSP Two Limited

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

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Date of Proposal: 06/03/2022

(Sr. No. 14 of Checklist)

CERTIFICATE
OF CATCHMENT AREA TREATMENT PLAN

Certified that the Project Authority is agreeing to take up the Catchment Area Treatment Plan operations in the Forest Area and Non- Forest Catchment Areas as per approved Plan of Operation and also agree to abide by all the conditions stipulated by the Government of India, vide letter no. F. No. 8- 227.87- FC dated 18 June 2004.

JSW Energy PSP Two Limited

Date: 06/02/2025
Place: Mumbai
Office Seal:

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

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(Sr. No. 15 of Checklist)

CATCHMENT AREA TREATMENT PLAN

Copy of draft CAT Plan is attached herewith.

From: Page No. 88/1 to Page No. 88/ 92

Date: 06/02/2025
Place: Mumbai
Office Seal:

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(Sr. No. 16 of Checklist)

CERTIFICATE
REGARDING NOC From FDCM

Certified that the Forest Land proposed for diversion for the extant proposal does not fall within the jurisdiction of Forest Development Corporation of Maharashtra. Hence, not applicable.

Date: 06/02/2025
Place: Mumbai
Office Seal:

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(Sr. No. 17 of Checklist)

MUCK DISPOSAL PLAN

Copy attached herewith.

From: Page No. 90/1 to Page No. 90/13

Date: 06/02/2025
Place: Mumbai
Office Seal:

JSW Energy PSP Two Limited

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

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(Sr. No. 18 of Checklist)

CERTIFICATE
OF SCHEDULED TRIBE AREA

1. Certified that the proposal project area in Shahapur Tehsil of Thane District is fully within the Scheduled Tribe Area.

2. Certified that the proposal project area in Jamunde village of Igatpuri Tehsil of Nasik District is fully within the Scheduled Tribe Area.

JSW Energy PSP Two Limited

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(Sr. No. 19 of Checklist)

MINING PLAN

Not applicable.

Date: 06 / 02/2025
Place: Mumbai
Office Seal:

JSW Energy PSP Two Limited

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai