



Government of India  
Ministry of Environment, Forest and Climate Change  
IA Division  
(River Valley and Hydroelectric Projects)

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Minutes of 54th EXPERT APPRAISAL COMMITTEE meeting River Valley and  
Hydroelectric Projects held from 08/05/2026 to 08/05/2026

Date: 22/05/2026

MoM ID: EC/MOM/EAC/929876/5/2026  
Agenda ID: EC/AGENDA/EAC/929876/5/2026  
Meeting Venue: N/A  
Meeting Mode: Virtual  
Date & Time:

08/05/2026	10:30 AM	05:30 PM
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### 1. Opening remarks

The 54<sup>th</sup> meeting of the EAC for River Valley & Hydroelectric Projects organized by the Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi, was held on 08<sup>th</sup> May, 2026 through Virtual Mode, under the Chairmanship of Prof. G. J. Chakrapani.

### 2. Confirmation of the minutes of previous meeting

The Minutes of the 53<sup>rd</sup> meeting held on 29<sup>th</sup> April and 30<sup>th</sup> April, 2026.

- Corrigendum to the Minutes of previous EAC meeting:

- [A]. Corrigendum to the Minutes of the 50<sup>th</sup> EAC meeting held on 11<sup>th</sup> March, 2026

Agenda Item No. 50.2 Saundatti (1200 MW to 1600 MW) (Integrated Renewable Energy with Pumped Storage Project) in an area of 307.42 Ha (213.7 ha existing + 93.72 Ha additional) in Village Badli, Mallor, Yekkundi, etc., Sub District Savadatti, District Belagavi Karnataka by M/s Greenko Ka01 IREP Private Limited - Terms of Reference (ToR) - reg.

[Proposal No. IA/KA/RIV/571168/2026; F. No. J-12011/11/2018-IA.I-(R)]

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[B]. Corrigendum to the Minutes of the 52<sup>nd</sup> EAC meeting held on 13.04.2026 in the Minutes of the 52<sup>nd</sup> EAC meeting held on 13<sup>th</sup> April, 2026

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Agenda Item No. 52.3: Chentikheda Major Irrigation Project (15,300 ha CCA) in an area of 1369.35 located at Aroda, Pachnia, and Garhi etc., Sub-District Vijaypur & Sabalgarh, District Sheopur & Morena, Madhya Pradesh by M/s Water Resource Department Sabalgarh, District Morena, MP – Environmental Clearance (EC) – reg.

[Proposal No. IA/MP/RIV/557462/2026; F. No. J-12011/28/2024-IA.I (R)]

The above-mentioned proposal has been considered by the EAC in its 52<sup>nd</sup> meeting held on 13.04.2026. The minutes of the meeting and all the project documents are available on PARIVESH portal. However, EAC noticed that there is some inadvertent typographical error in certain paragraphs of the EAC deliberation part of the minutes of the instant project mentioned as under:

*“.....The EAC noted that the project site is located within 10 km of Kuno National Park, an ecologically sensitive and protected area. In view of the proximity to the National Park, the Committee emphasized the requirement of prior clearance from the National Board for Wildlife (NBWL) under the provisions of the Wildlife (Protection) Act, 1972. The Committee took note that the Project Proponent has applied for wildlife clearance, and the proposal has been registered with reference/application no. WL/MP/IRRIG/541262/2025 for consideration by the NBWL.*

*The EAC inquired about the downstream impacts of the project and observed that the dam proposed on*

*The EAC opined that the project shall be considered further only after obtaining the requisite wildlife clearance and submission of recommendations of the Standing Committee of NBWL, along with a site-specific Wildlife Conservation Plan addressing potential impacts on fauna, habitat, and ecological connectivity. ....”*

Now, the EAC opined that the deliberations of the EAC of above-mentioned agenda item shall be read as:

*“.....The EAC noted that the project site is located within 10 km of Kuno National Park, an ecologically sensitive and protected area. In view of the proximity to the National Park, the Committee emphasized the requirement of prior clearance from the National Board for Wildlife (NBWL) under the provisions of the Wildlife (Protection) Act, 1972. The Committee took note that the Project Proponent has applied for wildlife clearance, and the proposal has been registered with reference/application no. WL/MP/IRRIG/541262/2025 for consideration by the NBWL.*

*The EAC opined that the project shall be considered cleared subject to obtaining the requisite wildlife clearance and submission of recommendations of the Standing Committee of NBWL, along with a site-specific Wildlife Conservation Plan addressing potential impacts on fauna, habitat, and ecological connectivity. ....”*

### 3. Details of proposals considered by the committee

Day 1 -08/05/2026

### 3.1. Agenda Item No 1:

#### 3.1.1. Details of the proposal

Panaura Pumped Storage Project by ADANI HYDRO ENERGY FIVE LIMITED located at SONBHADRA,UTTAR PRADESH			
Proposal For		Fresh EC	
Proposal No	File No	Submission Date	Activity Sub-Activity (Schedule Item)
<a href="#">IA/UP/RIV/570960/2026</a>	J-12011/14/2024-IA-(R)	10/03/2026	River Valley/Irrigation projects Standalone Pump Storage Projects ( 1(c))

#### 3.1.2. Project Salient Features

**54.1.1** The proposal is for grant of Environmental Clearance (EC) to the project for Panaura Close loop Pumped Storage Project (1500 MW) in an area of 236.37 Ha located at Sub District Robertsganj, District Sonbhadra, Uttar Pradesh by M/s Adani Hydro Energy Five Limited.

**54.1.2:** The Project Proponent and the accredited Consultant M/s. R S Envirolink Technologies Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

The study area comprises a total of 56 villages, out of which 2 villages viz., Gurar and Mahona are uninhabited. These villages are located in Robertsganj & Obra tehsils in Sonbhadra district of Uttar Pradesh and Kharaundhi & Ketar tehsils in Garhwa district of Jharkhand. Total population in the study area is 67601, belonging to 13856 households, and the average family size is 4-5 members. Of the total population, male population is 35919 (53.13%) and female population is 31682 (46.86%). The sex ratio is 882 females per 1,000 males. Children population (0-6 age group) is 19.39% of total population in the study area villages. Total percentage of Scheduled Tribe and Scheduled Caste population in the study area is 29.60% and 20.30% respectively. Literacy rate in the study area is 57.91%. Around 43.42% of the total population are workers, among them, 38.38% are main workers while 61.61% are marginal workers. Among specific occupational categories, 12.40% are cultivators, 67.24% are agricultural labourers, 4.05% are household industrial workers and the rest 16.30% are other workers constitute 16.30%.

Parameter	Unit	Min	Max	Avg	Standards
PM <sub>2.5</sub>	mg/m <sup>3</sup>	17.40	21.70	19.55	60
PM <sub>10</sub>	mg/m <sup>3</sup>	39.10	45.60	42.35	100
SO <sub>2</sub>	mg/m <sup>3</sup>	4.10	7.70	5.90	80
NO <sub>2</sub>	mg/m <sup>3</sup>	7.50	9.30	8.40	80
Parameter	Unit	Min	Max	Avg	Standards
PM <sub>2.5</sub>	mg/m <sup>3</sup>	18.10	25.60	21.85	60
PM <sub>10</sub>	mg/m <sup>3</sup>	41.60	50.30	45.95	100
SO <sub>2</sub>	mg/m <sup>3</sup>	5.20	8.50	6.85	80
NO <sub>2</sub>	mg/m <sup>3</sup>	6.10	12.20	9.15	80

Criteria P	Unit	Baseline Conc	Predicted in	Total GL
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pollutant		concentration [A]	incremental value considering worst case stability class [B]	C [A]+[B]	
PM <sub>10</sub>	mg/m <sup>3</sup>	45.6	13.68	59.28	
PM <sub>2.5</sub>	mg/m <sup>3</sup>	21.7	6.51	28.21	
SO <sub>2</sub>	mg/m <sup>3</sup>	7.3	8.76	16.06	
NO <sub>2</sub>	mg/m <sup>3</sup>	9.1	10.92	20.02	
Criteria Pollutant	Unit	Baseline Concentration [A]	Predicted incremental value considering worst case stability class [B]	Total GL C [A]+[B]	
PM <sub>10</sub>	mg/m <sup>3</sup>	48.9	0	48.9	
PM <sub>2.5</sub>	mg/m <sup>3</sup>	25.6	0	25.6	
SO <sub>2</sub>	mg/m <sup>3</sup>	8.2	0	8.2	
NO <sub>2</sub>	mg/m <sup>3</sup>	10.7	0	10.7	

Core Zone				
S. No.	Parameters	Min	Max	Standards
1	pH	7.4	7.75	8.5
2	Total Dissolved Solids, mg/L	34	110	500
3	Dissolved Oxygen (mg/l)	7.6	7.8	6
4	Chloride (as Cl), mg/L	24	30	250
5	Total Hardness (as CaCO <sub>3</sub> ), mg/L	97.4	104	300
6	Biological Oxygen Demand (mg/l)	3	3.9	2
7	Chemical Oxygen Demand (mg/l)	16.8	17.5	0
8	Total Coliform (MPN/100 ml)	48	420	50
Buffer Zone				
S. No.	Parameters	Min	Max	Standards
1	pH	7.04	7.83	8.5
2	Total Dissolved Solids, mg/L	37	227	500
3	Dissolved Oxygen (mg/l)	7.1	8.3	6
4	Chloride (as Cl), mg/L	28.8	32.8	250
5	Total Hardness (as CaCO <sub>3</sub> ), mg/L	83.2	111.4	200
6	Biological Oxygen Demand (mg/l)	1.8	3.2	2
7	Chemical Oxygen Demand (mg/l)	7.1	17.1	0
8	Total Coliform (MPN/100 ml)	21	485	50

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Core Zone					
S. No.	Parameters	Min	Max	Desired Limits	Permissible Limits
1	pH	7.17	7.27	6.5	8.5
2	Total Dissolved Solids, mg/L	188	590	500	2000
3	Chloride (as Cl), mg/L	20	23	250	1000
4	Total Hardness (as CaCO <sub>3</sub> ), mg/L	26	27.2	200	600
5	Fluoride (as F), mg/L	0.12	0.12	1	1.5
Buffer Zone					
S. No.	Parameters	Min	Max	Desired Limits	Permissible Limits
1	pH	6.55	7.37	6.5	8.5
2	Total Dissolved Solids, mg/L	73	646	500	2000
3	Chloride (as Cl), mg/L	19	26	250	1000

4	Total Hardness (as CaCO <sub>3</sub> ), mg/L	24.2	31.3	200	600
5	Fluoride (as F), mg/L	0.05	0.15	1	1.5

Zone	Category	Leq Day dB(A)		Leq Night dB(A)		Prescribed Limits	
		From	To	From	To	Day	Night
Core	Residential	50.0	54.0	33.6	35.5	55	45
Buffer	Residential	51.7	55.0	34.0	37.2	55	45

#### Core Zone

S. No.	Parameters	Min	Max	Prescribed Limits
1	Calcium (mg/kg)	450	479	500
2	Magnesium (mg/kg)	188	190	500
3	Nitrogen (kg/ha)	263	309	500
4	Phosphorus (kg/ha)	11.1	12.6	50
5	Potassium (kg/ha)	288	322	500
6	Carbon (%)	0.57	0.75	4
7	Sodium Absorption Ratio	1.37	1.58	10
8	Salinity (ppt)	0	0	0

#### Buffer Zone

S. No.	Parameters	Min	Max	Prescribed Limits
1	Calcium (mg/kg)	328	571	500
2	Magnesium (mg/kg)	152	259	500
3	Nitrogen (kg/ha)	214	295	500
4	Phosphorus (kg/ha)	9.9	14.7	50
5	Potassium (kg/ha)	229	312	500
6	Carbon (%)	0.55	0.8	4
7	Sodium Absorption Ratio	1.3	1.6	10
8	Salinity (ppt)	0	0	0

As per Wildlife Protection Amendment Act, 2022, 10 mammals (Blackbuck, Sambar, Jackal, Jungle Cat, Indian Grey Mongoose, Stripped Hyena, Sloth Bear, Common Leopard, Bengal Fox and Indian Crested Porcupine); 4 bird (Brahminy Kite, Red-Headed Vulture, Indian Peafowl and Mottled wood owl); and 7 herpetofauna (Indian Sand Boa, Indian Chameleon, Indian Rat snake, Indian cobra, King cobra, Russell's Viper and Bengal Monitor Lizard) species are listed as Schedule I species.

- Sanitation and Solid Waste Management Plan- The implementation of the Sanitation and Solid Waste Management Plan, including provision of infrastructure, training, and strict adherence to waste segregation, transportation, and disposal protocols, will be carried out at regular intervals throughout the construction period. The solid waste will be transported for disposal at the designated landfill sites. The landfill shall have impervious clay at the bottom-most layers. The second layer shall be impervious liner (Geomembrane), the third layer will be of sand, after that well-compacted solid waste is to be put over the sand, then again, a layer of clay, finally a layer of soil. Vegetation shall be grown on the topmost layers. It will give a good aesthetic view of the landfill.
- For Disposal of hazardous waste vendors authorized by State Pollution Control

Committee shall be engaged.

- Following the utilization of muck across various project components and deposition of the same within the reservoir areas, the remaining quantity of muck requiring disposal is estimated at 7,61,503 cum. This volume will be utilised for levelling the undulating terrain beneath Water Conductor System, Site Office, Workshop, Labour Camps and Batching Plant. Total capacity of these sites is 9,66,547 cum. All the sites are around 800m away from HFL.

**Suggestions/ Comments Given by Stakeholders**

Issues/Comments/Observations	Reply by the User Agency
<p>Shri Imran Ali of Village Panaura, Sonbhadra welcomed the project and stated that the company will indeed pay for land that is recorded in the land revenue record in the name of a person. However, some people do not own land, and those who live in the forest should also be given compensation. Shri Imran Ali requested that, keeping his experiences in mind, the officials of the project should pay attention to the ground situation.</p>	<p>Private land required for the project will be purchased based on consultation, negotiation, and mutual consent with the landowners under the supervision of the district administration, in accordance with the provisions of the 'Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013' and the notification number '98/I-13-2014-5KA(25)-2013T.C' issued by the State Government of Uttar Pradesh on October 22, 2014.</p>
<p>Shri. Abrar Ali, from Village Panaura, Sonbhadra, while welcoming the project, inquired about what percentage of people would receive employment in this company. Additionally, a request was made to provide free education and employment.</p>	<p>Provision for a Skill Development Center has been made under the Local Development Plan to provide self-employment opportunities and make local people self-reliant. Financial provisions have been made under the Local Development Plan to arrange for drinking water in the villages within the project area. There is a provision for compensatory afforestation on equivalent non-forest land in exchange for the forest land required for the project. A green belt will be developed around the project area. Under the Local Area Development Plan, financial provisions have been set aside for the strengthening of road routes as part of basic infrastructure development in the project area.</p>
<p>Shri Raj Kumar, Village Pradhan of Panaura, while welcoming the project, echoed the demand for free education and employment opportunities for the local population. He informed that Nagwa is a Naxal-affected area and requested the project proponent to consider establishment of a degree college, provision of free medicines, and supply of free electricity to the local community.</p>	<p>Local residents will be given employment in the project based on skills. Under the Company's Corporate Social Responsibility (CSR) scheme, educational and healthcare facilities will be extended to the surrounding areas.</p>
<p>Shri Istkar Ali, Village Panaura, Sonbhadra, while welcoming the project, thanked the</p>	<p>During the project construction phase, approximately 1,200 skilled and semi-skilled w</p>

Issues/Comments/Observations		Reply by the User Agency	
company for opening. Requested that at least 50% of jobs be given to local people.		workers will be required, and during the project operation phase, 150 skilled and semi-skilled workers will be required. Local people will get direct and indirect employment opportunities from the project. At the same time, affected families will be provided employment on the basis of seniority/eligibility. Local people will also be given contracts in construction works as per their qualifications. As required, local vehicles will be engaged in construction activities.	
Mohd. Umar, from Village Panaura, Sonbhadra, while welcoming the project, has informed that with the arrival of the Adani Company, a bright future is visible. He stated that without worrying about the land, people in Dala, Renukoot, and Obra have received employment due to the setting up of factories, and poverty has also been alleviated. We want a factory to open in Panaura so that the people here get employment and poverty is eliminated. Along with this, we want facilities for skill development, as well as sewing machines and computers/laptops, to be provided free of cost so that everyone can become educated.		In order to make the unemployed youth of the village skilled, they will first be trained under skill development. Following this, they will be given priority for employment in the project according to their qualifications. Through the company's CER scheme, education and medical facilities will be provided in the surrounding areas	
Sh. Santosh Kumar, Village Pradhan of Chanane, Sonbhadra, while welcoming the project, has informed that we are all tribals. Along with fair compensation for the land that will be taken from us, one job should be provided to each affected family and a free health center should be built.		Those who have land, houses, etc., in their name will be given full compensation through mutual consent, and educated people will be given employment in the project based on their skills. Health camps will be organized in the surrounding areas from time to time	
S. No.	Description	Upper Dam	Lower Dam
1	<b>LOCATION</b>		
A	State	Uttar Pradesh	
B	District	Sonbhadra	
C	Taluka/ Village	Robertsganj	
D	Latitude	24°32'50.58"N	24°31'30.04"N

S. No.	Description	Upper Dam	Lower Dam
E	Longitude	83°24'24.84"E	83°24'40.03"E
f	Nallah	Minor nallah draining Into Son (Sone) River	
g	Road	Robertsganj to Panaura via MDR 160E (43km) and thereafter village road	
h	Nearest Rail Head	Sonbhadra Railway Station, 50km from Project Site	
i	Nearest Airport	Varanasi, 145 km from Project Site	
<b>2</b>	<b>HYDROLOGY</b>		
a	Catchment Area	1.0 km <sup>2</sup>	7.0 km <sup>2</sup>
b	Design Flood	29.84 m <sup>3</sup> /s	269.84 m <sup>3</sup> /s
c	Quantity of Water Required for Daily 6 hrs Power Generation	11.06 Mm <sup>3</sup>	11.06 Mm <sup>3</sup>
<b>3</b>	<b>RESERVOIRS</b>		
a	MWL	El. 550.50 m	El. 217.50 m
b	FRL	El. 550.00 m	El. 216.00 m
c	MDDL	El. 532.00 m	El. 176.00 m
d	Gross Storage at FRL	11.48 Mm <sup>3</sup>	13.09 Mm <sup>3</sup>
e	Gross Storage at MDDL	0.33 Mm <sup>3</sup>	0.25 Mm <sup>3</sup>
f	Live Storage	11.15 Mm <sup>3</sup>	12.84 Mm <sup>3</sup>
<b>3.1</b>	<b>Dams</b>		
a	Dam Type	Concrete Gravity Dam	Geomembrane Faced Rockfill / Concrete Dam
b	Total Length	1608.00	1292.00

S. No.	Description	Upper Dam	Lower Dam
c	Top of Dam	El. 552.00 m	El. 219.50 m
d	Deepest Bed Level	El. 524.00 m	El. 166.00 m
e	Max. Height	28.0m	82.5m (Concrete) 53.5m (Rockfill)
<b>3.2</b>	<b>Spillway</b>		
a	Spillway Type & Size	Ungated (6 bays of 8.25m)	Gated (2 bays of 6.0m x 6.0 m)
b	Crest Level of Spillway	El. 550.00m	El. 207.00
<b>4</b>	<b>INTAKE</b>		
a	Type	Horizontal - 3 No.	Horizontal - 3 No.
b	Trash Rack Size (Each Intake)	Larger Unit -3 Bays of 7.7m (W)x 12.0m(H) Smaller Unit -2 Bays 6.0m (W)x 12.0m(H)	Larger Unit -3 Bays of 7.7m (W)x 12.7m(H) Smaller Unit -2 Bays 6.0m (W)x 12.7m(H)
c	Intake Gate Size	Larger Unit -7.0mx7.0m Smaller Unit-5.3mx5.3m	Larger Unit -8.2mx8.2m Smaller Unit-6.0mx6.0m
<b>5</b>	<b>PRESSURE SHAFT</b>	<b>Larger Units</b>	<b>Smaller Units</b>
a	Number	2 nos. / 4 nos.	1 no. / 2 nos.
b	Shape	Circular	Circular
c	Diameter	7.0m / 5.2m, 4.6m	5.3m / 3.6m
d	Length	865.0m / 576.0m , 343.0m	879.0m / 901.0m
e	Lining	Steel	Steel
<b>6</b>	<b>POWER HOUSE</b>		
a	Type	Deep pit Surface	
b	Installed Capacity	6 no's (4 X 300 MW & 2 X 150 MW)	

S. No.	Description	Upper Dam	Lower Dam
c	Size	178 m x 26 m x 52 m	
d	C/L of Unit	RL 132.00 m	
e	Service bay level	RL 148.30 m	
f	Control Room Building	178 m x 9 m x 29.5 m	
<b>7</b>	<b>TAILRACE TUNNEL</b>	<b>Larger Unit</b>	<b>Smaller Unit</b>
a	Number	4 nos./ 2 nos.	2 nos./ 1 no.
b	Length	50.0 m / 366.0 m	50.0 m / 218.0 m
c	Shape	Circular	Circular
d	Diameter	6.0 m / 8.2 m	4.6 m / 6.0 m
e	Lining	Concrete	Concrete
<b>8</b>	<b>ELECTRO-MECHANICAL EQUIPMENT</b>		
<b>10.1</b>	<b>Powerhouse</b>		
a	Type	Surface	
b	Center Line of Unit	El. 132.00 m	
c	Service bay level	El. 148.30 m	
d	Unloading Bay Level	El. 166.00 m	
<b>10.2</b>	<b>Electromechanical Equipment</b>		
a	Pump Turbine	Francis type, vertical shaft reversible pump-turbine	
b	Total No of units	6 no's (4 X 300 MW & 2 X 150 MW)	
c	Cumulative Design Discharge	509.33 m <sup>3</sup> /s (Turbine Mode) 396.65 m	

S. No.	Description	Upper Dam	Lower Dam
		3/s (Pump Mode)	
10.2.1		300 MW Turbines	150 MW Turbines
	Pump Turbine	Francis type, vertical shaft reversible pump-turbine	Francis type, vertical shaft reversible pump-turbine
	Turbine Capacity	300 MW	150 MW
	Turbine Design Discharge	101.82 m <sup>3</sup> /s for each Unit	51.02 m <sup>3</sup> /s for each Unit
	Rated Head in Turbine Mode	335.07 m	334.34 m
	Pump Capacity	335 MW	169 MW
	Pump Design Discharge	79.30 m <sup>3</sup> /s for each Unit	39.73 m <sup>3</sup> /s for each Unit
	Rated Head in Pump Mode	349.77 m	350.21 m
	Synchronous speed	273.73 rpm	375 rpm
10.2.2	Generator-Motor		
	Type	Three phase, alternating current salient pole synchronous, generator motor with vertical shaft	Three phase, alternating current salient pole synchronous, generator motor with vertical shaft
	Number of units	4 Units	2 Units
	Rated Capacity	Generator – 300 MW Motor Input –336 MW	Generator – 150 MW Motor Input –169 MW
	Rated Voltage	18 KV	18 KV
10.2.3	Motor Generator Transformer	OFWF type Three-Phase transformers with OFF Circuit tap changer (OCTC)	OFWF type Three-Phase transformers with OFF Circuit tap changer (OCTC)

S. No.	Description	Upper Dam	Lower Dam
	Number of units	4 Units	2 Units
	Rated Capacity of each unit	355 MVA	178 MVA
	Voltage Ratio	Primary – 18 KV; Secondary - 420 kV adjustable range of the secondary voltage: -5% to +5% in 2.5% steps	Primary – 18 KV; Secondary - 420 kV adjustable range of the secondary voltage: -5% to +5% in 2.5% steps
<b>10.3</b>	<b>400 kV Gas Insulated Switchgear</b>	(GIS)	
a	Type of GIS	Indoor Type	
b	No. of GIS units	One Set (11 Bays)	
c	Location	GIS Building (above Motor Generator transformers)	
d	Scheme	Double Busbar Arrangement with bus coupler	
<b>10.4</b>	<b>Power Evacuation</b>		
a	Voltage Level (KV)	400 KV	
b	No. of Transmission lines	Double Circuit Transmission Line	
c	Conductor	(GIS)	
d	Terminating at	Indoor Type	
EAC meeting/s		54 <sup>th</sup> Meeting	
Date of Meeting/s		08.05.2026	
Date of earlier EAC meetings		18-19 <sup>th</sup> July 2024 (Scoping Clearance)	
Name of the Proposal		Panaura Pumped Storage Project (1500 MW)	
Proposal No.		IA/UP/RIV/570960/2026	
Location (Including Coordinates)		Near Panaura village in the Robertsganj Tehsil and Chanane and Arugur villages in the Obra Tehsil of Sonbhadra District, Uttar Pradesh.	

	Upper Reservoir: Latitude 24°32'50.58"N and Longitude 83° 24'24.84"E Lower Reservoir: Latitude 24°31'30.04"N and Longitude 83° 24'40.03"E.	
Company's Name	M/s Adani Hydro Energy Five Limited	
CIN no. of Company/user agency	U35105GJ2024PLC156613	
Accredited Consultant and certificate no.	Name: R S Envirolink Technologies Pvt. Ltd. Certificate No.: NABET/EIA/25-28/RA 0415	
Project location (Coordinates /River/ Reservoir)	Near Panaura village in the Robertsganj Tehsil and Chanane and Arugur villages in the Obra Tehsil of Sonbhadra District, Uttar Pradesh. Upper Reservoir: Latitude 24°32'50.58"N and Longitude 83° 24'24.84"E Lower Reservoir: Latitude 24°31'30.04"N and Longitude 83° 24'40.03"E. Water for initial filling will be lifted from the Son River to the proposed lower reservoir and used cyclically for energy storage and discharge	
Inter- state issue involved	No	
Proposed on River/ Reservoir	Water for initial filling will be lifted from the Son River	
Type of Hydro-electric project	Off-stream Closed Loop Pumped Storage Project	
Seismic zone	III	
Category of the project	A	
Capacity / Cultural command area (CCA)	1500 MW	
Attracts the General Conditions (Yes/No)	No	
Additional information (if any)	-	
ToR Proposal No.	· IA/UP/RIV/472012/2024 (Fresh TOR) · IA/UP/RIV/525467/2025 (Transfer of TOR)	
EAC meeting date	18-19th July 2024 (Scoping Clearance)	
ToR Letter No.	· TOR Identification No.: TO24A0000UP5969698N (Fresh TOR) · TOR Identification No.: TO25A0000UP5358865T (Transfer of TOR)	

ToR grant Date	<ul style="list-style-type: none"> <li>· 07.09.2024 (Fresh TOR)</li> <li>· 30.04.2025 (Transfer of TOR)</li> </ul>
Cost of project	Rs. 7463.64 Crore
Total area of Project	236.37 Ha
Height of Dam from River Bed ( EL)	<ul style="list-style-type: none"> <li>· Upper Dam: 28 m Concrete Gravity Dam (from deepest foundation level)</li> <li>· Lower Dam: 82.5m Concrete Dam and 53.5m Geomembrane Faced Rockfill Dam (from deepest foundation level)</li> </ul>
Details of submergence area	<ul style="list-style-type: none"> <li>· Upper Reservoir: 11.48 Mm<sup>3</sup> Gross Storage at FRL</li> <li>· Lower Reservoir: 13.09 Mm<sup>3</sup> Gross Storage at FRL</li> </ul>
District to provide irrigation facility (if applicable)	NA
Details of tunnels on upper level & lower level and length of canal (if applicable)	<ul style="list-style-type: none"> <li>· Upper Dam: 2 Nos. 7.0m Dia. 865m long and 4 no. 5.2m/4.6m dia. 576.0m/343.0m long steel lined pressure shaft</li> <li>· Lower Dam: 1 Nos. 5.3m Dia. 879.0m long and 2 no. 3.6 m dia. 901.0m long steel lined unit pressure shaft</li> </ul>
No. of affected Village	Two (2): Panaura village of Robertsganj Tehsil and Arugur village of Obra Tehsil of Sonbhadra District, Uttar Pradesh
No. of Affected Families	
Project Benefits	<p><b>Social Benefits</b> A number of marginal activities and jobs will be available to the locals during the construction phase. Local Area Development, facilities in education, medical, transportation, road network and other infrastructure. An opportunity for small-scale and cottage industries to develop in the area.</p> <p><b>Financial Benefits</b> Project has been designed to meet the peaking requirement during weekdays in the southern region grid and in the state of Uttar Pradesh. The energy output of the project with an installed capacity of 1500 MW has been estimated as 3121 MU annually. The levelized cost of generation of the project has been found to be Rs 8.25 /kWh considering cost of pumping @ Rs 3.00 /kWh.</p>
R&R details	The entire private land identified for the project falls in Panaura village of Robertsganj Tehsil and Arugur village of Obra Tehsil of Sonbhadra District, Uttar Pradesh. The private land identified for the projects belongs to landowner families who will be losing their partial agricultural land holding and some temporary structures constructed in agricultural land. None of the families will be losing any house or

	<p>any other assets. None of them is getting displaced due to the project from the above land procurement.</p> <p>Private land identified for the project will be acquired as per Section 2 and Part (a) of Sub-Section 3 of The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCTLARR), 2013.</p>
Catchment area/ Command area	Both Upper and Lower reservoirs are proposed to be constructed on a stream, which further downstream joins Son River at its left bank. The catchment area of these streams at the dam of both the reservoirs is 7.0 sq km.
Types of Waste and quantity of generation during construction/ Operation	<ul style="list-style-type: none"> <li>· Muck during construction - 7.61 lakh cum (to be disposed)</li> <li>· Municipal Solid Waste during construction - Degradable (380 Kg/day for 1500 persons), Non degradable (100 Kg/day for 1500 persons)</li> </ul>
Material used for blasting and its composition as per DGMS standards.	One magazine of 25 MT capacities would be sufficient to meet the requirement of the project. A mobile explosive van shall be deployed to carry explosive at the site of use at upper and lower dam area. Movement of van should be done with armed guards and proper documentation recommended by PESO.
E-Flows for the Project	The project is an off-stream closed loop pumped storage scheme. The catchment yield shall be released to downstream of lower reservoir. Lower Reservoir will block two small rivulets, however, diversion of these rivulets being blocked by the lower dam is not found to be practical, therefore, appropriate provisions are made in the dams designs for releasing all the water of the upper and lower reservoir's catchment and provision. Hence, E-flow is not required for the scheme.
Is Projects earlier studied in Cumulative Impact assessment & Carrying Capacity studies(CIA&CC) for River in which project located. If yes then a) E-flow with TOR/Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river eco system.	No
Details on provision of fish passes	The project is an off-stream closed loop pumped storage scheme. Water for initial filling will be lifted from the Son River to the proposed lower reservoir and used cyclically for energy storage and discharge. Both the proposed upper and

	d lower reservoirs are artificial reservoirs and are not located on any active streams.
Project benefit including employment details (no of employee)	About 1200 workers (labour and staff) would be engaged during the peak construction period, out of which 350 people will be engaged permanently and about 850 will be temporary labour for the construction work. It is expected that at 90% of the total workforce shall be available from the State of Uttar Pradesh. After completion of the project only a staff of about 150 technical people shall be required for the operation of the project.
Area of Compensatory Afforestation (CA) with tentative no of plantation.	230.12 ha; tentative no. of plantation - 2,50,000
Previous EC details	-
EC Compliance Report by R.O, MOEF&CC	-
No. of trees/saplings proposed in view of 'Ek Ped Maa Ke Naam' campaign	500
Powerhouse Installed Capacity	1500 MW
Generation of Electricity Annually	3121 MU
No. of Units	6 (4 X 300 MW & 2 X 150 MW)
No. of proposed disposal area/ (type of land- Forest/Private land)	Following the utilization of muck across various project components and deposition of the same within the reservoir areas, the remaining quantity of muck requiring disposal is estimated at 7,61,503 cum. This volume will be utilised for levelling the undulating terrain beneath Water Conductor System, Site Office, Workshop, Labour Camps and Batching Plant. Total capacity of these sites is 9,66,547 cum.
Cross section of proposed muck area, Height of muck with slope.	Submitted
Distance of muck disposal area (location), from muck generation sources (project area)/River, HFL of proposed muck disposal area.	800 m from HFL.
Total Muck Disposal Area	-

Estimate Muck to be generated	7,61,503 cum (to be disposed off)	
Transportation	<p>The generated muck will be carried in dumper trucks covered with heavy duty tarpaulin properly tied to the vehicle in accordance with best international practices. All precautionary measures will be followed during the dumping of muck. All dumpers will be well maintained to avoid any chances of loose soil from being falling during transportation. All routes will be periodically wetted with the help of sprinklers prior to the movement of dumper trucks. Dumping would be avoided during the high-speed wind, so that suspended particulate matters (SPM) level could be maintained. Further, dumping will be avoided during heavy traffic. After the dumping the surface of dumps will be sprayed with water with the help of sprinklers and then compacted.</p>	
Monitoring mechanism for Muck Disposal Transportation	The provisions of Monitoring have been kept under proposed Environmental Monitoring Plan.	
Private land	6.25 ha	
Government land	0.00	
Forest Land	230.12 ha	
Total Land	236.37 ha	
Submergence area/Reservoir area	182.10 ha (upper and lower reservoirs)	
Additional information (if any)	-	
<b>Forest Land/ Protected Area/ Environmental Sensitivity Zone</b>	<b>Yes/ No</b>	<b>Details of Certificate/ letter/ Remarks</b>
Reserve Forest/ Protected Forest Land	No	No project component falls in any notified protected area. Nearest Protected Area to the Project Components is Kaimur Wildlife Sanctuary (Bihar), ESZ boundary is about 7.8 km from nearest project component. Nearest Protected Area to the Project Components in Uttar Pradesh is Kaimur Wildlife Sanctuary (U.P.), which is about 26 km from nearest project component.
National Park	No	
Wildlife Sanctuary	No	
Archaeological sites monuments/ historical temples etc.	No	
Additional information (if any)	-	

Advertisement for PH with date	"Dainik Jagran" and "Hindustan Times" dated 13.10.2025	
Date of PH	17/11/2025	
Venue	Village Panaura, Tehsil Robertsganj, District Sonbhadra	
Chaired by	Additional District Magistrate (Namami Gange & Rural Water Supply), District Sonbhadra	
Main issues raised during PH	<p>i. Requests were made to extend compensation not only to recorded landowners but also to forest dwellers and non-title holders, considering ground realities.</p> <p>ii. Strong demand for employment for local people, with some stakeholders suggesting a fixed percentage (e.g., 50%) and preference for affected families.</p> <p>iii. Need for skill development programs and support for self-employment (e.g., training, sewing machines, computers/laptops).</p> <p>iv. Requests for free education, establishment of educational institutions (e.g., degree college), and access to learning resources.</p> <p>v. Demand for free medical facilities, health centers, and regular healthcare support in the project area.</p> <p>vi. Concerns regarding improvement in drinking water supply, roads, electricity, and overall village infrastructure.</p> <p>vii. Emphasis on inclusive development, given the socio-economic vulnerability of tribal populations and the Naxal-affected nature of the region.</p> <p>viii. General support for the project with expectations of poverty alleviation, local economic growth, and improved quality of life.</p> <p>Complete issues raised during PH and clarification given by Project Proponent has been submitted.</p>	
No. of people attended	322	
<b>Particulars</b>	<b>Details</b>	
<b>Period of baseline data collection/ Sampling period.</b>	<b>Winter</b>	
Soil	November 2024	
Air Environment	November 2024-December 2024	

Noise & Traffic	November 2024
Water Quality	November 2024
Vegetation	November 2024
Faunal	November 2024
Socio-economic	November 2024
Brief description on hydrology and water assessment as per the approved Pre-DPR:	<p>The Panaura PSP is proposed between two reservoirs i.e. reservoir and lower reservoir (both are to be constructed newly) and one-time water will be pumped from nearby Son River to the proposed lower reservoir and used cyclically for energy storage and discharge. The one-time filling requirement is 13.42 MCM and annually 1.6 MCM.</p> <p>The upper and lower reservoirs are formed along the minor stream/nala draining into the reservoirs. The upper reservoir has catchment area of 1.0 sq.km, whereas the lower reservoir has a catchment of 7.0 sq.km. that drains the runoff into the reservoir. The yield into the reservoir is assumed to be exactly proportional to area. Based on the 50 year rainfall data, the 90% dependable work out to be 2005 and annual rainfall 558.3 mm and average rainfall is 902.01 mm.</p> <p>The average reservoir area (FRL &amp; MDDL) are 0.6 sq.km. for upper and 0.3 sq.km. for lower reservoir, thus the rainfall yield has been estimated considering runoff for catchment contribution only, whereas for reservoir contribution the runoff coefficient considered as 1. The reservoir yield for 90% dependable year is 0.46 MCM &amp; 2.466 MCM for upper &amp; lower reservoir respectively.</p> <p>The evaporation loss for the proposed upper and lower reservoir has been also worked out using the CWC manual on evaporation control in reservoir, 2006.</p> <p>The maximum annual evaporation loss is estimated as 1.5 MCM and has been adopted for the planning purposes. However, evaporation loss may be reduced by adopting some effective measures such as floating umbrellas, etc. The seepage loss from the reservoir also has been worked out based on the assumed permeability of Quartzite rock which are generally in the order of <math>10^{-5}</math> to <math>10^{-6}</math> cm/sec and accordingly seepage through reservoir bed has been worked out as 0.083 MCM. However, the same shall be reconfirmed after the detailed investigation. Considering the project as off-stream with a small catchment having vegetation's, the sediment volume is generally insignificant.</p> <p>The gross storage at FRL of Upper &amp; Lower reservoir is 11.48 &amp; 13.09 MCM respectively and hydraulic head are 11.60 m &amp; 23.40 m respectively. The upper reservoir falls in intermediate category while lower falls in large category as per IS 11223:1985. Hence, the design flood for upper &amp; lower reservoir would be PMF.</p>

The project is located in the Ganga basin, hence the rainfall of 10,000 year return period has been adopted from CWC PMP atlas which is 450mm. Accordingly, based on the empirical formula, the design flood for upper & lower reservoir have been worked out as 35 cumecs & 350 cumecs respectively. The diversion flood for lower reservoir have been worked out as 165 cumecs based on the 25 year return period flood.

The gross storage capacity available at EL. 550.0 m is estimated as 11.48 MCM, which is considered as FRL. The gross storage capacity available at EL. 216.0 m is estimated as 13.09 MCM, which is considered as FRL. The total quantum of water required for initial filling of both reservoirs together is worked out to 13.42 MCM (Gross storage of UR + Gross storage of LR - water requirement) which will be pumped from the nearby Son River.

Additional detail (If any) -

Particulars	Letter no. and date
Status of Stage- I FC	Online Proposal No. FP/UP/HYD/IRRIG/545346/2025 submitted on 28/07/2025. Currently, pending at UA due to EDS by MS after PSC-I
Approval of Central Water Commission	Feasibility report on the hydrological aspects are cleared by CWC, Hydrology (N) Directorate vide their file no. 1/UP/22/10/2024-Hyd(N), dated 04-12-2024.
Approval of Central Electricity Authority	Chapter on Power Potential Studies has been approved by HPPI Division, CEA vide file no. CEA-HY-14-20/6/2024-HPPI Division dated 06-01-2025.
Additional detail (If any)	
Is FRA (2006) done for FC-I	No

#### Cost for Implementing Environmental Management Plan

S. No.	Component of EMP	Capital Cost (Rs. in lakh)	Recurring Cost (Rs. in lakh)				Total Cost (Rs. in Lakh)
			Year 1	Year 2	Year 3	Year 4	
1	Biodiversity & Wildlife Conservation & Management Plan	235.50	0.00	0.00	0.00	0.00	235.50
2	Fisheries Conservation and Management Plan	59.00	0.00	0.00	0.00	0.00	59.00
3	Green Belt Development Plan	0.00	6.00	6.00	15.87	18.86	46.73

4	Catchment Area Treatment Plan	212.76	0.00	0.00	0.00	0.00	<b>212.76</b>
5	Disaster Management Plan	225.00	31.25	31.25	31.25	31.25	<b>350.00</b>
6	Muck Dumping and Management Plan	62.00	63.00	3.00	2.00	0.00	<b>130.00</b>
7	Landscaping, Restoration of Quarry, and Construction Sites	0.00	80.00	78.64	160.50	160.50	<b>479.64</b>
8	Public Health Delivery System	129.00	32.25	32.25	32.25	32.25	<b>258.00</b>
9	Sanitation and Solid Waste Management Plan	149.40	37.35	37.35	37.35	37.35	<b>298.80</b>
10	Energy Conservation Measures	41.00	60.50	60.50	60.50	60.50	<b>283.00</b>
11	Labour Management Plan	16.40	16.40	16.40	16.40	16.40	<b>82.00</b>
12	Control of Air, Noise and Water Pollution	0.00	20.00	20.00	20.00	20.00	<b>80.00</b>
13	Environmental Monitoring Programme	0.00	37.95	52.75	52.75	52.75	<b>196.20</b>
14	Watershed Development Plan	877.95	0.00	0.00	0.00	0.00	<b>877.95</b>
	<b>Total</b>	<b>2008.01</b>	<b>384.70</b>	<b>338.14</b>	<b>428.87</b>	<b>429.86</b>	<b>3589.58</b>

**Cost for R&R and CER**

S. No.	Components	Capital Cost (Rs. in lakh)
1	Rehabilitation and Resettlement Plan	0.00
2	Corporate Environment Responsibility (CER)	2000.00
	<b>Total</b>	<b>2000.00</b>

**Cost for Compensatory Afforestation, Net Present Value and Value of Trees to be Felled**

S. No	Components	Capital Cost (Rs. in lakh)
1	Compensatory Afforestation	2301.20

2	Net Present Value (NPV)	2204.04
3	Value of Trees to be affected	94.72
	<b>Total</b>	<b>4599.96</b>

### 3.1.3. Deliberations by the committee in previous meetings

N/A
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### 3.1.4. Deliberations by the EAC in current meetings

<p><b>54.1.3 The EAC during deliberations noted the following:</b></p> <ul style="list-style-type: none"> <li>• The EAC deliberated on the information submitted and presented during the meeting, observing that the proposal is for the grant of Environmental Clearance (EC) to the project for Panaura Close loop Pumped Storage Project (1500 MW) in an area of 236.37 Ha located at Sub District Robertsganj, District Sonbhadra, Uttar Pradesh by M/s Adani Hydro Energy Five Limited.</li> <li>• The project is listed under S.N.1(c) of the Schedule to the Environmental Impact Assessment (EIA) Notification as a Category 'A' project, which requires appraisal at the Central level by the Expert Appraisal Committee (EAC).</li> <li>• The EAC, constituted under the provisions of the EIA Notification, 2006, and comprising expert members/domain experts in various fields, examined the proposal submitted by the Project Proponent, including the EIA/EMP reports prepared and submitted by the Consultant accredited by QCI/NABET on behalf of the Project Proponent.</li> <li>• The EAC noted that the Project Proponent has provided an undertaking affirming that the data and information provided in the application and enclosures are accurate to the best of their knowledge, with no suppression of information in the EIA/EMP reports. The proponent also acknowledged that if any part of the data/information submitted is found to be false or misleading at any stage, the project will be rejected, and any Environmental Clearance granted will be revoked at the risk and cost of the Project Proponent.</li> <li>• The EAC observed that earlier Terms of Reference issued by MoEF&amp;CC vide letter no. J-12011/14/2024-IA-I(R) dated 07.09.2024 to the project, subsequently, transfer of ToR was further issued on 30.04.2025 from M/s Adani Green Energy Limited to M/s Adani Hydro Energy Five Limited.</li> <li>• The EAC noted that the baseline study was carried out for one season (from November 2024 - December 2024), which is as per requirement decided by the MoEF&amp;CC for closed loop PSP and all the parameters are within the prescribed norms. Additionally, it was noted by the EAC that the total land requirement is about 236.37 ha which includes 230.12 ha forest land &amp; 6.25 ha non-forest land. It was further noted that for diversion of 230.12 ha forest land the application vide proposal no. FP/UP/HYD/IRRIG/545346/2025 dated 19.07.2025 has been submitted to obtain Stage-I Forest Clearance which is still pending. The PP informed that private land acquisition is also underway; however, the private land owners have shown willingness to provide their land through agreement.</li> <li>• The EAC noted that the Public hearing was conducted on 17.11.2025 at Village Panaura, Tehsil Robertsganj, District Sonbhadra and chaired by Additional District Magistrate (Namami Gange &amp; Rural Water Supply), District Sonbhadra. Public notice mentioning venue location, date and time published in the "Dainik Jagran" and "Hindustan Times" dated 13.10.2025. The EAC discussed the concerns raised during the Public Hearing (PH) and reviewed the action plan submitted by the PP to address these issues. After detailed deliberation, the Committee</li> </ul>
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found the action plan satisfactory, recognizing that the proposed mitigation measures adequately respond to stakeholder's concerns.

- The Committee noted that One-time water will be pumped from nearby Son River to the proposed lower reservoir and used cyclically for energy storage and discharge. The one-time filling requirement is 13.42 MCM and annually 1.6 MCM. The hydrology of the project has been appraised by the CWC vide letter no.1/UP/22/10/2024-Hyd(N) dated 04-12-2024; whereas project layout appraisal was done vide CWC letter No. T-16044/4/2024-HCD(NW) dated 20.06.2025. The Central Electricity Authority (CEA) vide letter No. CEA-HY-14-20/6/2024-HPPI Division dated 06.01.2025 has appraised the proposal.
- The committee considered that due to the proximity of multiple PSPs within the same river basin, a Cumulative Environmental Impact Assessment (CEIA) has been undertaken by the PP to assess the combined and interactive environmental impacts of upstream and downstream developments within the corridor. The CEIA study focuses on assessing the integrated and cumulative impacts on key environmental components, including land use and land cover, water resources, biodiversity, forest areas, socio-economic conditions, and overall ecological balance. Particular attention has been given to potential cumulative effects on the hydrological regime of the Son River, forest ecosystems, and the livelihoods and well-being of local communities within the study area. The CEIA establishes that cumulative impacts associated with PSP clustering are significant but manageable, provided mitigation is implemented in a coordinated, corridor-level manner. The proposed mitigation and environmental management strategy shifts the focus from isolated project compliance to system-level environmental stewardship, ensuring that development of large-scale energy storage infrastructure proceeds without exceeding the carrying capacity of the regional environment or communities.
- Further, it has been observed that Kaimur Wildlife Sanctuary, located at an aerial distance of about 6.9 km from the project site, has an ESZ notified on 30.12.2015 (Bihar State) and all project components are situated outside the notified ESZ area. Accordingly, the Committee deliberated that the project does not attract the provisions of Wildlife Clearance under the Wildlife (Protection) Act, 1972, as amended. However, in view of the proximity of ESZ the Committee advised the PP to ensure compliance with all applicable wildlife and environmental safeguards during construction and operation phases.
- The EAC noted that the total estimated project cost is Rs. 7,463.64 Crore. The Committee further noted that a capital cost of Rs. 2,008.01 lakh has been earmarked towards implementation of the EMP. In addition, recurring expenditure towards operation and maintenance of the EMP has been proposed at Rs. 395.39 lakh per annum, aggregating to Rs. 1,581.57 lakh over a period of four years. Therefore, total EMP budget equates to Rs. 3589.58 Lakhs. The EAC suggested to revise the EMP budget emphasizing on the issues related wildlife habitat improvement and sustainability of river eco system. As advised by EAC, the PP revisited the EMP budget and revised the cost upwards focusing on budget for biodiversity and wildlife management, river ecology, river/nalla protection and fish conservation, muck management and green belt. Out of total project cost i.e. Rs. 7,463.64 crore revised EMP budget works out to be Rs. 73.41 crore, which is 0.984% (approx. 1%) of the total project cost.
- The revised EMP details are as under:

S. No.	Component of EMP	Capital Cost (Rs. in lakh)	Recurring Cost (Rs. in lakh)				Total Cost (Rs. in Lakh)
			Year 1	Year 2	Year 3	Year 4	
1	Biodiversity & Wildlife Conservation & Management Plan	635.00	0.00	0.00	0.00	0.00	635.00

2	River/Nalla Protection and Fisheries Conservation and Management Plan	159.00	0.00	0.00	0.00	0.00	<b>159.00</b>
3	Green Belt Development Plan	0.00	54.00	54.00	93.48	105.44	<b>306.92</b>
4	Catchment Area Treatment Plan	212.76	0.00	0.00	0.00	0.00	<b>212.76</b>
5	Disaster Management Plan	200.00	62.50	62.50	62.50	62.50	<b>450.00</b>
6	Muck Dumping and Management Plan	212.00	188.00	188.00	187.00	230.00	<b>1005.00</b>
7	Landscaping, Restoration of Quarry, and Construction Sites	0.00	160.00	157.28	321.00	321.00	<b>959.28</b>
8	Public Health Delivery System	358.00	64.50	64.50	64.50	64.50	<b>616.00</b>
9	Sanitation and Solid Waste Management Plan	298.80	74.70	74.70	74.70	74.70	<b>597.60</b>
10	Energy Conservation Measures	82.00	101.00	101.00	101.00	101.00	<b>486.00</b>
11	Labour Management Plan	248.00	98.00	98.00	98.00	98.00	<b>640.00</b>
12	Control of Air, Noise and Water Pollution	0.00	50.00	50.00	50.00	50.00	<b>200.00</b>
13	Environmental Monitoring Programme	0.00	37.95	52.75	52.75	52.75	<b>196.20</b>
14	Watershed Development Plan	877.95	0.00	0.00	0.00	0.00	<b>877.95</b>
	<b>Total</b>	<b>3283.51</b>	<b>890.65</b>	<b>902.73</b>	<b>1104.93</b>	<b>1159.89</b>	<b>7341.71</b>

### 3.1.5. Recommendation of EAC

Recommended
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### 3.1.6. Details of Environment Conditions

#### 3.1.6.1. Specific

<b>Miscellaneous:</b>	
1.	After 5 years of the commissioning of the project, a study shall be undertaken regarding impact of the project on the environment. The study shall be undertaken by an independent agency.
2.	A dedicated team to oversee environmental management activities (at project site) shall be set up comprising Environment Manager having post graduate qualification in Environmental Sciences/ Environment Engineering along with other supporting staff. The Environment Manager Shall report to Project Head directly.
3.	PP should establish in house (at project site) environment laboratory for measurement of environment parameter with respect to air quality and water (surface and ground). A dedicated team to oversee environment management shall be setup which should comprise of Environment Engineers, Laboratory chemist and staff for monitoring of air, water quality parameters on routine basis.
4.	PP shall procure construction material only from those Organizations having all valid legal/statutory clearances/permissions or necessary permission to be obtained for quarrying construction materials for the project as per the EIA Notification, 2006 and as amended thereof.
<b>Socio-economic:</b>	
1.	Land acquired for the project shall be suitably compensated in accordance with the prevailing guidelines of the state government and provisions under Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
2.	RO plant shall be installed in the project affected villages/nearby 5 villages and the maintenance shall be done by the project Authorities.
3.	Solar panel be provided to the families living in rural areas within 10 km radius of project.
4.	School up to 12 <sup>th</sup> Standard shall be established and managed to provide free quality education for children from project affected villages/Tribal villages. Adequate transportation facilities shall also be provided to students to ensure connectivity and ease of access.
5.	50 bed multi-specialty hospital shall be established to cater the need of tribal population/locals. The tribal population within 10 km radius of the project shall be given free of cost medical facility.
6.	i. Skill development Centre shall be established within 10 km radius of the project and regular training programmes for development and promotion of traditional art/products of tribal/local population. The Skill Development Plan shall mandatorily include the following components:

	<ul style="list-style-type: none"> <li>· Capacity building and skill enhancement programs aligned with local livelihood opportunities.</li> <li>· Establishment of linkages with Industrial Training Institutes (ITIs) and other recognized training centres for imparting technical skills.</li> <li>· Provision of free or subsidized access to healthcare facilities in project-supported hospitals and health centres.</li> <li>· Support to educational institutions in the study area through free services, scholarships, infrastructure strengthening, and vocational guidance programs.</li> <li>· Special outreach initiatives for women, youth, and vulnerable groups within the SC/ST communities to ensure inclusive participation and benefits.</li> </ul> <p>The Plan shall be implemented in a time-bound manner with clearly earmarked budgetary provisions, which shall not be diverted for any other purpose.</p>
7.	The PP shall submit annual progress reports on the implementation of the Skill Development Plan and associated community welfare measures to the Regional Office of the Ministry.
8.	Bio-Gas plant shall be installed in the Project affected area for Utilizing Cattle waste (Cow Dung) into renewable source of fuel.
9.	Preference in employment opportunities and admission to ITI institutions shall be given to Project Affected Families (PAFs).
10.	An institutional mechanism to be developed to ensure the preference of jobs to PAFs and SC/ST and also a policy for preferential treatment for award of sundry works to the PAFs and SC/ST and their dependents.
11.	The compliance of above conditions shall be monitored by IRO, MoEF&CC and regularly site visit once in year. The compliance report of IRO shall be regularly submitted to MoEF&CC.
<b>Disaster Management:</b>	
1.	Disposal of the excavated muck and its filling on the low-lying area with proper measures for the stabilization and greenery to minimize the impacts of the generated construction muck shall be taken up pari passu with construction work. A muck transportation plan shall be prepared and implemented. The movement of muck carrying vehicles shall be monitored through latest sensor-based technology to ensure the muck dumping at designated sites.
2.	Stabilization of muck disposal sites using biological and engineering measures shall be taken up immediately to ensure that muck does not roll down the slopes and does not pollute the natural streams and water bodies in surrounding area. The plantation on muck disposal site with local species for restoration of ecology and environment of the project site area.
3.	Necessary control measures such as water sprinkling arrangements, and construction of paved roads leading to muck disposal sites etc. shall be taken up on priority to arrest fugitive dust at all the construction sites.
4.	Solid waste generated, especially plastic waste, etc. should not be disposed of as landfill material. It should be treated with scientific approach and recycled. Use of single-use plastics may be discouraged.

5.	The Project Proponent shall obtain necessary approvals from Central Electricity Authority and Central Water Commission, as applicable, prior to commencement of construction activities and submitted to the Ministry/concerned Regional Office for record and compliance.
6.	Landslide and other heavy rain related disasters shall be taken care of through appropriate preventive measures during construction and operation of project.
<b>Environmental management and Biodiversity conservation:</b>	
1.	Stage-I FC shall be obtained before grant of EC.
2.	The water of rainfall yield of self-catchment of the reservoir shall be released to downstream through body of dam/ barrage/ embankment etc.
3.	The Environmental Management Plan (EMP) shall be strictly adhered to as submitted in the EIA/EMP reports. The budgetary provisions for implementation of EMP, shall be fully utilized and not to be diverted to any other purpose. In case of revision of the project cost or due to price level change, the cost of EMP shall also be updated proportionately.
4.	The contract clause limiting the No. of vehicles used during excavation and transportation shall followed scrupulously and the same shall informed to the ministry.
5.	Ambient Air Quality Monitoring Stations for real time data to be installed at project site before commencement of the construction, shall be displayed at project site and its report to be submitted to IRO, MoEF&CC.
6.	No vehicle purchase shall be allowed from funds earmarked for implementation of Wildlife Conservation plan. Measures for minimizing the human-animal conflict specially for black bear and leopard be suitably incorporated in the wildlife conservation plan in consultation with State Forest Department.
7.	10000 plants shall be planted around the muck disposal area and the survival of plants shall be submitted with the 6 monthly compliance report.
8.	Plantation of saplings shall be carried out as a part of the tree plantation campaign "Ek Ped Ma Ke Naam" and the details of the same shall be uploaded in the MeriLiFE Portal ( <a href="https://merilife.nic.in">https://merilife.nic.in</a> ).
9.	Watershed development plan prepared shall be implemented within 10 km radius of the project. At least one existing water body in each village within the study area shall be conserved/rejuvenate/restore in consultation with the local authorities. Implementation status be submitted in the 6 monthly compliance report to the concerned regional office of the Ministry.
10.	PP shall prepare time bound reclamation and restoration plan for restoration of batching plant in consultation with the Forest Department and same shall be submitted to IRO, MoEF&CC and shall be fully implemented within five years of commissioning of the project.
11.	The reservoir sedimentation study shall be conducted periodically to determine the actual amount of water available in the reservoir.

1 2.	PP shall optimize the road design by restricting the width to 7 meters along straight stretches and providing additional widening only at hairpin bends or U-turns, wherever essential, so as to minimize forest land diversion and reduce tree cutting to the extent possible.
1 3.	All ephemeral and seasonal rivulets and springs in and around the project area shall be preserved in their natural condition without obstruction or diversion. Necessary measures shall be undertaken for their conservation and rejuvenation to maintain natural drainage and ecological flow.
1 4.	A Wildlife Conservation Action Plan shall be prepared for the prominent species identified during the survey and investigation, in consultation with the State Forest and Wildlife Department, and implemented in letter and spirit with adequate budgetary provisions prior to commencement of project activities. The plan shall be submitted to the Regional office, MoEF&CC and implementation status of the same shall be submitted in six monthly compliance report.

### 3.1.6.2. Standard

1( c)	<b>River Valley/Irrigation projects</b>
<b>Statutory compliance</b>	
1.	The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.
2.	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.
3.	The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report. (in case of the presence of Schedule-I species in the study area).
4.	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee.
5.	NOC shall be obtained from National Commission of Seismic Design Parameters (NCSDS) of CWC.
6.	Necessary approval of CEA shall be obtained for those projects having the project cost more than Rs. 1,000 crores.
<b>Air quality monitoring and preservation</b>	
1.	Regular monitoring of various environmental parameters viz., Water Quality, Ambient Air Quality and Noise levels as per the CPCB guidelines at designated locations shall be carried out on monthly basis and a detailed database of the same shall be prepared and recorded. This shall be used as a baseline data for post construction EIA / Monitoring purposes.
2.	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points

	including fugitive dust from all vulnerable sources, so as to comply prescribed standards.
3.	Necessary control measures such as water sprinkling arrangements, etc. bet taken up to arrest fugitive dust at all the construction sites.
4.	Conjunctive use of surface water to be planned in the project to check water logging as well as to increase crops productivity. The field drains shall be connected with natural drainage system (if applicable).
5.	Remodelling of existing natural drains (link drains) and connecting them with irrigated land through constructed field drains, collector drains, etc. are to be ensured on priority basis (if applicable).
6.	Before impounding of the water, Cofferdams for both at the upstream and downstream are to be decommissioned as per EIA/EMP report so that once the project is commissioned; cofferdam should not create any adverse impact on water environment including the rock mass and muck used for the Cofferdam.
7.	As the reservoir will be acting as balancing reservoir and there would be fluctuation of water level during peaking period, efforts be made to reduce impact on aquatic life including impacts during spawning period both at the upstream and downstream of the project.
8.	Water depth sensors shall be installed at suitable locations to monitor e-flow. Hourly data to be collected and converted to discharge data. The Gauge and Discharge data in the form of Excel Sheet be submitted to the Regional Office, MoEF & CC and to the CWC on weekly basis.
9.	Mixed irrigation shall be practised and necessary awareness be given to all the farmers and trained in the use of such systems. Proper crops selection shall be carried out for making irrigation facility more effective (if applicable).
10.	On Farm Development (OFD) works like landscaping, land levelling, drainage facilities, field irrigation channels and farm roads, etc. should be taken up in phased manner prior to the start of irrigation in the entire command area. The Command Area Development Plan should be strictly implemented as proposed in the EIA/EMP report (if applicable).
<b>Noise monitoring and prevention</b>	
1.	All the equipment likely to generate high noise shall be appropriately enclosed or inbuilt noise enclosures be provided so as to meet the ambient noise standards as notified under the Noise Pollution (Regulation and Control) Rules, 2000, as amended in 2010 under the Environment Protection Act (EPA), 1986.
2.	The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time.
<b>Catchment Area Treatment Plan</b>	
1.	Catchment Area Treatment (CAT) Plan as proposed in the EIA/EMP report shall be implemented in consultation with the State Forest Department and shall be implemented in synchronization with the construction of the project.
<b>Waste management</b>	
1.	Muck disposal be carried out only in the approved and earmarked sites. The dumping sites shall be located sufficiently away from the HFL of the river. Efforts be made to reuse the muck for construction and other filling purposes and balanced be disposed of at the designated disposal sites. Once the muck

	disposal sites are inactive, proper treatment measures like both engineering and biological measures be carried out so that sites are stabilized quickly.
2.	Solid waste management should be planned in details. Land filling of plastic waste shall be avoided and instead be used for various purposes as envisaged in the EIA/EMP reports. Efforts be made to avoid one time use of plastics.
<b>Green Belt and Wildlife Management</b>	
1.	Based on the recommendation of Cumulative Impact Assessment and Carrying capacity study of river basin or as per the ToR conditions or minimum 15% of the average flow of four consecutive leanest months, whichever value is higher, shall be released as environmental flow.
2.	Detailed information on species composition particular to fish species from previous study/literature be inventoried and proper management plan shall be prepared for insitu conservation in the streams, tributaries of river and the main river itself for which adequate budget provision be made and followed strictly.
3.	Wildlife Conservation Plan approved by the Chief Wildlife Warden shall be implemented in consultation with the local State Forest Department.
4.	To enrich the habitat of the project site, plantation shall be raised as envisaged in the EIA/EMP report. Plantation to be developed along the periphery of the reservoir in multi-layers with local indigenous species in consultation with the local State Forest Department.
5.	Compensatory afforestation programme shall be implemented as per the plan approved.
6.	Fish ladder/pass as envisaged in the EIA/EMP report shall be provided for migration of fishes. Regular monitoring of this facility be carried out to ensure it effectiveness.
<b>Public hearing and Human health issues</b>	
1.	Resettlement & Rehabilitation plan be implemented in consultation with the State Govt. as approved by the State Govt.
2.	Budget provisions made for the community and social development plan including community welfare schemes shall be implemented in toto.
3.	Preventive measures viz. fuming and spraying of mosquito control shall be done in and around the labour colonies, affected villages, stagnated pools, etc. Provisions be made to not to create any stagnated pools to avoid creation of breeding grounds of the vector borne diseases.
4.	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.
5.	Labour force to be engaged for construction works shall be examined thoroughly and adequately treated before issuing them work permit. Medical facilities shall be provided at the construction sites.
<b>Risk Mitigation and Disaster Management</b>	
1.	Early Warning Telemetric system shall be installed in the upper catchment area of the project for

	advance intimation of flood forecast.
2.	Drilling and blasting shall be done only either by licensed explosive agent or by the proponent after obtaining required approvals from Competent Authorities.
3.	Emergency preparedness plan be made for any eventuality of the dam failure and shall be implemented as per the Disaster Management Plan.
4.	Stabilization of muck disposal sites using biological and engineering measures shall be taken up to ensure that muck does not roll down the slopes and shall be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area. The engineering measures for the muck disposal arrangements be evolved after carrying out required slope stability analysis.
5.	Catchment area treatment plan shall be prepared and sufficient fund shall be provided for afforestation, rim plantation, pasture development, nursery development.
<b>Corporate Environment Responsibility</b>	
1.	The project proponent shall comply with the provisions contained in this Ministry's OM vide F.No. 22-65/2017-IA.III dated 30th September, 2020, as applicable, regarding Corporate Environment Responsibility.
2.	Skill mapping be undertaken for the youths of the affected project area and based on the skill mapping, necessary trainings to the youths be provided for their long time livelihood generation
3.	The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest / wildlife norms/ conditions. The company shall have defined system of reporting infringements / deviation/violation of the environmental / forest / wildlife norms/conditions and / or shareholders/ stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.
4.	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.
5.	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six Monthly Compliance Report.
6.	Post EIA and SIA be prepared for the project through a third party and evaluation report be submitted to the Ministry after five years of commissioning of the project.
7.	Multi Disciplinary Committee (MDC) be constituted with experts from Ecology. Forestry, Wildlife, Sociology. Soil Conservation, Fisheries, NGO, etc. to oversee implementation of various environmental safeguards proposed in EIA/EMP report during construction of the project. The monitoring report the Committee shall be uploaded in the website of the Company.
8.	Formation of Water User Association/Co-operative be made involment of the whole community be ensured for discipline use of available water for irrigation purposes

<b>Miscellaneous</b>	
1.	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.
2.	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.
3.	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.
4.	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.
5.	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.
6.	The project proponent shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.
7.	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
8.	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.
9.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).
10.	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.
11.	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.
12.	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.
13.	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.
14.	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any

	other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.
1 5.	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

### 3.2. Agenda Item No 2:

#### 3.2.1. Details of the proposal

<b>Badagaon Off-Stream Close Loop Pumped Storage Project (1000 MW) by RENEW GREEN (TNJ TWO) PRIVATE LIMITED located at REWA, MADHYA PRADESH</b>			
<b>Proposal For</b>		Fresh ToR	
<b>Proposal No</b>	<b>File No</b>	<b>Submission Date</b>	<b>Activity Sub-Activity (Schedule Item)</b>
<a href="#">IA/MP/RIV/575114/2026</a>	J-12011/24/2026-IA.I(R)	30/04/2026	River Valley/Irrigation projects Standalone Pump Storage Projects (1(c))

#### 3.2.2. Project Salient Features

**54.2.1** The proposal is for grant of Terms of Reference (ToR) to the project Badagaon Close Loop Pumped Storage Project (1000 MW) in an area of 373.12 Ha located at Sub District Teonthar, District Rewa, Madhya Pradesh by M/s Renew Green (Tnj Two) Private Limited.

**54.2.2** The Project Proponent and the accredited Consultant M/s Ind Tech House Consult, made a detailed presentation on the salient features of the project and informed that:

<b>Reservoir</b>	<b>Latitude (N)</b>	<b>Longitude (E)</b>
<b>Lower Reservoir</b>	<b>24°56'20.25" N</b>	<b>81°46'50.64"E</b>
<b>Upper Reservoir</b>	<b>24°56'42.96" N</b>	<b>81°45'56.88"E</b>

- Annual energy generation: 3213.5 MU with 1.5 cycles/day
    - Peak power supply improves grid stability and meets demand
    - Levelized tariff: ~₹5.64/kWh (economically viable)
    - Return on equity: 17%
    - Supports renewable integration and reduces reliance on fossil fuels.
  - Local people will be benefited due to direct and indirect job opportunity, training and social welfare initiative, improvement in road infrastructure etc.
- Letter from the Office of the Commissioner – New and Renewable Energy, Govt. of MP

has been obtained on 20/01/2026. Initial stage of allotment published wherein preliminary details of the project is disclosed on the website [www.nred.mp.gov.in](http://www.nred.mp.gov.in). Three alternative layouts have been studied in detail, and the most technical and economical viable layout with minimal R&R issues has been selected for further study.

### Comparison of Alternatives

Description	Alternative-I	Alternative-II	Alternative-III
<b>Upper Reservoir</b>			
Type of Reservoir & Dam	Artificial & CFRD	Artificial & CFRD	Artificial & CFRD
Excavated Bed Level (m)	EL 315m	EL 315m	EL 310m
FRL (m)	EL 332m	EL 333m	EL 326m
MDDL (m)	EL 315m	EL 317m	EL 312m
Dam Top (m)	EL 337m	EL 338m	EL 331m
Area at FRL (Ha)	100 Ha	104.50 Ha	109.10 Ha
Live Storage Capacity (MCM)	16.14 MCM	15.95 MCM	14.67 MCM
Avg. Dam Height from bed level (m)	24m	23m	23m
Length of Dam (km)	3.9 km	3.98 km	4.2 km
<b>Lower Reservoir</b>			
Type of Reservoir & Dam	Artificial & CFRD	Artificial & CFRD	Artificial & CFRD
FRL (m)	EL 135m	EL 136m	EL 135m
MDDL (m)	EL 119m	EL 121m	EL 120m
Dam Top (m)	EL 140m	EL 141m	EL 140m
Area at FRL (Ha)	95	111.24 Ha	114.70 Ha
Live Storage Capacity (MCM)	13.34 MCM	13.29 MCM	15.65 MCM
Avg. Dam Height from bed level (m)	26m	26m	25m
Length of Dam (km)	2.9 km	1.74 km	2.70 km
<b>Water Conductor System (WCS)</b>			
Total Generation Discharge (m <sup>3</sup> /s)	596	594.16	611

Description	Alternative-I	Alternative-II	Alternative-III
Unit Discharge (m <sup>3</sup> /s)	149	148.54	153
Penstock/Pressure Shaft (m)	4 nos, 6.2m dia., ~avg 1120m long each	4 nos, 6.0m dia., ~1008m to 1071 m long each	4 nos, 6.2m dia., ~avg 1090m long each
Upstream L/H Ratio	5.9	5.6	5.9
Upstream Surge Shaft	Not Required	Not Required	Not Required
Tail Race Tunnel (TRT)	4 nos, 7m dia., ~avg 236m long each	4 nos, 6.5m dia., ~143m to 190m long each	4 nos, 7m dia., ~avg 240m long each
Downstream Surge Requirement	Not Required	Not Required	Not Required
<b>Power House</b>			
Type of Powerhouse	Pit-type surface	Pit-type surface	Pit-type surface
Maximum Pit depth (m)	~60m	~52m	~80m
Type of Turbine & No. of Units	Reversible Francis Pump Turbine (Fixed) & 4 Nos.	Reversible Francis Pump Turbine (Fixed) & 4 Nos.	Reversible Francis Pump Turbine (Fixed) & 4 Nos.
<b>Power Potential</b>			
Max Net Head (m)	207	207	200
Min. Net Head (m)	174	176	171
Max Min Net Head Ratio	1.19	1.18	1.17
Peaking Hours (Hrs.)	6.22	6.26	6.26
Pumping Hours (Hrs.)	7.23	7.21	7.28
Total Installed capacity (MW)	1000 MW	1000 MW	1000 MW
Total Pump Capacity (MW)	1100 MW	1100 MW	1100 MW
Rated Net Head (m)	~190.15m	~190.63m	~185.30m
Cyclic Efficiency (%)	78.27%	79.10%	78.20%
Annual Energy (MU)	2157	2172	2171

Description	Alternative-I	Alternative-II	Alternative-III
<b>Land Requirement</b>			
Muck Generated (cum) approx.	60 lakh cum	50 lakh cum	70 lakh cum
Forest land (Ha)	207	261	218
Non forest land (Ha)	186	112	204
Total land (Ha)	393	373	422
<b>Lower Reservoir Area - General</b>			
Submergence area and R&R Issues	Major	Almost negligible	Major
Nallah diversion	Required	Not Required	Not Required

Among three alternatives, Alternative-II has been identified as the most suitable option from an overall environmental, social and techno-economic standpoint -

#### **Environmental and R&R Aspects**

- Alternative-II is the only layout where the lower reservoir is located entirely away from village settlements. This eliminates the need for large-scale displacement and rehabilitation. In contrast, Alternative-I and Alternative-III involve submergence of inhabited areas, leading to major R&R implications, which are environmentally and socially disruptive and often associated with long-term livelihood and socio-economic impacts.
- Alternative-II does not involve any diversion of natural drainage channels or nallahs. Alternative-I requires diversion of a major nallah, which can alter natural hydrology, affect downstream ecosystems, and increase ecological imbalance.
- Although forest land requirement is little higher in Alternative-II, the overall land requirement (373 ha) is the lowest among all alternatives. Further, the land is largely contiguous and free from habitation, enabling better planning of mitigation measures such as compensatory afforestation and biodiversity management.
- Alternative-II has the shortest water conductor system and dam length for the lower reservoir, which reduces excavation, muck generation, and construction footprint. Lower intervention in natural terrain translates to reduced disturbance to local ecology, soil stability, and drainage patterns.
- The absence of habitation and drainage crossings in Alternative-II minimizes risks related to construction-stage impacts such as waterlogging, erosion, and accidental discharge affecting local communities and ecosystems.

#### **Head Utilization & Installed Capacity:**

- Alternative-II and Alternative-I provides a higher rated net head (190.63 m and 190.15m respectively) compared to 185.30 m in Alternative-III, while maintaining a favorable head ratio (Max/Min head 1.18).
- Alternative-II yields the maximum annual energy (2172 MU) with efficient utilization of available head and an adequate peaking duration of about 6.26 hours. All the three alternatives have the same installed capacity of **1000 MW** with similar configuration of

reversible Francis pump turbines.

**Reservoir Layout & Dam Configuration:**

**Water Conductor System & Powerhouse:**

- The water conductor system in Alternative II has the shortest length compared to other alternatives, and better L/H ratio. It is located in more favorable geological conditions with comparatively lesser overburden at the outlet portal of the upper-level pressure shafts. This facilitates ease in excavation, reduced support requirements and improved construction planning.
- The surface pit type powerhouse in Alternative II is located in an area with relatively low overburden and is devoid of nala/stream crossings, thereby minimizing dewatering requirements during construction. In Alternative I, the presence of thick overburden, stream crossings, likelihood of waterlogging and higher excavation depth would result in increased excavation, extensive dewatering measures and longer construction period and cost. In Alternative-III, the overall excavation depth is about 80m which is comparatively higher than Alternative-I (60m) & Alternative II (52m) overall excavation depth.


**· Project details:**

Name of the Proposal	Badagaon Off Stream Closed Loop Pumped Storage Project [1000MW] at Rewa Distict in Madhya Pradesh		
Location (Including coordinates)	Village: Badagaon, & Murli/Raksaha Khurd, Tehsil: Teont har, District: Rewa, Madhya Pradesh		
	Reservoir	Latitude (N)	Longitude (E)
	Lower Reservoir	24°56'20.25"N	81°46'50.64"E
	Upper Reservoir	24°56'42.96"N	81°45'56.88"E
Inter- state issue involved	No		
Seismic zone	Seismic Zone-III		

**· Category details:**

Category of the project	1(c) (i)- Standalone pump storage project, Category-A
Provisions	Nil
Capacity / Cultural command area (C CA)	Not Applicable
Attracts the General Conditions (Yes/	Yes, UP-MP interstate border is at aerial distance

No)	of 6.35 km on NNE
Additional information (if any)	Nil
<b>· Electricity generation capacity:</b>	
Powerhouse Installed Capacity	1000 MW
Generation of Electricity Annually	Total Annual Energy (Generation) (1 cycle/ 1.5 cycle) = 2172.4 MU/ 3213.5 MU
No. of Units	4 units of 250 MW each
Additional information (if any)	Nil
<b>· ToR/EC Details:</b>	
Cost of project	INR 4982.65 Crore
Total area of Project	373.1 ha [Forest land - 261.5 ha + non-forest land - 111.6 ha]
Height of Dam from River Bed (E L)	Not Applicable
Length of Tunnel/Channel	4 nos. Penstock tunnels with varying lengths 1008m to 1071m 4 nos. of TRT of varying lengths of 143 m to 190 m.
Details of Submergence area	Upper reservoir area - 138.8 ha [Forest land] Lower reservoir area - 142.8 ha [Forest land - 93.3 ha + non-forest area - 49.5 ha]
Types of waste and quantity of generation during construction/ Operation	Construction Phase · Muck - approx. 50 lakh cum · Solid wastes from labor camp - 250 TPA approx. · Plastic wastes - 10 TPA approx. · E wastes - 2 TPA approx. · Battery wastes - 3 TPA approx. · Biomedical wastes - 5 TPA approx. · Used oil [hazardous waste] - 1 TPA
E-Flows for the Project	Not applicable
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin.	Not applicable

b) If not the E-Flows maintain criteria for sustaining river ecosystem.		
No. of trees/saplings proposed in view of 'Ek Ped Maa Ke Naam' campaign	Will be detailed in EIA report	
<b>· Muck Management Details:</b>		
No. of proposed disposal area/ (type of land- Forest/Pvt. land)	Non-forest land of area 40 ha	
Muck Management Plan	Will be given in Final EIA report	
Monitoring mechanism for Muck Disposal	Will be given in Final EIA report	
<b>· Land Area Breakup:</b>		
Private land	111.6 ha	
Government land/revenue land		
Forest Land	261.5 ha	
Total Land	373.1 ha	
Submergence area/Reservoir area	Upper reservoir area - 138.8 ha [Forest land] Lower reservoir area - 142.8 ha [Forest land - 93.3 ha + non-forest area - 49.5 ha]	
Additional information (if any)	-	
<b>· Presence of Environmentally Sensitive areas in the study area</b>		
Forest Land/Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate/Letter/ Remarks
Reserve Forest/Protected Forest Land	Yes	Teonthar P.F - aerial distance 6.9 km, West Dhakrabari R.F - Falls within project site. Approval will be obtained for diversion of forest land.
National Park	No	
Wildlife Sanctuary	No	
<b>· Court Case details:</b> Nil		
<b>· Previous EC compliance and necessary approvals:</b>		
Particulars	Letter no. and date	
Certified EC compliance report (if applicable)	Not Applicable	

Status of Stage- I FC	Application is yet to submit
Additional detail (If any)	-
Is FRA (2006) done for FC-I	Will be submitted with the EIA report
<b>Miscellaneous</b>	
<b>Particulars</b>	<b>Details</b>
Details of consultant	Ind Tech House Consult NABET Accreditation valid upto 29/04/2029
Project Benefits	<ul style="list-style-type: none"> <li>· Annual energy generation: 3213.5 MU with 1.5 cycles/day</li> <li>- Peak power supply improves grid stability and meets demand</li> <li>- Levelized tariff: ~₹5.64/kWh (economically viable)</li> <li>- Return on equity: 17%</li> <li>- Supports renewable integration and reduces reliance on fossil fuels.</li> <li>· Local people will be benefited due to direct and indirect job opportunity, training and social welfare initiative, improvement in road infrastructure etc.</li> </ul>
Status of other statutory clearances	Will be obtained as per applicability
R&R details	Private lands will be purchased on mutual agreement between the PP and land owner. Detail R&R study will be conducted and submitted with the EIA report. If the total private land required exceeds the specified limits by the relevant rules notified by the State Government, if any, related to rehabilitation and resettlement under RFCTLARR, 2013 shall apply for the proposed Project.
Additional detail (If any)	-

### 3.2.3. Deliberations by the committee in previous meetings

N/A
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### 3.2.4. Deliberations by the EAC in current meetings

<p><b>54.2.3 The EAC during deliberations noted the following:</b></p> <ul style="list-style-type: none"> <li>· The Expert Appraisal Committee (EAC) deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of TOR for conducting EIA/EMP and Public hearing for Badagaon Close Loop Pumped Storage</li> </ul>
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Project (1000 MW) in an area of 373.12 Ha located at Sub District Teonthar, District Rewa, Madhya Pradesh by M/s Renew Green (Tnj Two) Private Limited.

- The project/activity falls under Category A of item 1(c), 'River Valley Projects,' as per the Schedule of the Environmental Impact Assessment Notification, 2006, and requires appraisal at the Central level by the sectoral EAC in the Ministry.
- The EAC noted that as per the details submitted by the PP, the upper reservoir and lower reservoir are located away from any riverine system, therefore the current proposal is termed as a Closed Loop Pumped Storage Project.
- The EAC observed that the total land required for the project components and related works has been estimated to be about 373.1 ha; out of which 261.5 Ha is forest land and remaining 111.6 Ha is non-forest land. Diversion of forest land for non-forest purpose will be involved for construction of project components. However, it was observed that the application for Stage-I Forest Clearance (FC) has not yet been submitted, which necessitates further action from the Project Proponent. The water requirement for initial filling of reservoir is approx. 23 MCM and estimated annual requirement of 2.50 MCM water from Belan River is required as the evaporation and transit loss makeup.
- Inter-state border of Madhya Pradesh and Uttar Pradesh is at aerial distance of 6.35 Km on NNE of project site. The EAC inquired about the presence of any wildlife corridor which may be disrupted by the proposed project. The PP could not give the satisfactory clarification in this regard. The EAC suggested to get this issue examined in consultation with State Forest and Wildlife Department and submit necessary permission/NOC in this regard along with EIA/EMP report.
- The EAC noted that there is a presence of numerous water falls which reflects the good health of the ecosystem in the region. Accordingly, it was suggested to map all such fresh water sources including ponds, small streams, rivulets etc within the study area and prepare watershed development plan in consultation with expert government research institute so as to maintain the ecological integrity of the region.

The EAC observed that a letter from the Office of the Commissioner, New and Renewable Energy, Govt. of Madhya Pradesh has been obtained vide letter no. F/NRE/2025-26/05-11/1326 dated 20/01/2026.

### 3.2.5. Recommendation of EAC

Recommended

### 3.2.6. Details of Terms of Reference

#### 3.2.6.1. Specific

Miscellaneous:	
1.	Both capital and recurring expenditure under EMP shall be submitted.
2.	Pre-DPR Chapters viz., Hydrology, Layout Map and Power Potential Studies duly appraised by CWC/CEA shall be submitted.
3.	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring

	station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.
4.	Drone video of project site shall be recorded and to be submitted.
5.	Detailed plan to restore wider roads and convert them into narrow up to 10m after construction of the project.
6.	Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pumped storage projects shall be used for preparation of EIA/ EMP reports.
7.	As per Ministry's OM dated 1 <sup>st</sup> August, 2013, PP shall submit application to obtain prior approval of Central Government under the Forest Conservation Act, 1980 for diversion of forest land required for such projects will be submitted as soon as the actual extent of forest land required for the project is known to the project proponent, and in any case, within 6 months of issuance of ToR. However, no proposal will be put up before EAC without submission of application for forest clearance, wherever applicable.
<b>Disaster Management:</b>	
1.	Impact of Project activities (specially blasting and drilling) on the aquatic and terrestrial ecosystem, within study area to be studied and be incorporated in EIA/EMP report.
2.	The muck dumping sites shall be located with a distance of 100 mts from HFL. The PP shall submit the detailed action plan for transportation of muck along with monitoring mechanism of movement of muck carrying trucks.
<b>Muck Management:</b>	
1.	Details of quantity of muck generation component wise, types of muck (Excavation in tunnels, pressure shaft and powerhouse etc.) and disposal site/ transportation to be provided.
2.	Details of muck management such as dumping sites and its locations, transportation plan along with monitoring mechanism for muck transportation, detailing the road map of project construction site/ indicating the distances from HFL, river, project construction site along with types of road etc.
3.	Safety measures for avoiding spill over muck into the riverbed/streams and its flow into the river during the high discharge/ flood or monsoon period. Prepare plan for stabilization of muck disposal sites using biological and engineering measures to ensure that muck does not roll down the slopes and shall be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area.
4.	Restoration plan for construction area including dumping site of excavated materials by levelling, filling up of burrow pits, landscaping etc.
<b>Socio-economic Study:</b>	

1.	Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.
2.	All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. A comparative chart of issues raised by General Public during Public Hearing and commitments made by the Project Proponent will be prepared and submitted in the relevant chapter of EIA/EMP report.
3.	The EIA/EMP shall include a detailed socio-economic assessment of the tribal population in the project-affected area based on primary data and community consultations. A Tribal Development Plan, prepared in consultation with the District Administration and Tribal Welfare Department, shall be submitted along with the EIA report.
4.	PP shall submit the credible documents to show the status of land acquisition w.r.t project site from/through the concerned State Government as required under Ministry's OM dated 7 <sup>th</sup> October, 2014 for the project land to be acquired.
5.	Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land (if any) shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. Budget earmarked for R&R, CSR shall not be included in the cost of EMP.
<b>Environmental Management and Biodiversity Conservation:</b>	
1.	A detailed action plan for large scale plantation of native species of plant sapling within 10 km radius of the project shall be prepared in consultation with State Forest Department. The monitoring mechanism to ensure the survival of saplings shall be finalized in consultation with ICFRE.
2.	The PP will submit 10 years water availability data certified by the CWC/State Water Resource Department for quantity of water that is received annually by the small stream on which lower reservoir is proposed to be constructed.
3.	The PP will submit a detailed plan and monitoring mechanism for releasing the self - catchment water of small stream draining in to river along with action plan for conservation and protection of other streams/rivulets draining in to upper and lower reservoirs.
4.	Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 261.5 Ha of forest land involved in the project shall be submitted within stipulated time.
5.	Muck disposal site and other components such as Township, site office, Stacking area and batching plant shall be located outside the forest area.
6.	Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is not falling in any Ecological Sensitive Area, Wildlife Sanctuary/Tiger corridor/Elephant corridor within 10 km of Project site.
7.	Transportation Plan for transporting construction materials shall be submitted. Separate

	chapter for risk assessment of such transportation through/within proposed the Wildlife Sanctuary shall be included in the EIA report, if any.
8.	Environmental Cost Benefit Analysis shall be done in terms of loss of Forest ecosystem due to diversion of Forest land/loss of biodiversity, water availability, water uses for generation of hydro power and Ecological flows.
9.	The baseline data collection will cover the changes in biological and ecological profile of the region after monsoon with worst-case scenario study and critical mineral assessment.
10.	Calculation and values of GHGs (CO <sub>2</sub> , CH <sub>4</sub> etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.
11.	The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report.
12.	Quantitative values of Impact modelling of environmental parameters shall be submitted for during construction and operation. Also, mitigation measures shall be submitted in terms of construction and operation phase.
13.	Conducting site-specific ecological study emphasizing on riverine ecology viz. fishes diversity, fish migration, habitat and aquatic biota due to construction PSP. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
14.	Action plan for survival or diversion of the rivulets/stream, if any, leading to join river shall be submitted.
15.	Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Specific ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all seasons.
16.	A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.
17.	Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
18.	All fresh water resources viz. small streams, rivulets, water falls in the study area shall be mapped and a report be submitted along with EIA/EMP report.
19.	Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Indian Council of Agriculture Research (ICAR) Institutes/ Expert Govt. institutions and accordingly a detailed Water Shed Development Plan shall be prepared and

	incorporated in EIA/ EMP report.
20.	Details of mineral zone, if any, in the study area, certified by Geological Survey of India or any other concerned Government Organization shall be submitted. The project area should not come up on any critical mineral zone, the same shall to be verified by GSI/NMDC.
21.	Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI.
22.	Combined Impact of projects proposed in the basin on carrying capacity and sustainability of Reservoir/ River /nala of catchment area due to tapping of water for filling reservoir shall be studied.
23.	Action plan for handling the human-wildlife conflict in the study area shall be prepared in consultation forest & wildlife department and be submitted with EIA/EMP report.

### 3.2.6.2. Standard

1(c)	<b>River Valley/Irrigation projects</b>
<b>Scope of EIA Study</b>	
1.	The EIA Report should identify the relevant environmental concerns and focus on potential impacts that may change due to the construction of proposed project. Based on the baseline data collected for three (3) seasons (Pre-monsoon, Monsoon and Winter seasons), the status of the existing environment in the area and capacity to bear the impact on this should be analysed. Based on this analysis, the mitigation measures for minimizing the impact shall be suggested in the EIA/EMP study.
<b>Details of the Project and Site</b>	
1.	General introduction about the proposed project.
2.	Details of Project and site giving L-Sections of all U/S and D/S Projects with all relevant maps and figures. Connect such information as to establish the total length of interference of Natural River and the committed unrestricted release from the site of Dam/Barrage into the main river.
3.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project location.
4.	Location details on a map of the project area with contours indicating main project features. The project layout shall be superimposed on a contour map of ground elevation showing main project features (viz. location of dam, Head works, main canal, branch canals, quarrying etc.) shall be depicted in a scaled map.
5.	Layout details and map of the project along with contours with project components clearly marked with proper scale maps of at least 1:50,000 scale and printed at least on A3 scale for clarity.
6.	Existence of National Park, Sanctuary, Biosphere Reserve etc. in the study area, if any, should be detailed and presented on a map with distinct distances from the project components.
7.	Drainage pattern and map of the river catchment up to the proposed project site.

8.	Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per the methodology of Soil and Land use Survey of India.
9.	Soil characteristics and map of the project area.
1 0.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
1 1.	Remote Sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of the study using overlaying mapping techniques viz. Geographic Information System (GIS), False Color Composite (FCC) generated from satellite data of project area.
1 2.	Land details including forests, private and other land.
1 3.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
1 4.	Different riverine habitats like rapids, pools, side pools and variations in the river substratum bedrocks, rocks, boulders, sand/silt or clay etc. need to be covered under the study
<b>Description of Environment and Baseline Data</b>	
1.	To know the present status of environment in the area, baseline data with respect to environmental components air, water, noise, soil, land and biology & biodiversity (flora & fauna), wildlife, socioeconomic status etc. should be collected within 10 km radius of the main components of the project/site i.e. dam site and power house site. The air quality and noise are to be monitored at such locations which are environmentally & ecologically more sensitive in the study area. The baseline studies should be collected for 1 season (Preferably Monsoon season). Flora-Fauna in the catchment and command area should be documented. The study area should comprise of the following:
2.	(i) Catchment area up to the dam/barrage site.
3.	(ii) Submergence Area.
4.	(iii) Project area or the direct impact area should comprise of area within 10 km radius of the main project components like dam, canals etc.
5.	(iv) Downstream upto 10 km from the tip of the reservoir.
<b>Details of the Methology</b>	
1.	The methodology followed for collection of base line data along with details of number of samples and their locations in the map should be included. Study area should be demarcated properly on the appropriate scale map. Sampling sites should be depicted on map for each parameter with proper legends. For Forest Classification, Champion and Seth (1968) methodology should be followed.
<b>Methodology for Collection of Biodiversity Data</b>	
1.	The number of sampling locations should be adequate to get a reasonable idea of the diversity and other attributes of flora and fauna. The guiding principles should be the size of the study area (larger area should have larger number of sampling locations) and inherent diversity at the location, as known from

	secondary sources (e.g. eastern Himalayan and low altitude sites should have a larger number of sampling locations owing to higher diversity).
2.	The entire area should be divided in grids of 5kmX5km preferably on a GIS domain. There after 25% of the grids should be randomly selected for sampling of which half should be in the directly affected area (grids including project components such as reservoir, dam, powerhouse, tunnel, canal etc.) and the remaining in the rest of the area (areas of influence in 10 km radius form project components). At such chosen location, the size and number of sampling units (e.g. quadrates in case of flora/transects in case of fauna) must be decided by species area curves and the details of the same (graphs and cumulative number of species in a tabulated form) should be provided in the EIA report. Some of the grids on the edges may not be completely overlapping with the study area boundaries. However, these should be counted and considered for selecting 25% of the grids. The number of grids to be surveyed may come out as a decimal number (i.e. it has an integral and a fractional part) which should be rounded to the next whole number.
3.	The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports. The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.
4.	The R.E.T. species referred to in this point should include species listed in Schedule I and II of Wildlife (Protection) Act, 1972 and those listed in the red data books (BSI, ZSI and IUCN).
<b>Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follows:</b>	
1.	null
2.	null

3.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
4.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
5.	Landslide zone or area prone to landslide existing in the study area should be examined.
6.	Presence of important economic mineral deposit, if any.
7.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
8.	Impact of project on geological environment.
9.	null
10.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
11.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO <sub>2</sub> ) and Oxides of Nitrogen (NO <sub>x</sub> ) in the study area at 5-6 Locations.
12.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
13.	null
14.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
15.	null
16.	(i) Generation of thematic maps viz, slope map, drainage map, soil map, land use and land cover map, etc. Based on these, thematic maps, an erosion intensity map should be prepared.
17.	null
18.	History of the ground water table fluctuation in the study area.
19.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO <sub>2</sub> , PO <sub>4</sub> , Cl, SO <sub>4</sub> , Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).

20.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
21.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
22.	Run off, discharge, water availability for the project, sedimentation rate, etc.
23.	Basin characteristics
24.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
25.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km <sup>2</sup> year <sup>-1</sup> .
26.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
27.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
28.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
29.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
30.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
31.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.
32.	A minimum of 1 km distance from the tip of the reservoir to the tail race tunnel should be maintained between upstream and downstream projects.
33.	Besides primary studies, review of secondary data/literature published for project area on flora & fauna including RET species shall be reported in EIA/EMP report.
34.	null
35.	Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.

3 6.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteridophytes, Bryophytes (all groups).
3 7.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
3 8.	Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index (IVI) , Shannon Weiner index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrates, size of quadrates etc. to be reported within the study area in different ecosystems.
3 9.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
4 0.	Economically important species like medicinal plants, timber, fuel wood etc.
4 1.	Details of endemic species found in the project area.
4 2.	Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along-with economic significance. Species diversity curve for RET species should be given.
4 3.	Cropping pattern and Horticultural Practices in the study area.
4 4.	null
4 5.	Fauna study and inventorisatation should be carried out for all groups of animals in the study area. Their present status alongwith Schedule of the species.
4 6.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
4 7.	Information (authenticated) on Avi-fauna and wildlife in the study area.
4 8.	Status of avifauna their resident/ migratory/ passage migrants etc.
4 9.	Documentation of butterflies, if any, found in the area.
5 0.	Details of endemic species found in the project area.
5 1.	RET species-voucher specimens should be collected along-with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian Wildlife (Protection) Act, 1972.
5	Existence of barriers and corridors, if any, for wild animals.

2.	
5 3.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the proposed project development and loss of biodiversity.
5 4.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
5 5.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
5 6.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplanktons, benthos etc.
5 7.	Fish and fisheries, their migration and breeding grounds.
5 8.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
5 9.	Conservation status of aquatic fauna.
6 0.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.
6 1.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.
6 2.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
6 3.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
6 4.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
6 5.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
6 6.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
6 7.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
6 8.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other

	property, possession of cattle, type of house etc.
6 9.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any ethnic/indigenous groups that are getting affected by the project.
<b>Impact Prediction and Mitigation Measures</b>	
1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
2.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources.
3.	Effect on soil, material, vegetation and human health.
4.	Impact of emissions from DG set used for power during the construction, if any, on air environment.
5.	Pollution due to fuel combustion in equipments and vehicles
6.	Fugitive emissions from various sources
7.	Changes in surface and ground water quality
8.	Steps to develop pisci-culture and recreational facilities
9.	Changes in hydraulic regime and downstream flow.
1 0.	Water pollution due to disposal of sewage
1 1.	Water pollution from labour colonies/ camps and washing equipment.
1 2.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) (a) due to considerable road construction / widening activity (b) interference of reservoir with the inflowing stream (c) blasting for commissioning of HRT, TRT and some other structures.
1 3.	Changes in land use / land cover and drainage pattern
1 4.	Immigration of labour population
1 5.	Quarrying operation and muck disposal
1 6.	Changes in land quality including effects of waste disposal
1 7.	River bank and their stability
1	Impact due to submergence.

8.	
1 9.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
2 0.	Pressure on existing natural resources
2 1.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
2 2.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
2 3.	Impact on fish migration and habitat degradation due to decreased flow of water
2 4.	Impact on breeding and nesting grounds of animals and fish.
2 5.	Impact on local community including demographic profile.
2 6.	Impact on socio-economic status
2 7.	Impact on economic status.
2 8.	Impact on human health due to water / vector borne disease
2 9.	Impact on increase traffic
3 0.	Impact on Holy Places and Tourism
3 1.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studied. Proper record shall be maintained of the baseline information in the post project period.
3 2.	Positive and negative impacts likely to be accrued due to the project are listed.
<b>Environmental Management Plan</b>	
1.	null
2.	Biodiversity and Wildlife Conservation and Management Plan for the conservation and preservation of rare, endangered or endemic floral/faunal species or some National Park/Sanctuary/ Biosphere Reserve or other protected area is going to get affected directly or indirectly by construction of the project, then suitable conservation measures should be prepared in consultation with the State Forest Department

	and with the physical and financial details. Suitable conservation techniques (in-situ/ ex-situ) will be proposed under the plan and the areas where such conservation is proposed will be marked on a project layout map.
3.	Compensatory Afforestation shall be prepared by the State Forest Department in lieu of the forest land proposed to be diverted for construction of the project as per the Forest (Conservation) Act, 1980. Choice of plants for afforestation should include native and RET species, if any. This will be a part of the forest clearance proposal.
4.	Fisheries Conservation and Management Plan - a specific fisheries management measures should be prepared for river and reservoir. If the construction of fish ladder/ fish-way etc. is not feasible then measures for reservoir fisheries will be proposed. The plan will detail out the number of hatcheries, nurseries, rearing ponds etc. proposed under the plan with proper drawings. If any migratory fish species is getting affected then the migratory routes, time/season of upstream and downstream migration, spawning grounds etc will be discussed in details.
5.	Green Belt Development Plan along the periphery of the reservoir, approach roads around the colonies and other project components, local plant species must be suggested with physical and financial details. A layout map showing the proposed sites for developing the green belt should be prepared.
6.	Environmental Monitoring Programme to monitor the mitigatory measures implemented at the project site is required will be prepared. Provision for Environment Management Cell should be made. The plan will spell out the aspects required to be monitored, monitoring indicators/parameters with respect to each aspect and the agency responsible for the monitoring of that particular aspect throughout the project implementation.
7.	Catchment Area Treatment (CAT) Plan should be prepared micro-watershed wise. Identification of free draining/ directly draining catchment based upon Remote Sensing and Geographical Information System (GIS) methodology and Sediment Yield Index (SYI) method of AISLUS, Deptt. of Agriculture, Govt. of India coupled with ground survey. Areas or watersheds falling under 'very severe' and 'severe' erosion categories should be provided and required to be treated. Both biological as well as engineering measures should be proposed in consultation with State Forest Department for areas requiring treatment. Year-wise schedule of work and monetary allocation should be provided. Mitigation measures to check shifting cultivation in the catchment area with provision for alternative and better agricultural practices should be included.
8.	Study of Design Earthquake Parameters: A site specific study of earthquake parameters should be done. Results of the site specific earthquake design parameters should be approved by National Committee of Seismic Design Parameters, Central Water Commission (NCSDP), New Delhi.
9.	Dam Break Analysis and Disaster Management Plan The outputs of dam break model should be illustrated with appropriate graphs and maps clearly bringing out the impact of Dam Break scenario. To identify inundation areas, population and structures likely to be affected due to catastrophic floods in the event of dam failure. DMP will be prepared with the help of Dam Break Analysis. Maximum water level that would be attained at various points on the downstream in case of dam break will be marked on a detailed contour map of the downstream area, to show the extent of inundation. The action plan will include Emergency Action and Management plan including measures like preventive action notification, warning procedure and action plan for co-ordination with various authorities.
10.	Reservoir Rim Treatment Plan for stabilization of land slide / land slip zones, if any, around the reservoir periphery is to be prepared based on detailed survey of geology of the reservoir rim area. Suitable engineering and biological measures for treatment of identified slip zones to be suggested with physical and financial schedule. Layout map showing the landslide/landslip zones shall be prepared and appended in the chapter.

1 1.	Muck Disposal Plan- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m away from the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites and approach roads to be given. Financial out lay for this may be given separately. Detailed muck transportation plan delineating the path ways, number of trucks, quantity of muck to be transported along with monitoring mechanism using latest technology, shall be prepared.
1 2.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
1 3.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio-economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
1 4.	Public Health Delivery Plan including the provisions of drinking water supply for local population shall be in the EIA/EMP Report. Status of the existing medical facilities in the project area shall be discussed. Possibilities of strengthening of existing medical facilities, construction of new medical infrastructure etc. will be explored after assessing the need of the labour force and local populace.
1 5.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Panchayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
1 6.	Labour Management Plan for their Health and Safety.
1 7.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
1 8.	Energy Conservation Measures for the work force during construction with physical and financial details. Alternatives will be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use is curbed.
1 9.	Environmental safeguards during construction activities including Road Construction.
2 0.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
2 1.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

### 3.3. Agenda Item No 3:

#### 3.3.1. Details of the proposal

**Nayagaon Pumped Storage Project by GREENKO MH01 IREP PRIVATE LIMITED located at AURANGABAD,**

<b>MAHARASHTRA</b>			
<b>Proposal For</b>		Fresh ToR	
<b>Proposal No</b>	<b>File No</b>	<b>Submission Date</b>	<b>Activity Sub-Activity (Schedule Item)</b>
<a href="#">IA/MH/RIV/577259/2026</a>	J-12011/04/2020-IA-I (R)	01/05/2026	River Valley/Irrigation projects Standalone Pump Storage Projects (1(c))

### 3.3.2. Project Salient Features

**54.2.1** The proposal is for grant of Terms of Reference (ToR) to the project Nayagaon Close loop Pumped Storage Project (2000 MW) in an area of 530.4 Ha located at Sub- District Soegaon, Sillod, Kannad and Phulambri, District Aurangabad (Chhatrapati Sambhajnagar), Maharashtra by M/s Greenko Mh01 Irep Private Limited.

**54.2.2** The Project Proponent and the accredited Consultant M/s. R S Envirolink Technologies Pvt. Ltd, made a detailed presentation on the salient features of the project and informed that:

- i. Nayagaon Standalone Pumped Storage Project is an Off-stream Close Loop Pumped Storage Project. The project envisages construction of two new reservoirs and the surface powerhouse located in Soegaon Taluk in Aurangabad District (Chhatrapati Sambhajnagar) of Maharashtra state.
- ii. The Nayagaon Standalone Pumped Storage Project is proposed with installed capacity of 2000 MW and with a storage capacity of 12740 MWH. This Project is comprising of 5 larger units of 334 MW each and 2 smaller units of 165 MW each.
- iii. The Project will generate 2000 MW by utilizing a design discharge of 756 cumecs and rated head of around 304. The Nayagaon Standalone PSP will utilize 2285 MW to pump 0.61 TMC of water to the upper reservoir in 7.05 hours.
- iv. Upper reservoir is located in the flat/sloping ground with low height embankment to create the desired storage capacity and is away from all existing river systems and have no/very small catchment area.
- v. Similarly, the lower reservoir is proposed to be located across the existing seasonal nala which is right bank tributary of Hivra Nadi for creating the desired storage capacity and will have small catchment area. For first (one time) filling Water will be taken from Hivra Nadi and used cyclically for energy storage and discharge. After first filling water regime of Nala will remain more or less same as earlier because whatever water comes same will be released to downstream. Evaporation losses will be recouped during period whenever water is available in Hivra Nadi.
- vi. The project proposal was considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 31<sup>st</sup> EAC meeting held during 05.03.2020 and recommended for grant of Terms of References (ToRs) for the Project. The ToR has been issued by Ministry vide letter No.J-12011/04/2020-IA-I ; date 13.04.2020.
- vii. The geographical co-ordinate of the project is Upper reservoir is at Longitude: 75°21'45.71" East and Latitude is 20°27'17.77"North and that of Lower reservoir is at longitude 75° 20' 54.62" East and latitude is 20° 27' 26.25" North.
- viii. The Nayagaon Off-Stream Closed Loop Pumped Storage Project (2000 MW) envisages construction of:
  - Geomembrane Faced Rock fill Dam Embankment of weighted average height of around 16 m with maximum of 30 m height in upper reservoir and weighted average height of around 19 m with maximum of 37 m in lower reservoir for creation of Nayagaon

OCPSP upper & lower reservoir with 0.66 & 0.65 TMC live storage capacity respectively

- 50.0 m high Power Intake Structure.
- 6 nos. of 1522 m long and 5m dia. circular steel lined Penstocks/ Pressure Shafts i.e., 768.8 m length is head race tunnel, 237.7 m long vertical pressure shaft and 515.3 m long Horizontal pressure shaft up to bifurcation point) will get bifurcated into 2 nos. near power house each of 3.6 m dia to feed 2 smaller units.
- The surface powerhouse in deep excavated trench has been planned to accommodate 7 units of Francis reversible type Turbines corresponding to 2000 MW (5 x 334 MW + 2 x 165 MW) installed capacity operating under a rated head of 303.31 m in generating mode & 318.54 m in pumping mode for larger unit and rated head of 300.62 m in generating mode & 321.82 m in pumping mode for smaller unit.

**ix. Land requirement:**

The total land requirement for proposed project is about 530.4 Ha; out of which 297.38 Ha is forest land and remaining 233.02 Ha is non-forest land.

**x. Demographic details in 10 km radius of project area:**

- Ø Chhatrapati Sambhajnagar District lies on the Deccan plateau and is covered by the Deccan Traps.
- Ø The district is located mainly in the Godavari River Basin and partly in the Tapti River Basin. The district lies between 19- and 20-degrees north longitude and between 74- and 76-degrees east latitude.
- Ø The district covers an area of 10,100 km<sup>2</sup>, out of which 141.1 km<sup>2</sup> is urban area and 9,958.9 km<sup>2</sup> is rural. Chhatrapati Sambhajnagar district is a major tourism region in Marathwada.
- Ø Administratively, the district comprises nine tehsils, Kannad, Soyagaon, Sillod, Phulambri, Aurangabad, Khuldabad, Vaijapur, Gangapur, and Paithan.
- Ø The major occupation of this district is agriculture and about 84.2 % population is dependent on agriculture and allied sector.
- Ø Agriculture plays an important role in the district economy. Agriculture in the Chhatrapati Sambhajnagar district is diversified, wide range of crops are grown in the district.
- Ø Major food grains are Jowar, pearl millet, wheat & gram, among oilseeds Soybean is major crops while Cotton is major cash crops.
- Ø Although basic amenities such as schools, healthcare centres, and road connectivity are present, they are still not fully developed.
- Ø The proportion of Scheduled Tribe population in the project area is very low.

**xi. Water requirement:** The water requirement for the project for initial filling (one-time) is about 20.23 Mm<sup>3</sup> (0.70 TMC) and annual water requirement for recuperating losses in reservoir storage due to evaporation, transit and seepage etc. has been estimated to be about 1.21 Mm<sup>3</sup> (0.04 TMC).

**xii. Project Cost:** The estimated project cost is Rs 9564.31 Cr. Total capital cost earmarked towards environmental management plan is Rs 1490.27 lakhs and the Recurring cost (operation and maintenance) will be about Rs 5072.82 lakh.

**xiii. Project Benefit:** The project is expected to generate significant employment potential during both the construction and post-construction phases, contributing to local livelihood opportunities. Additionally, it will support the overall development of the area through the implementation of Corporate Social Responsibility (CSR) initiatives and comprehensive watershed development plans.

**xiv. Environmental Sensitive area:** The Nearest Protected Area to the proposed project is the Gautala Autramghat Wildlife Sanctuary situated in Chhatrapati Sambhajnagar and Jalgaon Districts of Maharashtra and extends over an area of 260.61 sq km. The Eco-sensitive Zone is spread over an area of 483.45 sq km with an extent of up to one kilometre from the boundary



PM <sub>2.5</sub>	37.6	68	60
PM <sub>10</sub>	17.4	45.7	100
SO <sub>2</sub>	3.9	9	80
NO <sub>2</sub>	4.7	14	80

**Incremental GLC Level**

**Core Zone**

Criteria Pollutant [PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , Other parameters specific to the sector (Please specify)]	Unit [mg/m <sup>3</sup> ]	Baseline Concentration [A]	Predicted incremental value considering worst case stability class [B]	Total GLC [A]+[B]
PM <sub>10</sub>	mg/m <sup>3</sup>	28.15	21.11	49.26
PM <sub>2.5</sub>	mg/m <sup>3</sup>	51.50	6.18	57.68
SO <sub>x</sub>	mg/m <sup>3</sup>	5.50	8.25	13.75
NO <sub>x</sub>	mg/m <sup>3</sup>	6.50	9.75	16.25

**Buffer Zone**

Criteria Pollutant [PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , Other parameters specific to the sector (Please specify)]	Unit [mg/m <sup>3</sup> ]	Baseline Concentration [A]	Predicted incremental value considering worst case stability class [B]	Total GLC [A]+[B]
PM <sub>10</sub>	mg/m <sup>3</sup>	31.55	0	31.6
PM <sub>2.5</sub>	mg/m <sup>3</sup>	52.8	0	52.8
SO <sub>x</sub>	mg/m <sup>3</sup>	6.45	0	6.5
NO <sub>x</sub>	mg/m <sup>3</sup>	9.35	0	9.4

**River water samples (06 samples)**

**Core Zone**

S. No	Parameters	Min	Max	Standards
1	pH	6.7	7.8	8.5
2	Total Dissolved Solids, mg/L	100	174	0
3	Dissolved Oxygen (mg/l)	6.5	8.5	6
4	Chloride (as Cl), mg/L	36.4	63	0
5	Total Hardness (as CaCO <sub>3</sub> ), mg/L	98	137	0
6	Biological Oxygen Demand (mg/l)	2.6	4.5	3.0
7	Chemical Oxygen Demand (mg/l)	10.9	19.7	0
8	Total Coliform (MPN/100 ml)	136	313	50

**Buffer Zone**

S. No	Parameters	Min	Max	Standards
1	pH	7	8	8.5
2	Total Dissolved Solids, mg/L	106	202	0
3	Dissolved Oxygen (mg/l)	6.4	8.2	6
4	Chloride (as Cl), mg/L	28	63	0
5	Total Hardness (as CaCO <sub>3</sub> ), mg/L	102	144	0
6	Biological Oxygen Demand (mg/l)	2.5	4.4	3.0
7	Chemical Oxygen Demand (mg/l)	10.5	19.2	0
8	Total Coliform (MPN/100 ml)	183	270	50

Pond water samples	-							
Groundwater samples quality at 10 locations	<b>Core Zone</b>							
	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Prescribed Limits</b>			
	1	pH	7.7	7.8	6.5-8.5			
	2	Total Dissolved Solids (mg/l)	1078	1716	500	200		
	3	Chloride (as Cl) (mg/l)	63	103	250	1000		
	4	Total Hardness (as CaCO <sub>3</sub> ) (mg/l)	159	348	200	600		
	5	Fluoride (mg/l)	0.12	0.22	1.0	1.5		
	<b>Buffer Zone</b>							
	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Prescribed Limits</b>			
	1	pH	7.5	8.2	6.5-8.5			
	2	Total Dissolved Solids (mg/l)	578	1073	500	200		
	3	Chloride (as Cl) (mg/l)	35	64	250	1000		
4	Total Hardness (as CaCO <sub>3</sub> ) (mg/l)	101	225	200	600			
5	Fluoride (mg/l)	0.18	0.33	1.0	1.5			
Noise levels Leq (Day & Night) at 6 locations	<b>Noise Level</b>	<b>Zone</b>	<b>Leq Day dB(A)</b>		<b>Leq Night dB(A)</b>		<b>Prescribed Limits</b>	
			From	To	From	To	Day	Night
	Core	Residential	44.9	59.5	35.4	47.2	55	45
	Buffer	Residential	48.4	56.1	34.7	45.5	55	45
Soil Quality at 10 Locations	<b>Core Zone</b>							
	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Prescribed Limits</b>			
	1	Calcium (mg/kg)	190	475	500			
	2	Magnesium (mg/kg)	75	275	500			
	3	Nitrogen (kg/ha)	160	259	500			
	4	Phosphorus (kg/ha)	18.9	31.6	50			
	5	Potassium (kg/ha)	280	420	500			
	6	Carbon (%)	0.4	0.51	1			
	7	Sodium Absorption Ratio	1.4	2.37	10			
	8	Salinity (ppt)	0	0	0.01			
	<b>Buffer Zone</b>							
	1	Calcium (mg/kg)	126	523	500			
	2	Magnesium (mg/kg)	119	183	500			
	3	Nitrogen (kg/ha)	180	281	500			
	4	Phosphorus (kg/ha)	17.8	31.3	50			
	5	Potassium (kg/ha)	310	452	500			
	6	Carbon (%)	0.34	0.57	1			
	7	Sodium Absorption Ratio	1.07	2.9	10			
8	Salinity (ppt)	0	0	0.01				
Flora & Fauna	Schedule-I species observed in the study area:							
	As per Wildlife Protection Amendment Act, 2022, Sambar Deer, Jackal, Common							

n Leopard), Indian Fox, Jungle Cat, Indian Grey Mongoose, Stripped Hayena, Sloth Bear, Indian Crested Porcupine, Indian Peafowl, Mottled wood owl, Indian Chameleon, Indian cobra, Russell's Viper, Indian Python, Indian Softshell Turtle and Bengal Monitor are the species listed under Schedule-I.

xx. **Details of Solid waste/ Hazardous waste generation/ Muck and its management:** The solid waste will be transported for disposal at the designated landfill sites. The landfill shall have impervious clay at the bottom most layers. The second layer shall be impervious liner (Geo membrane), third layer will be of sand, after that well compacted solid waste is to be put over the sand, then again, a layer of clay, finally a layer of soil. Vegetation shall be grown on the topmost layers. It will give a good aesthetic view of landfill.

xxi. Public Hearing for the proposed project has been conducted by the State Pollution Control Board on November 08, 2023 in Chhatrapati Sambhajinagar (Aurangabad) district. The main issues raised during the public hearing are related to Employment opportunities for local youth.

xxii. Status of Litigation Pending against the proposal, if any: NA

xxiii. The details of the project are as under: -

S. No.	Description	Upper Dam (Proposed)
<b>1</b>	<b>LOCATION</b>	
a)	State	Maharashtra
b)	District	Chhatrapati Sambhajinagar
c)	Taluka / Village	Kannad/ Wadhod
d)	Latitude	20° 27' 17.77" N
e)	Longitude	75° 21' 45.71" E
f)	River	-
g)	Nearest rail head	Pachora
h)	Nearest international airport	Chhatrapati Sambhajinagar
<b>2</b>	<b>HYDROLOGY</b>	
a)	Catchment Area	1.43 km <sup>2</sup>
b)	Design Flood	44.0 m <sup>3</sup> /s
c)	Quantity of water required daily for 6.37 hours power generation	17
<b>3</b>	<b>DAMS / RESERVOIRS</b>	
		Upper Dam (Proposed)

	MDDL	RL 690.00 m	
	FRL	RL 710.00 m	
	MWL	RL 710.00 m	
d)	Top of Dam	RL 713.00 m	
	Live Storage	18.688 Mm <sup>3</sup>	
		(0.66 TMC)	
f)	Dead Storage	0.85 Mm <sup>3</sup>	
		(0.03 TMC)	
g)	Gross Storage	19.538 Mm <sup>3</sup>	
		(0.69 TMC)	
h)	Length of Dam	3985.00 m	
i)	Maximum Height of Dam	30.00 m	
j)	Average Height of Dam	16.00 m	
k)	Type of Spillway	-	
l)	Length of Spillway	-	
m)	Design Flood		
n)	Crest Level of Spillway	-	
<b>4</b>	<b>APPROACH CHANNEL</b>		
a)	Type & Shape		Shot
b)	Length of channel		
c)	Length of Transition Portion		198
d)	Bed width		
e)	Full supply depth		
f)	Bed slope of Channel		1(V
g)	Bed slope of Transition Portion		

<b>5</b>	<b>UPPER INTAKE</b>		
	Type		
	No. of Vents		
	Size of Each Intake	23.00 m (W) including pier	
d)	Length of each Intake's diffuser		45.00
e)	Elevation of Intake centre line		
f)	Elevation of Intake bottom		
g)	Trash rack type		Vertical
h)	Size of Trash rack	3 no. of 5.70 m (W) x 10	
i)	Numbers & Size of Intake Service Gate		6 nos. of
j)	Numbers & Size of Intake Stop log Gate	1 No. of 7.90 m (	
<b>6</b>	<b>HEADRACE TUNNEL</b>		
<i>I</i>	<u>Intake Tunnel (up to Exit portal)</u>		
a)	Number		
b)	Type		Finis
c)	Diameter		
d)	Design discharge		
e)	velocity in the tunnel		
<i>II</i>	<u>Pressure shaft</u>		
a)	Type		Finis
b)	Number of Pressure Shaft	Total 6 No 1 No. bifurcated into 2	
c)	Diameter of Main Pressure Shaft		
d)	Design Discharge of each Main Penstock		
e)	Velocity in the Main Penstock		

f)	Dia. Of Branch Penstock/ Pressure Shaft		
g)	Design Discharge in each branch penstock		
h)	Velocity in branch penstock		
i)	Length of Penstock		
j)	Length of each branch penstock		
<b>7</b>	<b>POWERHOUSE</b>		
	Installed Capacity		5 x 3
	C/L of Unit		
c)	Service bay level		
d)	Unloading bay level		
<b>8</b>	<b>LOWER INTAKE</b>		
a)	Type		
b)	No. of Vents		
c)	Size of each Intake	23.00 m (W) inclu	
		20.00 m (W) inclu	
d)	Length of each Intake's Diffuser	40	
		43	
e)	Elevation of Intake center line	EL +	
		EL +	
f)	Elevation of Intake bottom		
g)	Trash rack type		Vertic
h)	Size of Trash rack Panel	3 no. of 5.70 m (	
		3 no. of 4.70 m (	
i)	Numbers & Size of Intake Service Gate	5 no. o	
		2 no. o	

j) `	Numbers & Size of Intake Stop log Gate	1 No. - 6.50 m (	
		1 No. - 5.50 m (	
<b>9</b>	<b>TAILRACE TUNNEL</b>		
	Number		
b)	Type		Co
	Diameter		6.
			4.6
d)	Velocity		5.3
			4.77
	Invert Level		
<b>10</b>	<b>TAILRACE CHANNEL</b>		
a)	Type & Shape		Shot
b)	Length of channel		
c)	Length of Transition Portion		152.7
d)	Bed width		
e)	Full supply depth		
f)	Bed slope of Channel		
g)	Bed slope of Transition Portion		
<b>11</b>	<b>ELECTROMECHANICAL EQUIPMENT</b>		
l	<u>Pump Turbine</u>		<b>Larger Unit</b>
a)	Type		Vertical Re
b)	Number of Units		7 No. (5
c)	Each Turbine Capacity		334 MW
d)	Each Pump Capacity		379 MW
e)	Rated Gross Head		311.33 m

f)	Maximum Gross Head	334.00 m
g)	Minimum Gross Head	290.00 m
h)	Head Loss	
	Generation	8.03 m
	Pumping	7.21 m
i)	Rated Head	
	Generation	303.31 m
	Pumping	318.54 m
j)	Rated discharge	
	Generation	126.00 m <sup>3</sup> /s
	Pumping	113.00 m <sup>3</sup> /s
k)	Synchronous Speed	250.00 rpm
III	<u>Main Power Transformer</u>	<b>Larger Unit</b>
a)	Type	Outdoor Single-Phase Power transformers with Off-Circuit tap changer (OCTC)
b)	Number of units	15 Nos. i.e., 3 nos. per
c)	Rated Capacity of each unit	Single Phase, 21 kV/400kVA
d)	Rated Voltage	Primary - 21.0 kV; Secondary - 0 kV adjustable range of the secondary voltage: -10% to +10% (Tap)
	Ratio of length of water conductor system to design head	
<b>12</b>	<b>ANNUAL POWER</b>	
a)	Daily hours of generation	
b)	Daily hours of pumping	

c)	Annual generation		
d)	Annual pumping		
e)	Cycle Efficiency		
<b>13</b>	<b>400 kV Gas Insulated Switchgear</b>		
a)	Type of GIS		
b)	No. of GIS units		
c)	Location		
d)	Scheme		Double Busb
<b>14</b>	<b>POWER EVACUATION</b>		
a)	Voltage Level		
b)	No. of Circuits		Two D
c)	No. of Transmission Lines	Two 400 kV double circuit	gaon PSP pothead yard to
d)	Conductor		
e)	Length of Transmission Lines/ Purpose	Transmission Lines are of	ed Power from Nayagaon wer to
<b>15</b>	<b>PRELIMINARY PROJECT COST (2022-23 Price Lev</b>		
a)	Civil works		
b)	Electro-mechanical works including Power Evacuation		
c)	Total cost (including FC)		
d)	IDC & others		
e)	Total cost		

xxiv. The salient features of the project are as under: -

**· Project details:**

Name of the Proposal	Nayagaon Off-Stream Closed Loop Pumped Storage Project (2000 MW)
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Location (Including coordinates)	Project is located in Nayagaon, Wadi Suto nda, Jangli Kotha, Palashi, Banoti, Ghorkhund, Gondegaon villages of Soegaon Tehsil and Wadhod village of Kannad Tehsil of Chhatrapati Sambhajnagar (Aurangabad) district, Maharashtra Upper Reservoir- Latitude: 20°27'17.77"North Longitude: 75°21'45.71" East Lower Reservoir- Latitude: 20°27'26.25"North Longitude: 75°20'1'54.62" East
Inter- State Issue involved	No
Seismic zone	Zone-II
<b>· Category details:</b>	
Category of the project	1(c)
Provisions	-
Capacity / Cultural command area (CCA)	2000 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	NA
<b>· Electricity generation capacity:</b>	
Powerhouse Installed Capacity	2000 MW
Generation of Electricity Annually	4415.28 MU
No. of Units	7 nos. (5 X 334 MW+2 X 165 MW)
Additional information (if any)	NA
<b>· ToR/EC Details:</b>	
Cost of project	9564.31 Cr
Total area of Project	530.4 Ha
Height of Dam from River Bed (EL)	Upper Reservoir: 30 m & Lower Reservoir: 37 m
Length of Tunnel/ Channel	1908.4 m (Tailrace Channel 7 nos)
Details of Submergence area	372.84 Ha
Types of Waste and quantity of generation d	Major waste generation is muck from excavat

uring construction/ Operation	ion. Total quantity of excavated material is worked out as 9.08 Mcum
E-Flows for the Project	NA
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR / Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	NA
No. of trees/ saplings proposed in view of 'Ek Ped Maa Ke Naam' campaign	500

**· Muck Management Details:**

No. of proposed disposal area/ (type of land Forest/ Pvt. land)	Non-Forest Land – 25 Ha, comprising of 2 Muck disposal sites MDS- 1 – 15.03 Ha MDS- 2 -10 Ha
Muck Management Plan	The total quantity of muck generated is 9.08 Mcum, in which 6.36 Mcum of excavated muck is expected to be reutilized for Road Development, Protection works and Embankment of upper & lower reservoirs. The Rehabilitation plan of muck dumping site includes engineering and biological measures and has been incorporated in EIA report.
Monitoring mechanism for Muck Disposal	Properly covered Dumper trucks will be used for transportation.

**· Land Area Breakup:**

Private land	233.02 Ha
Government land	-
Forest Land	297.38 Ha
Total Land	530.40 Ha
Submergence area/ Reservoir area	372.84 Ha
Additional information (if any)	-

**· Presence of Environmentally Sensitive areas in the study area**

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate/ letter/ Remarks
Reserve Forest/ Protected Forest Land	Yes	<ul style="list-style-type: none"> <li>· 297.38 Ha forest land to be diverted. Application for the diversion of forest land is submitted and it is under processing.</li> <li>· The project is located around 1.5 km from Gautala Autramgh at Wildlife Sanctuary.</li> <li>· Since all the project components are outside the boundary of Wildlife Sanctuary, wildlife clearance is not applicable.</li> </ul>
National Park	No	
Wildlife Sanctuary	No	

· Court case details: Nil

· Previous EC compliance and necessary approvals:

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	NA
Status of Stage- I FC	Under Process
Additional detail (If any)	None
Is FRA (2006) done for FC-I	No

· Miscellaneous

Particulars	Details
Details of consultant	<p>M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (NABET Accredited Consultant Organization)            Certificate No : NABET/EIA/25-28/RA0415            Validity : August 15, 2028            Contact Person: Mr. Ravinder Bhatia            Name of Sector: River Valley and Hydroelectric Projects            Category : A            MoEF Schedule: I(C)            Address : 403, Bestech Chambers, Block-B, Sushant Lok Phase I, Sector 43, Gurugram, Haryana - 122009            E-mail : ravi@rstechnologies.co.in            Land Line : (0124) 4295383            Cellular : (+91) 9810136853</p>
Project Benefits	The project is expected to generate significant employment potential during both the construction and post-construction phases, contributing to local li

	<p>velihood opportunities. Additionally, it will support the overall development of the area through the implementation of Corporate Social Responsibility (CSR) initiatives and comprehensive watershed development plans</p>
Status of other statutory clearances	<ul style="list-style-type: none"> <li>· Forest Clearance - Online application seeking for est diversion for around 297.38 Ha submitted in Parivesh portal vide proposal No. FP/MH/HYD/IRRIG/545934/2025.</li> <li>· Allocation of 0.78 TMC of water has been approved by Tapi Irrigation Development Corporation, Jalgaon (under WRD) for the development of the Nayagaon Off-Stream Closed Loop Pumped Storage Project vide letter dated 12/12/2024.</li> </ul>
R&R details	<p>Applicable. Based on the findings of the socio economic studies and survey, an appropriate R&amp;R compensation package as per the provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement, 2013 (RFC TLARR, 2013) and respective State R&amp;R Policy in vogue has been formulated.</p>
Additional detail (If any)	NA

### 3.3.3. Deliberations by the committee in previous meetings

N/A
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### 3.3.4. Deliberations by the EAC in current meetings

<ul style="list-style-type: none"> <li>· The Expert Appraisal Committee (EAC) deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of TOR for conducting EIA/EMP and Public hearing for Nayagaon Close loop Pumped Storage Project (2000 MW) in an area of 530.4 Ha located at Sub- District Soegaon, Sillod, Kannad and Phulambri, District Aurangabad (Chhatrapati Sambhajinagar), Maharashtra by M/s Greenko Mh01 Irep Private Limited.</li> <li>· The project/activity falls under Category A of item 1(c), 'River Valley Projects,' as per the Schedule of the Environmental Impact Assessment Notification, 2006, and requires appraisal at the Central level by the sectoral EAC in the Ministry.</li> <li>· The EAC noted that the Terms of Reference (TOR) for the Nayagaon Pumped Storage Project (2000 MW) was issued by MoEF&amp;CC vide letter dated 13.04.2020 in favour of Greenko Energies Private Limited. Subsequently, the TOR was transferred vide letter dated 11.11.2025 in favour of Greenko MH01 IREP Private Limited from Greenko Energies Private Limited. As per provisions mentioned under MoEF&amp;CC Gazette Notification S.O. 751 ( E) dated 17.02.2020 the validity of TOR for river valley and Hydro-electric project is 5 years. It was observed that the application for grant of EC was submitted on 10.04.2026 i.e. after expiry of validity of TOR; hence, the same was not accepted. Therefore, the present proposal</li> </ul>
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for seeking a fresh TOR for the Nayagaon Pumped Storage Project (2000 MW) has been submitted on 01.05.2026 and being considered in the present meeting.

- During the deliberations the committee noted that although the proposed Upper Reservoir to be located away from any riverine system but lower reservoir is proposed to be located across the existing seasonal nala which is right bank tributary of Hivra Nadi. Since the lower reservoir will be located on non-perennial nallah, the committee opined that the project shall be categorized as an open-loop project rather than a closed-loop PSP.
- The EAC observed that the project is stated to be located in Soegaon Taluk of Chhatrapati Sambhajnagar District (formerly Aurangabad). However, the details furnished by the PP on the PARIVESH Portal indicated that the project spans two districts, namely Aurangabad District and Jalgaon District. In this regard, the PP, vide letter dated 06.05.2026, clarified that the project is entirely located within a single district, i.e., Chhatrapati Sambhajnagar District. In view of the above, the Committee opined that the project may be considered as falling within a single district, namely Chhatrapati Sambhajnagar (formerly Aurangabad) District, Maharashtra. However, the PP shall obtain and submit appropriate authorization/confirmation from the competent State authorities of both Aurangabad and Jalgaon districts, certifying that the entire project area falls exclusively within Chhatrapati Sambhajnagar District.
- The EAC noted that the total land required for the project components and related works has been estimated to be about 530.4 Ha; out of which 297.38 Ha is forest land and remaining 233.02 Ha is non-forest land. Diversion of forest land for non-forest purpose will be involved for construction of project components. However, it was observed that the application for Stage-I Forest Clearance (FC) has been submitted vide proposal no. FP/MH/HYD/IRRIG/545934 on December 23, 2025 for the diversion of 297.38 ha of forest land. The PP informed that currently, the proposal is pending at DFO/CF/Nodal Officer after acceptance in PSC-I.
- The EAC also noted that there is change in land from earlier ToR granted by the Ministry on 13.04.2020, accordingly a comparative assessment of land required for the project at different stage is mentioned as under:

<b>Description</b>	<b>As per earlier ToR</b>	<b>Draft EIA Report submitted for PH</b>	<b>Present proposal</b>
<b>Capacity (MW)</b>	<b>2000</b>		
<b>Forest (Ha)</b>	<b>187.79</b>	<b>195.97</b>	<b>297.38</b>

<b>Non-Forest (Ha)</b>	<b>300.43</b>	<b>333.35</b>	<b>233.02</b>
<b>Total (Ha)</b>	<b>488.22</b>	<b>529.32</b>	<b>530.40</b>

- The EAC noted that the total water requirement for initial reservoir filling of the project is estimated to be about 20.23 Mm<sup>3</sup> (0.70 TMC), which is a one-time requirement, whereas the annual water requirement for recuperating losses due to evaporation, seepage, transit losses, etc. has been estimated as 1.21 Mm<sup>3</sup> (0.04 TMC). The Committee further noted that water for the project is proposed to be lifted from the upstream of Hivra Dam on the Hivra River, a tributary of the Girna River in the Tapti River Basin. The Committee also noted that water allocation for development of the Nayagaon Off-Stream Closed Loop Pumped Storage Project has been approved by Tapi Patbandare Vikas Mahamandal under the Water Resources Department (WRD), vide letter dated 12.12.2024.
- The EAC noted that there are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site. However, it has been informed that nearest Protected Area to the proposed project is the Gautala Autramghat Wildlife Sanctuary situated in Chhatrapati Sambhajnagar and Jalgaon Districts of Maharashtra and it has been notified vide MoEF&CC's notification no. S.O. 3996(E) dated 9<sup>th</sup> December, 2016. It was further informed that all project components are outside the boundary of Wildlife Sanctuary. The aerial distance from the project component to the boundary of the wildlife sanctuary is about 11.50 km.
- The EAC observed that Memorandum of Understanding was signed between Department of Water Resources, Government of Maharashtra on July 15, 2025 through SPV: Greenko MH01 IREP Private Limited for development of Nayagaon Pumped Storage Project of capacity 2000 MW.

### 3.3.5. Recommendation of EAC

Recommended

### 3.3.6. Details of Terms of Reference

#### 3.3.6.1. Specific

<b>Miscellaneous:</b>	
1.	Both capital and recurring expenditure under EMP shall be submitted.
2.	Pre-DPR Chapters viz., Hydrology, Layout Map and Power Potential Studies duly appraised by CWC/CEA shall be submitted.
3.	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring

	station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.
4.	Drone video of project site shall be recorded and to be submitted.
5.	Detailed plan to restore wider roads and convert them into narrow up to 10m after construction of the project.
6.	Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pumped storage projects shall be used for preparation of EIA/ EMP reports.
<b>Disaster Management:</b>	
1.	Impact of Project activities (specially blasting and drilling) on the aquatic and terrestrial ecosystem, within study area to be studied and be incorporated in EIA/EMP report.
2.	The muck dumping sites shall be located with a distance of 100 mts from HFL. The PP shall submit the detailed action plan for transportation of muck along with monitoring mechanism of movement of muck carrying trucks.
<b>Muck Management:</b>	
1.	Details of quantity of muck generation component wise, types of muck (Excavation in tunnels, pressure shaft and powerhouse etc.) and disposal site/ transportation to be provided.
2.	Details of muck management such as dumping sites and its locations, transportation plan along with monitoring mechanism for muck transportation, detailing the road map of project construction site/ indicating the distances from HFL, river, project construction site along with types of road etc.
3.	Safety measures for avoiding spill over muck into the riverbed/streams and its flow into the river during the high discharge/ flood or monsoon period. Prepare plan for stabilization of muck disposal sites using biological and engineering measures to ensure that muck does not roll down the slopes and shall be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area.
4.	Restoration plan for construction area including dumping site of excavated materials by levelling, filling up of burrow pits, landscaping etc.
<b>Socio-economic Study:</b>	
1.	Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.
2.	All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. A comparative chart of issues raised by General Public during Public Hearing and commitments made by the Project Proponent will be prepared and submitted in the relevant chapter of EIA/EMP report.

3.	The EIA/EMP shall include a detailed socio-economic assessment of the tribal population in the project-affected area based on primary data and community consultations. A Tribal Development Plan, prepared in consultation with the District Administration and Tribal Welfare Department, shall be submitted along with the EIA report.
4.	PP shall submit the credible documents to show the status of land acquisition w.r.t project site from/through the concerned State Government as required under Ministry's OM dated 7 <sup>th</sup> October, 2014 as amended, for the project land to be acquired.
5.	Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land (if any) shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. Budget earmarked for R&R, CSR shall not be included in the cost of EMP.
<b>Environmental Management and Biodiversity Conservation:</b>	
1.	The Project Proponent shall ensure that the entire project area falls within a single district, i.e., Chhatrapati Sambhajnagar District (formerly Aurangabad). In this regard, the Project Proponent shall obtain and submit appropriate authorization/confirmation from the competent State authorities of Aurangabad District and Jalgaon District, certifying that the project does not extend beyond the administrative boundary of Chhatrapati Sambhajnagar District. The said confirmation shall be submitted to the Ministry/concerned Regional Office prior to commencement of construction activities for record and compliance.
2.	Impact of construction activities on natural streams/springs/aquifers shall be studied and accordingly conservation action plan shall be prepared in consultation with expert government research institute after detailed mapping of the study area.
3.	A detailed action plan for large scale plantation of native species of plant sapling within 10 km radius of the project shall be prepared in consultation with State Forest Department. The monitoring mechanism to ensure the survival of saplings shall be finalized in consultation with ICFRE.
4.	The PP will submit 10 years water availability data certified by the CWC/State Water Resource Department for quantity of water that is received annually by the small stream on which lower reservoir is proposed to be constructed.
5.	The PP will submit a detailed plan and monitoring mechanism for releasing the self-catchment water of small stream draining in to river along with action plan for conservation and protection of other streams/rivulets draining in to upper and lower reservoirs
6.	Explore the possibilities for reducing the Forest land requirement.
7.	Muck disposal site and other components such as Township, site office, Stacking area and batching plant shall be located outside the forest area.
8.	Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is not falling in any Ecological Sensitive Area, Wildlife Sanctuary/Tiger/elephant corridor/Critically polluted area within 10 km of Project site.

9.	Transportation Plan for transporting construction materials shall be submitted. Separate chapter for risk assessment of such transportation through/within proposed the Wildlife Sanctuary shall be included in the EIA report, if any.
10.	Environmental Cost Benefit Analysis shall be done in terms of loss of Forest ecosystem due to diversion of Forest land/loss of biodiversity, water availability, water uses for generation of hydro power and Ecological flows.
11.	The baseline data collection will cover the changes in biological and ecological profile of the region after monsoon with worst-case scenario study and critical mineral assessment.
12.	Calculation and values of GHGs (CO <sub>2</sub> , CH <sub>4</sub> etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.
13.	The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report.
14.	Quantitative values of Impact modelling of environmental parameters shall be submitted for during construction and operation. Also, mitigation measures shall be submitted in terms of construction and operation phase.
15.	Conducting site-specific ecological study emphasizing on riverine ecology viz. fishes diversity, fish migration, habitat and aquatic biota due to construction PSP. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
16.	Action plan for survival or diversion of the rivulets/stream, if any, leading to join river shall be submitted.
17.	Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Specific ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all seasons.
18.	A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.
19.	Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
20.	Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Indian Council of Agriculture Research (ICAR) Institutes/ Expert Govt. institutions and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.

2 1.	Details of mineral zone, if any, in the study area, certified by Geological Survey of India or any other concerned Government Organization shall be submitted. The project area should not come up on any critical mineral zone, the same shall to be verified by GSI/NMDC.
2 2.	Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI.
2 3.	Combined Impact of projects proposed on carrying capacity and sustainability of the natural stream/Reservoir/ River /nala of catchment area due to tapping of water for filling reservoir shall be studied.
2 4.	In view of the project's location in ecologically sensitive areas, an EAC Sub-Committee shall undertake a site visit prior to consideration of the proposal for grant of Environmental Clearance. The Project Proponent shall facilitate the said visit, and the proposal shall be considered for Environmental Clearance only after submission of the site visit report by the EAC Sub-Committee.

### 3.3.6.2. Standard

1( c)	<b>River Valley/Irrigation projects</b>
<b>Scope of EIA Study</b>	
1.	The EIA Report should identify the relevant environmental concerns and focus on potential impacts that may change due to the construction of proposed project. Based on the baseline data collected for three (3) seasons (Pre-monsoon, Monsoon and Winter seasons), the status of the existing environment in the area and capacity to bear the impact on this should be analysed. Based on this analysis, the mitigation measures for minimizing the impact shall be suggested in the EIA/EMP study.
<b>Details of the Project and Site</b>	
1.	General introduction about the proposed project.
2.	Details of Project and site giving L-Sections of all U/S and D/S Projects with all relevant maps and figures. Connect such information as to establish the total length of interference of Natural River and the committed unrestricted release from the site of Dam/Barrage into the main river.
3.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project location.
4.	Location details on a map of the project area with contours indicating main project features. The project layout shall be superimposed on a contour map of ground elevation showing main project features (viz. location of dam, Head works, main canal, branch canals, quarrying etc.) shall be depicted in a scaled map.
5.	Layout details and map of the project along with contours with project components clearly marked with proper scale maps of at least 1:50,000 scale and printed at least on A3 scale for clarity.
6.	Existence of National Park, Sanctuary, Biosphere Reserve etc. in the study area, if any, should be detailed and presented on a map with distinct distances from the project components.

7.	Drainage pattern and map of the river catchment up to the proposed project site.
8.	Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per the methodology of Soil and Land use Survey of India.
9.	Soil characteristics and map of the project area.
10.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
11.	Remote Sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of the study using overlaying mapping techniques viz. Geographic Information System (GIS), False Color Composite (FCC) generated from satellite data of project area.
12.	Land details including forests, private and other land.
13.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
14.	Different riverine habitats like rapids, pools, side pools and variations in the river substratum bedrocks, rocks, boulders, sand/silt or clay etc. need to be covered under the study
<b>Description of Environment and Baseline Data</b>	
1.	To know the present status of environment in the area, baseline data with respect to environmental components air, water, noise, soil, land and biology & biodiversity (flora & fauna), wildlife, socioeconomic status etc. should be collected within 10 km radius of the main components of the project/site i.e. dam site and power house site. The air quality and noise are to be monitored at such locations which are environmentally & ecologically more sensitive in the study area. The baseline studies should be collected for 1 season (Preferably Monsoon season). Flora-Fauna in the catchment and command area should be documented. The study area should comprise of the following:
2.	(i) Catchment area up to the dam/barrage site.
3.	(ii) Submergence Area.
4.	(iii) Project area or the direct impact area should comprise of area within 10 km radius of the main project components like dam, canals etc.
5.	(iv) Downstream upto 10 km from the tip of the reservoir.
<b>Details of the Methology</b>	
1.	The methodology followed for collection of base line data along with details of number of samples and their locations in the map should be included. Study area should be demarcated properly on the appropriate scale map. Sampling sites should be depicted on map for each parameter with proper legends. For Forest Classification, Champion and Seth (1968) methodology should be followed.
<b>Methodology for Collection of Biodiversity Data</b>	
1.	The number of sampling locations should be adequate to get a reasonable idea of the diversity and other

	<p>attributes of flora and fauna. The guiding principles should be the size of the study area (larger area should have larger number of sampling locations) and inherent diversity at the location, as known from secondary sources (e.g. eastern Himalayan and low altitude sites should have a larger number of sampling locations owing to higher diversity).</p>
2.	<p>The entire area should be divided in grids of 5kmX5km preferably on a GIS domain. There after 25% of the grids should be randomly selected for sampling of which half should be in the directly affected area (grids including project components such as reservoir, dam, powerhouse, tunnel, canal etc.) and the remaining in the rest of the area (areas of influence in 10 km radius form project components). At such chosen location, the size and number of sampling units (e.g. quadrates in case of flora/transects in case of fauna) must be decided by species area curves and the details of the same (graphs and cumulative number of species in a tabulated form) should be provided in the EIA report. Some of the grids on the edges may not be completely overlapping with the study area boundaries. However, these should be counted and considered for selecting 25% of the grids. The number of grids to be surveyed may come out as a decimal number (i.e. it has an integral and a fractional part) which should be rounded to the next whole number.</p>
3.	<p>The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.</p> <p>The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.</p>
4.	<p>The R.E.T. species referred to in this point should include species listed in Schedule I and II of Wildlife (Protection) Act, 1972 and those listed in the red data books (BSI, ZSI and IUCN).</p>
<p><b>Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follows:</b></p>	
1.	<p>null</p>

2.	null
3.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
4.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
5.	Landslide zone or area prone to landslide existing in the study area should be examined.
6.	Presence of important economic mineral deposit, if any.
7.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
8.	Impact of project on geological environment.
9.	null
10.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
11.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO <sub>2</sub> ) and Oxides of Nitrogen (NO <sub>x</sub> ) in the study area at 5-6 Locations.
12.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
13.	null
14.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
15.	null
16.	(i) Generation of thematic maps viz, slope map, drainage map, soil map, land use and land cover map, etc. Based on these, thematic maps, an erosion intensity map should be prepared.
17.	null
18.	History of the ground water table fluctuation in the study area.
19.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO <sub>2</sub> , PO <sub>4</sub> , Cl, SO <sub>4</sub> , Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii)

	Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
2 0.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
2 1.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
2 2.	Run off, discharge, water availability for the project, sedimentation rate, etc.
2 3.	Basin characteristics
2 4.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
2 5.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km <sup>2</sup> year <sup>-1</sup> .
2 6.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
2 7.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
2 8.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
2 9.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
3 0.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
3 1.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.
3 2.	A minimum of 1 km distance from the tip of the reservoir to the tail race tunnel should be maintained between upstream and downstream projects.
3 3.	Besides primary studies, review of secondary data/literature published for project area on flora & fauna including RET species shall be reported in EIA/EMP report.
3 4.	null

3 5.	Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.
3 6.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteridophytes, Bryophytes (all groups).
3 7.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
3 8.	Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index (IVI) , Shannon Weiner index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrates, size of quadrates etc. to be reported within the study area in different ecosystems.
3 9.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
4 0.	Economically important species like medicinal plants, timber, fuel wood etc.
4 1.	Details of endemic species found in the project area.
4 2.	Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along-with economic significance. Species diversity curve for RET species should be given.
4 3.	Cropping pattern and Horticultural Practices in the study area.
4 4.	null
4 5.	Fauna study and inventorisatation should be carried out for all groups of animals in the study area. Their present status alongwith Schedule of the species.
4 6.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
4 7.	Information (authenticated) on Avi-fauna and wildlife in the study area.
4 8.	Status of avifauna their resident/ migratory/ passage migrants etc.
4 9.	Documentation of butterflies, if any, found in the area.
5 0.	Details of endemic species found in the project area.
5 1.	RET species-voucher specimens should be collected along-with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian

	Wildlife (Protection) Act, 1972.
5 2.	Existence of barriers and corridors, if any, for wild animals.
5 3.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the proposed project development and loss of biodiversity.
5 4.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
5 5.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
5 6.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplanktons, benthos etc.
5 7.	Fish and fisheries, their migration and breeding grounds.
5 8.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
5 9.	Conservation status of aquatic fauna.
6 0.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.
6 1.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.
6 2.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
6 3.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
6 4.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
6 5.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
6 6.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
6 7.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.

6 8.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other property, possession of cattle, type of house etc.
6 9.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any ethnic/indigenous groups that are getting affected by the project.
<b>Impact Prediction and Mitigation Measures</b>	
1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
2.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources.
3.	Effect on soil, material, vegetation and human health.
4.	Impact of emissions from DG set used for power during the construction, if any, on air environment.
5.	Pollution due to fuel combustion in equipments and vehicles
6.	Fugitive emissions from various sources
7.	Changes in surface and ground water quality
8.	Steps to develop pisci-culture and recreational facilities
9.	Changes in hydraulic regime and downstream flow.
1 0.	Water pollution due to disposal of sewage
1 1.	Water pollution from labour colonies/ camps and washing equipment.
1 2.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) (a) due to considerable road construction / widening activity (b) interference of reservoir with the inflowing stream (c) blasting for commissioning of HRT, TRT and some other structures.
1 3.	Changes in land use / land cover and drainage pattern
1 4.	Immigration of labour population
1 5.	Quarrying operation and muck disposal
1 6.	Changes in land quality including effects of waste disposal
1	River bank and their stability

7.	
1 8.	Impact due to submergence.
1 9.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
2 0.	Pressure on existing natural resources
2 1.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
2 2.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
2 3.	Impact on fish migration and habitat degradation due to decreased flow of water
2 4.	Impact on breeding and nesting grounds of animals and fish.
2 5.	Impact on local community including demographic profile.
2 6.	Impact on socio-economic status
2 7.	Impact on economic status.
2 8.	Impact on human health due to water / vector borne disease
2 9.	Impact on increase traffic
3 0.	Impact on Holy Places and Tourism
3 1.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
3 2.	Positive and negative impacts likely to be accrued due to the project are listed.
<b>Environmental Management Plan</b>	
1.	null
2.	Biodiversity and Wildlife Conservation and Management Plan for the conservation and preservation of

	<p>rare, endangered or endemic floral/faunal species or some National Park/Sanctuary/ Biosphere Reserve or other protected area is going to get affected directly or indirectly by construction of the project, then suitable conservation measures should be prepared in consultation with the State Forest Department and with the physical and financial details. Suitable conservation techniques (in-situ/ ex-situ) will be proposed under the plan and the areas where such conservation is proposed will be marked on a project layout map.</p>
3.	<p>Compensatory Afforestation shall be prepared by the State Forest Department in lieu of the forest land proposed to be diverted for construction of the project as per the Forest (Conservation) Act, 1980. Choice of plants for afforestation should include native and RET species, if any. This will be a part of the forest clearance proposal.</p>
4.	<p>Fisheries Conservation and Management Plan - a specific fisheries management measures should be prepared for river and reservoir. If the construction of fish ladder/ fish-way etc. is not feasible then measures for reservoir fisheries will be proposed. The plan will detail out the number of hatcheries, nurseries, rearing ponds etc. proposed under the plan with proper drawings. If any migratory fish species is getting affected then the migratory routes, time/season of upstream and downstream migration, spawning grounds etc will be discussed in details.</p>
5.	<p>Green Belt Development Plan along the periphery of the reservoir, approach roads around the colonies and other project components, local plant species must be suggested with physical and financial details. A layout map showing the proposed sites for developing the green belt should be prepared.</p>
6.	<p>Environmental Monitoring Programme to monitor the mitigatory measures implemented at the project site is required will be prepared. Provision for Environment Management Cell should be made. The plan will spell out the aspects required to be monitored, monitoring indicators/parameters with respect to each aspect and the agency responsible for the monitoring of that particular aspect throughout the project implementation.</p>
7.	<p>Catchment Area Treatment (CAT) Plan should be prepared micro-watershed wise. Identification of free draining/ directly draining catchment based upon Remote Sensing and Geographical Information System (GIS) methodology and Sediment Yield Index (SYI) method of AISLUS, Deptt. of Agriculture, Govt. of India coupled with ground survey. Areas or watersheds falling under 'very severe' and 'severe' erosion categories should be provided and required to be treated. Both biological as well as engineering measures should be proposed in consultation with State Forest Department for areas requiring treatment. Year-wise schedule of work and monetary allocation should be provided. Mitigation measures to check shifting cultivation in the catchment area with provision for alternative and better agricultural practices should be included.</p>
8.	<p>Study of Design Earthquake Parameters: A site specific study of earthquake parameters should be done. Results of the site specific earthquake design parameters should be approved by National Committee of Seismic Design Parameters, Central Water Commission (NCSDP), New Delhi.</p>
9.	<p>Dam Break Analysis and Disaster Management Plan The outputs of dam break model should be illustrated with appropriate graphs and maps clearly bringing out the impact of Dam Break scenario. To identify inundation areas, population and structures likely to be affected due to catastrophic floods in the event of dam failure. DMP will be prepared with the help of Dam Break Analysis. Maximum water level that would be attained at various points on the downstream in case of dam break will be marked on a detailed contour map of the downstream area, to show the extent of inundation. The action plan will include Emergency Action and Management plan including measures like preventive action notification, warning procedure and action plan for co-ordination with various authorities.</p>
10.	<p>Reservoir Rim Treatment Plan for stabilization of land slide / land slip zones, if any, around the reservoir periphery is to be prepared based on detailed survey of geology of the reservoir rim area. Suitable engineering and biological measures for treatment of identified slip zones to be suggested with physical</p>

	and financial schedule. Layout map showing the landslide/landslip zones shall be prepared and appended in the chapter.
1 1.	Muck Disposal Plan- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m away from the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites and approach roads to be given. Financial out lay for this may be given separately. Detailed muck transportation plan delinating the path ways, number of trucks, quantity of muck to be transportated along with monitoring mechanism using latest technology, shall be prepared.
1 2.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
1 3.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio-economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
1 4.	Public Health Delivery Plan including the provisions of drinking water supply for local population shall be in the EIA/EMP Report. Status of the existing medical facilities in the project area shall be discussed. Possibilities of strengthening of existing medical facilities, construction of new medical infrastructure etc. will be explored after assessing the need of the labour force and local populace.
1 5.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Panchayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
1 6.	Labour Management Plan for their Health and Safety.
1 7.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
1 8.	Energy Conservation Measures for the work force during construction with physical and financial details. Alternatives will be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use is curbed.
1 9.	Environmental safeguards during construction activities including Road Construction.
2 0.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
2 1.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

### 3.4. Agenda Item No 4:

### 3.4.1. Details of the proposal

Panari Pumped Storage Project by PANARI ENERGY PRIVATE LIMITED located at PANNA, MADHYA PRADESH			
Proposal For		Fresh ToR	
Proposal No	File No	Submission Date	Activity Sub-Activity (Schedule Item)
<a href="#">IA/MP/RIV/577091/2026</a>	J- 12011/05/2020-IA. I(R)	01/05/2026	River Valley/Irrigation projects Standalone Pump Storage Projects ( 1(c))

### 3.4.2. Project Salient Features

**53.4.1** The proposal is for grant of Terms of Reference (ToR) to the project Panari Pumped Storage Project (1800 MW) in an area of 581.68 Ha located at Sub District Majhgawan and Panna, District Satna and Panna, Madhya Pradesh by M/s Panari Energy Private Limited.

**52.4.2** The Project Proponent and the accredited Consultant M/s. R S Envirolink Technologies Pvt. Ltd, made a detailed presentation on the salient features of the project and informed that:

- i. Panari Standalone Pumped Storage Project (PSP) of 1800 MW / 11160 MWH storage capacity, located at Panna District, Madhya Pradesh. The Panari Standalone PSP will comprise of two reservoirs which are to be constructed newly. The Project will generate 1800 MW by utilizing a design discharge of 966.00 Cumec and rated head of 213.30m. The Panari Standalone PSP will utilize 4874.60 MU to pump 0.766 TMC of water to the upper reservoir in 7.1 hours.
- ii. The upper reservoir is proposed to be located on flat / gradually sloping land which is suitable for creating the desired gross storage capacity of 0.961 TMC. Out of 0.961 TMC, the live storage capacity is 0.766 TMC and the dead storage capacity is 0.195 TMC by keeping FRL & MDDL at EL 408.00m & EL 390.00m respectively.
- iii. Similarly, Panari PSP lower reservoir is proposed to be created in the existing seasonal tributary / nala (Baghain Nadi) by constructing a gravity dam across the nala with an average height of 12m ( maximum height of 25m) to retain the desired gross storage capacity of 1.188 TMC in which the live storage capacity is 0.949 TMC and dead storage capacity is 0.239 TMC by keeping FRL and MDDL at EL 185.00m & EL 170.00m respectively.
- iv. The project proposal was considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 31<sup>st</sup> EAC meeting held during 05.03.2020 and recommended for grant of Terms of References (ToRs) for the Project. The ToR has been issued by Ministry vide letter No.J-12011/05/2020-IA-I ; date 13.04.2020.
- v. The geographical co-ordinate of the project is Upper reservoir is at Longitude 80°28'17.18" East and Latitude is 24°54'44.79" North and that of Lower reservoir is at longitude 80°29'42.95" East and latitude is 24°54'1.98" North.
- vi. The Panari Pumped Storage Project (1800 MW) envisages construction of:
  - Geomembrane-faced rockfill and cement sand gravel dams, 21 m average and 42 m maximum height in the upper reservoir, and 12 m average and 25 m maximum height in the lower reservoir, will form the Panari Upper reservoir with 0.766 TMC and the Panari Lower reservoir with 0.949 TMC live storage.
  - 6 no. of upper Intake Structure
  - Six 1087 m long, 6.0 m dia steel-lined penstocks (862 m surface, 104 m vertical, 121 m horizontal) will feed five 300 MW units. One 1031 m long, 6.0 m diameter penstock (844 m surface, 144 m vertical, 83 m horizontal) will bifurcate near the powerhouse into

two 46 m long, 4.2 m diameter branches to feed two 150 MW units.

- A surface powerhouse will house five 300 MW and two 150 MW reversible Francis turbines (all fixed-speed), operating under a rated head of 213.30 m in generating mode and 223.90 m in pumping mode.

vii. **Land requirement:** The total land requirement for proposed project is about 581.68 Ha; out of which 520.66 Ha is forest land and remaining 61.02 Ha is non-forest land.

viii. **Demographic details in 10 km radius of project area:** The study area for the proposed project primarily covers Panna and Satna districts in Madhya Pradesh. Panna district, in the north-eastern part of the state under Sagar Division, covers 7,135 sq. km and is known for its diamond mines. It has a population of 1,016,520 (Census 2011) with 533,480 males and 483,040 females, a population density of 142 per sq. km, a sex ratio of 905, and a literacy rate of 64.79% (male 74.14%, female 54.44%). Scheduled castes and tribes constitute 20.46% and 16.81% of the population, respectively. Satna district, in the Rewa Division and covering 7,502 sq. km, is a major agricultural area and a leading center for bidi manufacturing, employing over 100,000 villagers, especially women. Its population is 2,228,935 (1,157,495 males, 1,071,440 females), with a density of 297 per sq. km, a sex ratio of 926, and a literacy rate of 72.26% (male 81.37%, female 62.45%). Scheduled castes and tribes account for 17.88% and 14.36% of Satna's population, respectively.

ix. **Water requirement:** The water requirement for the project for initial filling (one-time) is about 39.16 Mm<sup>3</sup> (1.383 TMC) and the net annual evaporation losses will be around 20% of the live storage of the project i.e. 4.33 Mm<sup>3</sup> (0.153 TMC) will be recouped annually during monsoon period.

x. **Project Cost:** The estimated project cost is Rs 10512.38 Cr. Total capital cost earmarked towards environmental management plan is Rs 1573.06 lakh and the Recurring cost (operation and maintenance) will be about Rs 4614.78 lakh.

xi. **Project Benefit:**

**Employment Generation:** Panari Standalone PSP is planned to be completed in 48 months. At peak construction, around 3600 persons may be engaged, out of which about 1200 will be from local population/surrounding villages and about 2400 will be skilled/semiskilled from other areas. All local persons will come from their homes. After commissioning, about 200 persons will be required, from local areas or migrated from other areas. The project would also create direct and indirect employment opportunities due to reliable power supply, contract works during construction and operation phase, etc.

**Local Area Development** Total project cost is Rs. 10512.38 Crore (with IDC). An amount of Rs. 15.00 crore has been earmarked for local area development to improve quality of life of local residents, especially those whose land will be acquired. They will have opportunities of skill development, education, better medical and health care, improved local infrastructure, along with green belt development, restoration and greening of the project and surrounding area.

xii. **Environmental Sensitive area:**

The Forest land of proposed project area falls in the North-Eastern Tiger Corridor associated with the Panna Tiger Reserve. The nearest Protected Area is Panna Tiger Reserve. The nearest distance between the project component and the Buffer Zone of the Tiger Reserve is about 18.20 km and that of Core Zone of the Tiger Reserve is about 36.05 km. Application for Wildlife clearance vide proposal no. WL/MP/HYD/551887/2025 was submitted in September 2025 and under process.

xiii. **MoU / any other clearance/ permission signed with State government:**

MoU is entered with Madhya Pradesh state government on 24.02.2025.

xiv. **Resettlement and rehabilitation:** All the landowners will be losing their partial agricultural land holding and none of the families will be losing any house or any other assets, and none of them is getting displaced due to the project. The project affects 4 villages and 81 families, and the status of Rehabilitation & Resettlement is yet to start. With reference to Section 2 and Part (a) of Sub-Section 3 of RFCTLARR Act, 2013, the provisions apply where a private company purchases land beyond prescribed limits through private negotiations. As per Rule 22 of the Madhya Pradesh Rules, 2015, the limits are 50 hectares in urban areas

and 1000 hectares in rural areas. The total private land proposed to be purchased is about 61.02 hectares, which is within the prescribed limits, and the land does not involve any habitation; hence, provisions relating to Rehabilitation and Resettlement are not applicable for the proposed Project.

xv. **Scheduled -I species:** As per Wildlife Protection Amendment Act, 2022, Tiger, Northern Red Muntjac, Sambhar, Indian Fox, Jackal, Common Leopard, Common Jungle cat, Striped hyaena, Sloth Bear, Porcupine, Lesser Adjutant, Python and Bengal Monitor lizard are the species listed under Schedule-I.

xvi. **Alternative Studies:** Alternative-3 has been selected for the Panari Standalone Pumped Storage Project as it offers the most techno-economically suitable layout among the three alternatives. While the upper and lower reservoir locations remain almost the same for all options, Alternative-3 optimizes the size and shape of the reservoirs in alignment with the water conductor system and powerhouse. Alternative-1 was discarded due to excessive water and land requirements, and Alternative-2 was rejected because it requires a long approach channel and situates the powerhouse in a deep valley. In contrast, Alternative-3 minimizes land use, reducing about 19 Ha compared to Alternative-2 and nearly 40% overall, uses the shortest water conductor system, involves minimal forest land, and avoids major social and resettlement issues, making it the most practical and efficient choice.

xvii. **Baseline Environmental Scenario:**

The field surveys for the collection of primary data were initiated in December 2021-22 and were completed in July-August 2022, in accordance with the Terms of Reference (ToR) accorded by the EAC, MoEF&CC. A supplementary study was carried out during December 2025 - January 2026 for winter season. These surveys covered winter, pre-monsoon/summer, and monsoon seasons, focusing on the collection of data and information related to terrestrial ecology, physical and social environmental parameters.

Period	From December 2021 to January 2026				
AAQ parameters at 6 locations (min. & Max.)	Unit in mg/m <sup>3</sup>				
	Core		Min	Max	Standards
	PM <sub>2.5</sub>		32.9	47	60
	PM <sub>10</sub>		14.5	23.7	100
	SO <sub>2</sub>		5.1	6.7	80
	NO <sub>2</sub>		5.6	8.1	80
	Buffer		Min	Max	
	PM <sub>2.5</sub>		25.9	47	60
	PM <sub>10</sub>		10.5	23.7	100
	SO <sub>2</sub>		4.2	6.7	80
NO <sub>2</sub>		5.2	8.1	80	
Incremental GLC Level	Core Zone				
	Criteria Pollutant [PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , Other parameters specific to the sector (Please specify)]	Unit [mg/m <sup>3</sup> ]	Baseline Concentration [A]	Predicted incremental value considering worst case stability class [B]	Total GLC [A]+[B]
	PM <sub>10</sub>	mg/m <sup>3</sup>	19.10	14.33	33.425
	PM <sub>2.5</sub>	mg/m <sup>3</sup>	39.95	15.98	55.93
	SO <sub>x</sub>	mg/m <sup>3</sup>	5.90	5.90	11.8
NO <sub>x</sub>	mg/m <sup>3</sup>	6.85	6.85	13.7	

**Buffer Zone**

Criteria Pollutant [PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , Other parameters specific to the sector (Please specify)]	Unit [mg/m <sup>3</sup> ]	Baseline Concentration [A]	Predicted incremental value considering worst case stability class [B]	Total GLC [A]+[B]
PM <sub>10</sub>	mg/m <sup>3</sup>	17.1	0	17.1
PM <sub>2.5</sub>	mg/m <sup>3</sup>	36.45	0	36.5
SO <sub>x</sub>	mg/m <sup>3</sup>	5.45	0	5.5
NO <sub>x</sub>	mg/m <sup>3</sup>	6.65	0	6.7

River water samples (03 samples)

Core Zone				
S. No	Parameters	Min	Max	Standards
1	pH	7.2	8	8.5
2	Total Dissolved Solids, mg/L	253.5	338	0
3	Dissolved Oxygen (mg/l)	5.8	7.5	6
4	Chloride (as Cl), mg/L	28	60	0
5	Total Hardness (as CaCO <sub>3</sub> ), mg/L	187.8	239.4	0
6	Biological Oxygen Demand (mg/l)	2.5	3.5	3.0
7	Chemical Oxygen Demand (mg/l)	8	11.6	0
8	Total Coliform (MPN/100 ml)	157	285	50

**Buffer Zone**

S. No	Parameters	Min	Max	Standards
1	pH	7.3	7.8	8.5
2	Total Dissolved Solids, mg/L	247	312	0
3	Dissolved Oxygen (mg/l)	6.6	7.6	6
4	Chloride (as Cl), mg/L	40	49	0
5	Total Hardness (as CaCO <sub>3</sub> ), mg/L	209.7	251.6	0
6	Biological Oxygen Demand (mg/l)	2.4	3	3.0
7	Chemical Oxygen Demand (mg/l)	7.7	9.8	0
8	Total Coliform (MPN/100 ml)	210	300	50

Pond water samples

-

Ground water samples quality at 7 location

**Core Zone**

S. No.	Parameters	Min	Max	Prescribed Limits	
1	pH	7.2	7.9	6.5-8.5	
2	Total Dissolved Solids (mg/l)	156	741	500	200
3	Chloride (as Cl) (mg/l)	20	86	250	1000
4	Total Hardness (as CaCO <sub>3</sub> ) (mg/l)	98.5	242.9	200	600
5	Fluoride (mg/l)	0.13	0.44	1.0	1.5

**Buffer Zone**

S. No.	Parameters	Min	Max	Prescribed Limits	
1	pH	7.1	7.8	6.5-8.5	
2	Total Dissolved Solids (mg/l)	163	943	500	200
3	Chloride (as Cl) (mg/l)	29	110	250	1000

	4	Total Hardness (as CaCO <sub>3</sub> ) (mg/l)	114.6	310.1	200	600		
	5	Fluoride (mg/l)	0.22	0.7	1.0	1.5		
Noise Levels Leq (Day & Night) at 6 locations	<b>Noise Level</b>	<b>Zone</b>	<b>Leq Day dB(A)</b>		<b>Leq Night dB(A)</b>		<b>Prescribed Limits</b>	
			From	To	From	To	Day	Night
	Core	Residential	45.8	61.2	35.4	47.2	55	45
	Buffer	Residential	44.8	59	34.7	45.5	55	45
Soil Quality at 10 Locations	<b>Core Zone</b>							
	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Prescribed Limits</b>			
	1	Calcium (mg/kg)	430	555	500			
	2	Magnesium (mg/kg)	258	331	500			
	3	Nitrogen (kg/ha)	260	300	500			
	4	Phosphorus (kg/ha)	13.4	19	50			
	5	Potassium (kg/ha)	190	264	500			
	6	Carbon (%)	0.63	0.83	1			
	7	Sodium Absorption Ratio	0.57	1.04	10			
	8	Salinity (ppt)	0	0	0.01			
	<b>Buffer Zone</b>							
	1	Calcium (mg/kg)	390	650	500			
	2	Magnesium (mg/kg)	234	387	500			
	3	Nitrogen (kg/ha)	220	337	500			
	4	Phosphorus (kg/ha)	12.2	29.5	50			
	5	Potassium (kg/ha)	150	286	500			
	6	Carbon (%)	0.43	0.8	1			
	7	Sodium Absorption Ratio	0.52	1.17	10			
8	Salinity (ppt)	0	0	0.01				
Flora & Fauna	Schedule-I species observed in the study area:							
	As per Wildlife Protection Amendment Act, 2022, Tiger, Northern Red Muntjac, Sambar, Indian Fox, Jackal, Common Leopard, Common Jungle cat, Striped hyaena, Sloth Bear, Porcupine, Lesser Adjutant, Python and Bengal Monitor lizard are the species listed under Schedule-I.							
<p>xviii. <b>Details of Solid waste/ Hazardous waste generation/ Muck and its management:</b>  The solid waste will be transported for disposal at the designated landfill sites. The biodegradable portion of the solid waste would be disposed of by composting. Project will identify authorized vendors for recycling or disposal of Hazardous waste like used batteries, used oil and used oil filters. The total quantity of muck likely to be generated from excavation including construction of roads is about 11.19 Mcum. The entire excavated material, after the reutilization, is proposed to be dumped in two locations i.e, Muck disposal Site- 1 and Muck disposal Site -2 having area of 17.68 ha and 6.14 ha respectively.</p> <p>xix. Public Hearing for the proposed project has been conducted by the State Pollution Control Board on May 19, 2023 in Panna and Satna districts of Madhya Pradesh. The main issues raised during the public hearing are related to Employment opportunities for local youth.</p> <p>xx. Status of Litigation Pending against the proposal, if any: NA</p>								

1		<b>NAME OF THE PROJECT</b>	<b>Panari Standalone Pumped Storage Project</b>
2		<b>Location</b>	
	a	Country	India
	b	State	Madhya Pradesh
	c	District	Panna
	d	Village near Powerhouse	Panari
3		<b>Geographical Co-Ordinates</b>	
	a	Upper Reservoir- (Now Proposed)	
		Latitude	24°54'44.79" N
		Longitude	80°28'17.18" E
	b	Lower Reservoir - (Now Proposed)	
		Latitude	24°54'1.98"N
		Longitude	80°29'42.95"E
4		<b>Access To Project Site</b>	
	a	Airport	Khajuraho Airport – 87.8 kms from project site
	b	Rail head	Khajuraho Railway Station, 84.8 kms from project site
	c	Road	SH 49
	d	Port	International Sea Ports (Haldia) Pvt. Ltd. 1100 kms from project site
5		<b>Project</b>	
	a	Type	Standalone Pumped Storage Project

	b	Storage Capacity	11160 MWH
	c	Rating	1800 MW
	d	Peak Operation Duration	6.2 Hours
6		<b>Upper Reservoir (newly proposed)</b>	
	a	Live Storage	0.766 TMC
	b	Dead Storage	0.195 TMC
	c	Gross Storage	0.961 TMC
7		<b>Upper Dam</b>	
	a	Top Bund Level (TBL)	EL +411.00 m
	b	Full Reservoir level (FRL)	EL +408.00 m
	c	Min. Draw Down Level (MDDL)	EL +390.00m
	d	Type of Dam	Geomembrane Faced Rockfill Embankment Dam (GFRD) & Cement Sand Gravel Dam (CSG)
	e	Max. Height of Rockfill Embankment	42 m
	f	Length of Embankment/Dam	3712 m
	g	Top width of Embankment/Dam	7.00 m
8		<b>Lower Reservoir (newly proposed)</b>	
	a	Live Storage	0.949 TMC
	b	Dead Storage	0.239 TMC
	c	Gross Storage	1.188 TMC

9		<b>Lower Dam</b>	
	a	Top Bund Level (TBL)	EL +188.00 m
	b	Full Reservoir level (FRL)	EL +185.00 m
	c	Min. Draw Down Level (MDDL)	EL +170.00m
	d	Type of Dam	Concrete Gravity Dam
	e	Max. Height of Dam	25.00 m
	f	Length of Dam	114.00 m
	g	No. of Spillway	7 no.
	h	No & size spillway Service Gates	7 no. & 7.5m (W) X 10.0 m(H) – vertical lift gates
	i	No. & size of Stoplogs	7 no. & 7.5m (W) X 10.0 m(H) – vertical lift gates
	j	Design Flood	5647 Cumec
10		<b>Diversion Tunnel</b>	
	a	No. & Shape of Tunnel	2 no. & Circular Shaped
	b	Dia. of Tunnel	10 m
	c	Average Length of each Tunnel	700 m
	d	Design flood	2193 Cumec
11		<b>Approach Channel</b>	
	a	Type & Shape	Concrete lined & Trapezoidal
	b	Length of channel	1197.00 m
	c	Bed width	80.0 m
12		<b>Intake Structure</b>	

	a	Type	Diffuser Type
	b	No. of Intakes	6 nos.
	c	Size of Each Intake	26.1 m (W) x 8.70 m (H) including piers
	d	Elevation of Intake centre line	EL 377.50 m
	e	Elevation of Intake bottom	EL 374.40 m
	f	Design Discharge of each Intake	161.00 Cumec
	g	Numbers & Size of Intake Service Gate	6 nos. of 4.70 m (W) x 6.00 m (H)
	h	Numbers & Size of Stoplog Gate	1 set of 4.70 m (W) x 6.00 m (H)
13		<b>Penstock /Pressure Shafts</b>	
	a	Type	Steel lined - circular
	b	Number of Penstock/Pressure Shaft	6 Nos. - where in 1 no. will be bifurcated to two smaller units & 5 No. will be connected to each larger unit
	c	Diameter of Penstock/Pressure Shaft	6.00 m
	d	Dia. Of Branch Pressure Shaft	4.20 m
	e	Length of Penstock/Pressure Shaft (Along Large Unit) - 6.00 m	1087.0 m Buried penstock - 862.00 m Vertical Pressure Shaft - 104.00 m Bottom Horizontal Pressure Shaft - 121.00 m
	e	Length of Penstock/Pressure Shaft (Along Small Unit) - 6.00 m	1031.0 m Buried penstock - 844.00 m Vertical Pressure Shaft - 104.00 m Bottom Horizontal Pressure Shaft - 8

			3.00 m
	f	Length of each branch Pressure Shaft (Small Unit) - 4.20 m	46.00 m
	g	Design Discharge in branch Pressure Shaft	80.50 Cumec (Small Unit)
	h	Design Discharge of each	161.00 Cumec (Large Unit)
		Penstock/Pressure Shaft	
	i	Velocity in the Penstock/Pressure Shaft	5.70 m/sec
	j	Velocity in Branch Penstock	5.81 m/s
14		<b>Powerhouse</b>	
	a	Type	Surface Powerhouse
	b	Centre line of Unit	EL 140.00 m
	c	Dimensions (Excluding Service bay)	195.00 m(L) x 25.50 m(W) x 51.10 m(H)
	d	Size of Service Bay	55.00 m(L) x 25.50 m(W)
	e	Service bay level	EL 154.30 m
15		<b>Tail Race Tunnel</b>	
	a	Type & Shape	Concrete Lined - Circular
	b	Number of Tunnels	7 Nos. (5 nos. for large units + 2nos. for smaller units)
	c	Dia. of Tunnel	7.20 m for larger unit & 5.10 m for smaller unit
	d	Length of the Tunnel	165 m

	e	Design Discharge	161.00 Cumec from each large unit and 80.50 Cumec from each smaller unit
	f	Velocity in Tunnel	3.95 m/s in Large Unit & 3.94 m/s in Small Unit
16		<b>Tailrace Outlet</b>	
	a	Type	Bellmouth Type
	b	No. of Outlet	7 Nos. (5 nos. for Large Units + 2 nos. for Smaller Units)
	c	Size of each outlet	22.80 m (W) x 9.20 m (H) including piers for larger units 20.32 m (W) x 7.00 m (H) including piers for smaller units
	d	Elevation of outlet center line	EL 158.60 m for larger units & EL 157.60 m for smaller units.
	e	Elevation of Outlet bottom	EL 155.00
	f	Tailrace outlet Service Gate	5 Nos. of 5.60 m (W) x 7.20 m (H) for larger units 2 Nos. of 4.00 m (W) x 5.10 m (H) for smaller units
	g	Tail Race outlet Stoplog Gate	1 set of 5.60 m (W) x 7.20 m (H) for larger units
			& 1 set of 4.00 m (W) x 5.10 m (H) for smaller unit
17		<b>Electro-mechanical Equipment</b>	
	a	Pump Turbine	Francis type, vertical shaft reversible pump turbine
	b	Total No of units	7 nos. (5X300MW + 2X150MW)
	c	Total Design Discharge (Turbine	966.00 Cumec

		Mode)		
	d	Rated Head in Turbine mode	213.30 m (for Large Unit) 211.70 m (for Smaller Unit)	
17.1		<b>300MW Turbines</b>		
	a	Total No of units	5 Units (All Fixed Speed)	
	b	Turbine Design Discharge	161.00 Cumec	
	c	Rated Pump Discharge	138.70 Cumec	
	d	Pump Capacity	330 MW	
	e	Rated Generation Head	213.30 m	
	f	Rated Pumping Head	223.90 m	
	g	Size of MIV	4.40 m (Butterfly Valve)	
	h	Speed of Machine	214.28 RPM	
	<b>I</b>	<b>Generator-Motor</b>		
	a	Type	Three (3) phase, alternating current synchronous generator motor semi umbrella type with vertical shaft	
	b	Number of units	5 Units (5 x 300MW)	
	c	Rated Capacity	Generator - 300 MW Pump Input - 330 MW	
	d	Rated Voltage	18.0 KV	
	<b>II</b>	<b>Power Transformer</b>		
	a	Type	Three Single Phase Power transformers with On Load tap changer (OLTC)	
	b	Number of units	16 Numbers (3 Numbers/Unit + 1 Spare limb) i.e. Three Single Phase, <b>18 KV/400KV</b> , each <b>123 MVA</b> rating po	

			wer transformers.
	c	Rated Capacity of each unit	Single Phase, 18 KV/400 KV, 123 MVA
	d	Rated Voltage	Primary - 18 kV; Secondary - 400 kV adjustable
			range of the secondary voltage: - 10% to +10% in 1.25% steps
17.2		<b>150 MW Turbines</b>	
	a	Total No. of units	2 Units (All Fixed Speed)
	b	Turbine Design Discharge	80.50 Cumec
	c	Rated Pump Discharge	69.40 Cumec
	d	Pump Capacity	165 MW
	e	Rated Generation Head	211.70 m
	f	Rated Pumping Head	224.80 m
	g	Size of MIV	3.10 m $\phi$ (Butterfly Valve)
	h	Speed of Machine	300 RPM
	I	<b>Generator-Motor</b>	
	a	Type	Three (3) phase, alternating current synchronous generator motor semi umbrella type with vertical shaft.
	b	Number of units	2 Units (2X150MW)
	c	Rated Capacity	Generator - 150 MW; Pump Input - 165 MW
	d	Rated Voltage	18.0 KV

	<b>II</b>	<b>Power Transformer</b>	
	a	Type	Three Single-Phase Power transformers with <b>ON Load Tap Changer (OLTC)</b>
	b	Number of units	6 Nos. i.e., 3 nos. per unit +1no. Spare Total: 7 nos.
	c	Rated Capacity of each unit	Single Phase, 18 kV/400kV, 62 MVA
	d	Rated Voltage	Primary - 18 kV; Secondary - 400 kV adjustable range of the secondary voltage: - 10% to +10% in 1.25% steps.
18		<b>POWER EVACUATION</b>	
	a	Voltage Level (KV)	400 KV
	b	No. of Transmission Lines	One 400 KV transmission line with double circuit.
	c	Total Length	One 400 KV Double Circuit Transmission Line with Quad Moose Conductor of length <b>165 K Ms (appx.)</b> from PSP will be connected to PowerGrid Orai <b>765/400 KV</b> Sub Station, Jaloun, Uttar Pradesh for evacuation of generated Power and for Supply of power during pumping mode.

xxii. The salient features of the project are as under: -

**· EAC Meeting Details:**

EAC meeting/s	54 <sup>th</sup> EAC meeting
Date of Meeting/s	08.05.2026

Date of earlier EAC meetings	31 <sup>st</sup> EAC meeting, dt 05.03.2020 (TOR)
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**Project details:**

Name of the Proposal	Panari Pumped Storage Project
Location (Including coordinates)	The proposed Panari Pumped Storage Project is located near Panari village, Tehsil Panna of District Panna and near Salikpur, Kaunhari, Pahauwa & Kathwaria villages of Majhgawan Tehsil, District Satna of Madhya Pradesh. The geographical co-ordinates of the proposed upper reservoir are at latitude 24°54'44.79" N and longitude is 80°28'17.18" E and that of lower reservoir are at 24°54'1.98"N and 80°29'42.95"E.
Inter-state issue involved	No
Seismic zone	Zone II

**Category details:**

Category of the project	1 (c)
Provisions	Standalone Pumped Storage Project
Capacity / Cultural command area (CCA)	1800 MW
Attracts the General Conditions (Yes/No)	Yes
Additional information (if any)	NA

**Electricity generation capacity:**

Powerhouse Installed Capacity	1800 MW
Generation of Electricity Annually	3869.70 MU
No. of Units	5 X 300MW + 2 X 150MW
Additional information (if any)	NA

**ToR/EC Details:**

Cost of project	10512.38 Crores
Total area of Project	581.68 Ha
Height of Dam from River Bed (EL)	Upper reservoir: Height of Embankment max-42 m & avg height-21 m

	Lower reservoir: Height of Embankment max-25 m & avg height-12 m
Length of Tunnel/Channel	1197 m
Details of Submergence area	431.70 Ha
Types of Waste and quantity of generation during construction/ Operation	Major waste generation is muck from excavation. Total quantity of excavated material is worked out as 11.19 Mcum, in which 8.02 Mcum will be reutilized for construction.
E-Flows for the Project	NA
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	NA
No. of trees/saplings proposed in view of 'Ek Ped Maa Ke Naam' campaign	500
<b>· Muck Management Details:</b>	
No. of proposed disposal area/(type of land-Forest/Pvt. land)	Two (Non-forest land), Muck Disposal Area I: 17.68 Ha & Muck Disposal Area II: 6.14 Ha, Capacity of 4.51 Mcum Ht- 26 m , Slope- 30o, Retaining wall Ht: 8 m
Muck Management Plan	The total quantity of muck generated is 11.19 Mcum, in which 8.02 Mcum of excavated muck is expected to be reutilized. The Rehabilitation plan of muck dumping site includes engineering and biological measures.
Monitoring mechanism for Muck Disposal	Properly and tightly covered Dumper trucks will be used
<b>· Land Area Breakup:</b>	
Private land	37.00 Ha
Government land	24.02 ha

Forest Land	520.66 Ha
Total Land	581.68 Ha
Submergence area/Reservoir area	433.7 Ha
Additional information (if any)	NA

**· Presence of Environmentally Sensitive areas in the study area**

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate/ letter/Remarks
Reserve Forest/Protected Forest Land	Yes	<ul style="list-style-type: none"> <li>· 520.66 ha forest land will be diverted for the project. Application under consideration. Proposal No. FP/MP/HYD/IRRIG/421339/2023. Date of application: 08/03/2023.</li> <li>· Since the project falls within the North-Eastern Tiger Corridor (Panna Tiger Corridor), NBWL recommendation required.</li> <li>· Application for Wildlife clearance vide proposal no. WL/MP/HYD/551887/2025 was submitted in September 2025 and under process.</li> </ul>
National Park	No	
Wildlife Sanctuary	No	

· Court case details: Nil

**· Previous EC compliance and necessary approvals:**

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	NA
Status of Stage- I FC	Application under consideration Proposal No: FP/MP/HYD/IRRIG/421339/2023. Date of Application: 08/03/2023
Additional detail (If any)	NA
Is FRA (2006) done for FC-I	Yes

**· Miscellaneous**

Particulars	Details
Details of consultant	R S Envirolink Technologies Pvt. Ltd.
Project Benefits	<b>Employment Generation:</b> Panari Stand alone PSP is planned to be completed in 48 months. At peak construction, around 3600 persons may be engaged, out of

	<p>which about 1200 will be from local population/surrounding villages and about 2400 will be skilled/semiskilled from other areas. All local persons will come from their homes. After commissioning, about 200 persons will be required, from local areas or migrated from other areas. The project would also create direct and indirect employment opportunities due to reliable power supply, contract works during construction and operation phase, etc.</p> <p><b>Local Area Development</b> Total project cost is Rs. 10512.38 Crore (with IDC). An amount of Rs. 15.00 crore has been earmarked for local area development to improve quality of life of local residents, especially those whose land will be acquired. They will have opportunities of skill development, education, better medical and health care, improved local infrastructure, along with green belt development, restoration and greening of the project and surrounding area.</p>
<p>Status of other statutory clearances</p>	<ul style="list-style-type: none"> <li>· FC Application: Under Consideration. Application No: FP/MP/HYD/IRRIG/421339/2023. Date of Application: 08/03/2023</li> <li>· NBWL Application: Under Consideration. Application No: WL/MP/HYD/551887/2025 Date of application: 17/09/2025</li> </ul>
<p>R&amp;R details</p>	<p>All the land owners will be losing their partial agricultural land holding and none of the families will be losing any house or any other assets, and none of them is getting displaced due to the project. The project affects 4 villages and 81 families, and the status of Rehabilitation &amp; Resettlement is yet to start. With reference to Section 2 and Part (a) of Sub-Section 3 of RFCTLARR Act, 2013, the provisions apply where a private company purchases land beyond prescribed limits through private negotiations. As per Rule 22 of the Madhya Pradesh Rules, 2015, the limits are 50 hectares in urban areas and 1000 hectares in rural areas. The total private land proposed to be purchased is about 61.02 hectares, which is within the prescribed limits, and the land d</p>

	oes not involve any habitation; hence, provisions relating to Rehabilitation and Resettlement are not applicable for the proposed Project.
Additional detail (If any)	NA

### 3.4.3. Deliberations by the committee in previous meetings

N/A
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### 3.4.4. Deliberations by the EAC in current meetings

<p><b>54.4.3 The EAC during deliberations noted the following:</b></p> <ul style="list-style-type: none"> <li>· The Expert Appraisal Committee (EAC) deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of TOR for conducting EIA/EMP and Public hearing for Panari Pumped Storage Project (1800 MW) in an area of 581.68 Ha located at Sub District Majhgawan and Panna, District Satna and Panna, Madhya Pradesh by M/s Panari Energy Private Limited.</li> <li>· The project/activity falls under Category A of item 1(c), 'River Valley Projects,' as per the Schedule of the Environmental Impact Assessment Notification, 2006, and requires appraisal at the Central level by the sectoral EAC in the Ministry.</li> <li>· During the deliberations the committee noted that although the proposed Upper Reservoir to be located away from any riverine system but lower reservoir is proposed to be created in the existing seasonal tributary / nala (Baghain Nadi). Since the lower reservoir will be located on non-perennial nallah, the committee opined that the project shall be categorized as an open-loop project rather than a closed-loop PSP.</li> <li>· The EAC noted that the total land required for the project components and related works has been estimated to be about 581.68 Ha; out of which 520.66 Ha is forest land and remaining 61.02 Ha is non-forest land. Diversion of forest land for non-forest purpose will be involved for construction of project components. However, it was observed that the application for Stage-I Forest Clearance (FC) has been submitted vide proposal no. FP/MP/HYD/IRRIG/421339 on March 08, 2023 for the diversion of 519.26 ha of forest land. Further, it was informed by the PP that Forest proposal was subsequently revised for diversion area of 520.66 ha due to changes in required forest land. The PP informed that the Advisory Committee (AC) discussed the Stage-I FC proposal in its meeting held on 27.02.2026 and EDS was raised by MOEF&amp;CC and proposal is pending with the user agency for submission of EDS reply.</li> <li>· The EAC noted that the land requirement proposed for various project components such as roads, stock yard, etc. appears to be on the higher side and may be optimized. In response, the PP submitted that necessary measures would be undertaken in this regard. The Committee opined that the PP shall optimize the land requirement to the extent feasible, and the revised details along with justification shall be incorporated in the EIA/EMP report.</li> <li>· The EAC also noted that there is change in land from earlier ToR granted by the Ministry on 13.04.2020, accordingly a comparative assessment of land required for the project at different stage is mentioned as under:</li> </ul>
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Description	As per ToR	Draft EIA Report submitted for PH	Fresh proposal for TOR
Capacity (MW)	1800		
Forest (Ha)	1013.62	519.26	520.66
Non-Forest (Ha)	0	62.45	61.02
Total (Ha)	1013.62	581.71	581.68

- The EAC noted that the total water requirement for initial reservoir filling of the project has been estimated at approximately 39.16 MCM (0.766 TMC), which is a one-time requirement. The Committee further noted that the annual water requirement for replenishment of losses on account of evaporation, seepage, transit losses, etc., has been assessed at 4.33 MCM per annum. It was also observed that the proposed source of water for the project shall be Panari Nala (lower dam located across Baghain River), to be met from the self-catchment area.
- The EAC noted that the project falls within the NTCA-recognized North-Eastern Tiger Corridor linked with the Panna Tiger Reserve. The Committee further noted that the application for Wildlife Clearance has been submitted vide proposal No. WL/MP/HYD/551887/2025 in September, 2025, which has been recommended by the State Board for Wildlife and is presently under consideration of the Standing Committee of the National Board for Wildlife.
- The Committee also observed that the Biodiversity Management and Wildlife Conservation Plan, with a total financial outlay of Rs. 413.58 lakh, has been duly approved by the Chief Wildlife Warden, Bhopal, vide letter dated 28.04.2025.
- The EAC observed that Memorandum of Understanding was signed between Government of Madhya Pradesh and Sri Siddharth Infratech & Services (I) Pvt. Ltd. through its SPV Panari Energy Pvt. Ltd. on February 24, 2025 for development of Panari Pumped Storage Project of capacity 1800 MW.

### 3.4.5. Recommendation of EAC

Recommended
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### 3.4.6. Details of Terms of Reference

#### 3.4.6.1. Specific

Miscellaneous:	
1.	Both capital and recurring expenditure under EMP shall be submitted.
2.	Pre-DPR Chapters viz., Hydrology, Layout Map and Power Potential Studies duly appraised by CWC/CEA shall be submitted.
3.	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and

	certificates of the labs which will analyze the samples.
4.	Drone video of project site shall be recorded and to be submitted.
5.	Detailed plan to restore wider roads and convert them into narrow up to 10m after construction of the project.
6.	Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pumped storage projects shall be used for preparation of EIA/ EMP reports.
<b>Disaster Management:</b>	
1.	Impact of Project activities (specially blasting and drilling) on the aquatic and terrestrial ecosystem, within study area to be studied and be incorporated in EIA/EMP report.
2.	The muck dumping sites shall be located with a distance of 100 mts from HFL. The PP shall submit the detailed action plan for transportation of muck along with monitoring mechanism of movement of muck carrying trucks.
<b>Muck Management:</b>	
1.	Details of quantity of muck generation component wise, types of muck (Excavation in tunnels, pressure shaft and powerhouse etc.) and disposal site/ transportation to be provided.
2.	Details of muck management such as dumping sites and its locations, transportation plan along with monitoring mechanism for muck transportation, detailing the road map of project construction site/ indicating the distances from HFL, river, project construction site along with types of road etc.
3.	Safety measures for avoiding spill over muck into the riverbed/streams and its flow into the river during the high discharge/ flood or monsoon period. Prepare plan for stabilization of muck disposal sites using biological and engineering measures to ensure that muck does not roll down the slopes and shall be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area.
4.	Restoration plan for construction area including dumping site of excavated materials by levelling, filling up of burrow pits, landscaping etc.
<b>Socio-economic Study:</b>	
1.	Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.
2.	All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. A comparative chart of issues raised by General Public during Public Hearing and commitments made by the Project Proponent will be prepared and submitted in the relevant chapter of EIA/EMP report.

3.	The EIA/EMP shall include a detailed socio-economic assessment of the tribal population in the project-affected area based on primary data and community consultations. A Tribal Development Plan, prepared in consultation with the District Administration and Tribal Welfare Department, shall be submitted along with the EIA report.
4.	PP shall submit the credible documents to show the status of land acquisition w.r.t project site from/through the concerned State Government as required under Ministry's OM dated 7 <sup>th</sup> October, 2014 as amended, for the project land to be acquired.
5.	Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land (if any) shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. Budget earmarked for R&R, CSR shall not be included in the cost of EMP.
<b>Environmental Management and Biodiversity Conservation:</b>	
1.	Impact of construction activities on natural streams/springs/aquifers shall be studied and accordingly conservation action plan shall be prepared in consultation with expert government research institute after detailed mapping of the study area.
2.	A detailed action plan for large scale plantation of native species of plant sapling within 10 km radius of the project shall be prepared in consultation with State Forest Department. The monitoring mechanism to ensure the survival of saplings shall be finalized in consultation with ICFRE.
3.	The PP will submit 10 years water availability data certified by the CWC/State Water Resource Department for quantity of water that is received annually by the small stream on which lower reservoir is proposed to be constructed.
4.	The PP will submit a detailed plan and monitoring mechanism for releasing the self - catchment water of small stream draining in to river along with action plan for conservation and protection of other streams/rivulets draining in to upper and lower reservoirs.
5.	Explore the possibilities for reducing the Forest land requirement.
6.	Muck disposal site and other components such as Township, site office, Stacking area and batching plant shall be located outside the forest area.
7.	Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is not falling in any Ecological Sensitive Area, Wildlife Sanctuary/Tiger/elephant corridor/Critically polluted area within 10 km of Project site.
8.	Transportation Plan for transporting construction materials shall be submitted. Separate chapter for risk assessment of such transportation through/within proposed the Wildlife Sanctuary shall be included in the EIA report, if any.
9.	Environmental Cost Benefit Analysis shall be done in terms of loss of Forest ecosystem due to diversion of Forest land/loss of biodiversity, water availability, water uses for generation of hydro power and Ecological flows.

1 0.	The baseline data collection will cover the changes in biological and ecological profile of the region after monsoon with worst-case scenario study and critical mineral assessment.
1 1.	Calculation and values of GHGs (CO <sub>2</sub> , CH <sub>4</sub> etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.
1 2.	The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report.
1 3.	Quantitative values of Impact modelling of environmental parameters shall be submitted for during construction and operation. Also, mitigation measures shall be submitted in terms of construction and operation phase.
1 4.	Conducting site-specific ecological study emphasizing on riverine ecology viz. fishes diversity, fish migration, habitat and aquatic biota due to construction PSP. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
1 5.	Action plan for survival or diversion of the rivulets/stream, if any, leading to join river shall be submitted.
1 6.	Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Specific ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all seasons
1 7.	A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.
1 8.	Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
1 9.	Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Indian Council of Agriculture Research (ICAR) Institutes/ Expert Govt. institutions and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.
2 0.	Details of mineral zone, if any, in the study area, certified by Geological Survey of India or any other concerned Government Organization shall be submitted. The project area should not come up on any critical mineral zone, the same shall to be verified by GSI/NMDC.
2 1.	Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI.
2 2.	Combined Impact of projects proposed on carrying capacity and sustainability of the natural stream/Reservoir/ River /nala of catchment area due to tapping of water for filling reservoir

	shall be studied.
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### 3.4.6.2. Standard

1(c)	<b>River Valley/Irrigation projects</b>
<b>Scope of EIA Study</b>	
1.	The EIA Report should identify the relevant environmental concerns and focus on potential impacts that may change due to the construction of proposed project. Based on the baseline data collected for three (3) seasons (Pre-monsoon, Monsoon and Winter seasons), the status of the existing environment in the area and capacity to bear the impact on this should be analysed. Based on this analysis, the mitigation measures for minimizing the impact shall be suggested in the EIA/EMP study.
<b>Details of the Project and Site</b>	
1.	General introduction about the proposed project.
2.	Details of Project and site giving L-Sections of all U/S and D/S Projects with all relevant maps and figures. Connect such information as to establish the total length of interference of Natural River and the committed unrestricted release from the site of Dam/Barrage into the main river.
3.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project location.
4.	Location details on a map of the project area with contours indicating main project features. The project layout shall be superimposed on a contour map of ground elevation showing main project features (viz. location of dam, Head works, main canal, branch canals, quarrying etc.) shall be depicted in a scaled map.
5.	Layout details and map of the project along with contours with project components clearly marked with proper scale maps of at least 1:50,000 scale and printed at least on A3 scale for clarity.
6.	Existence of National Park, Sanctuary, Biosphere Reserve etc. in the study area, if any, should be detailed and presented on a map with distinct distances from the project components.
7.	Drainage pattern and map of the river catchment up to the proposed project site.
8.	Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per the methodology of Soil and Land use Survey of India.
9.	Soil characteristics and map of the project area.
10.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
11.	Remote Sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of the study using overlaying mapping techniques viz. Geographic Information System (GIS), False Color Composite (FCC) generated from satellite data of project area.
12.	Land details including forests, private and other land.

2.	
1 3.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
1 4.	Different riverine habitats like rapids, pools, side pools and variations in the river substratum bedrocks, rocks, boulders, sand/silt or clay etc. need to be covered under the study
<b>Description of Environment and Baseline Data</b>	
1.	To know the present status of environment in the area, baseline data with respect to environmental components air, water, noise, soil, land and biology & biodiversity (flora & fauna), wildlife, socioeconomic status etc. should be collected within 10 km radius of the main components of the project/site i.e. dam site and power house site. The air quality and noise are to be monitored at such locations which are environmentally & ecologically more sensitive in the study area. The baseline studies should be collected for 1 season (Preferably Monsoon season). Flora-Fauna in the catchment and command area should be documented. The study area should comprise of the following:
2.	(i) Catchment area up to the dam/barrage site.
3.	(ii) Submergence Area.
4.	(iii) Project area or the direct impact area should comprise of area within 10 km radius of the main project components like dam, canals etc.
5.	(iv) Downstream upto 10 km from the tip of the reservoir.
<b>Details of the Methology</b>	
1.	The methodology followed for collection of base line data along with details of number of samples and their locations in the map should be included. Study area should be demarcated properly on the appropriate scale map. Sampling sites should be depicted on map for each parameter with proper legends. For Forest Classification, Champion and Seth (1968) methodology should be followed.
<b>Methodology for Collection of Biodiversity Data</b>	
1.	The number of sampling locations should be adequate to get a reasonable idea of the diversity and other attributes of flora and fauna. The guiding principles should be the size of the study area (larger area should have larger number of sampling locations) and inherent diversity at the location, as known from secondary sources (e.g. eastern Himalayan and low altitude sites should have a larger number of sampling locations owing to higher diversity).
2.	The entire area should be divided in grids of 5kmX5km preferably on a GIS domain. There after 25% of the grids should be randomly selected for sampling of which half should be in the directly affected area (grids including project components such as reservoir, dam, powerhouse, tunnel, canal etc.) and the remaining in the rest of the area (areas of influence in 10 km radius form project components). At such chosen location, the size and number of sampling units (e.g. quadrates in case of flora/transects in case of fauna) must be decided by species area curves and the details of the same (graphs and cumulative number of species in a tabulated form) should be provided in the EIA report. Some of the grids on the edges may not be completely overlapping with the study area boundaries. However, these should be counted and considered for selecting 25% of the grids. The number of grids to be surveyed may come out as a decimal number (i.e. it has an integral and a fractional part) which should be rounded to the next whole number.

3.	<p>The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.</p>
4.	<p>The R.E.T. species referred to in this point should include species listed in Schedule I and II of Wildlife (Protection) Act, 1972 and those listed in the red data books (BSI, ZSI and IUCN).</p>
<p><b>Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follows:</b></p>	
1.	null
2.	null
3.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
4.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
5.	Landslide zone or area prone to landslide existing in the study area should be examined.
6.	Presence of important economic mineral deposit, if any.
7.	Justification for location & execution of the project in relation to structural components (dam /barrage height).

8.	Impact of project on geological environment.
9.	null
10.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
11.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO <sub>2</sub> ) and Oxides of Nitrogen (NO <sub>x</sub> ) in the study area at 5-6 Locations.
12.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
13.	null
14.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
15.	null
16.	(i) Generation of thematic maps viz. slope map, drainage map, soil map, land use and land cover map, etc. Based on these, thematic maps, an erosion intensity map should be prepared.
17.	null
18.	History of the ground water table fluctuation in the study area.
19.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO <sub>2</sub> , PO <sub>4</sub> , Cl, SO <sub>4</sub> , Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
20.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
21.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
22.	Run off, discharge, water availability for the project, sedimentation rate, etc.
23.	Basin characteristics

2 4.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
2 5.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km <sup>2</sup> year <sup>-1</sup> .
2 6.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
2 7.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
2 8.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
2 9.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
3 0.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
3 1.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.
3 2.	A minimum of 1 km distance from the tip of the reservoir to the tail race tunnel should be maintained between upstream and downstream projects.
3 3.	Besides primary studies, review of secondary data/literature published for project area on flora & fauna including RET species shall be reported in EIA/EMP report.
3 4.	null
3 5.	Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.
3 6.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteridophytes, Bryophytes (all groups).
3 7.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
3 8.	Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index (IVI) , Shannon Weiner index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrates, size of quadrates etc. to be reported within the study area in different ecosystems.
3 9.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.

4 0.	Economically important species like medicinal plants, timber, fuel wood etc.
4 1.	Details of endemic species found in the project area.
4 2.	Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along-with economic significance. Species diversity curve for RET species should be given.
4 3.	Cropping pattern and Horticultural Practices in the study area.
4 4.	null
4 5.	Fauna study and inventorisation should be carried out for all groups of animals in the study area. Their present status alongwith Schedule of the species.
4 6.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
4 7.	Information (authenticated) on Avi-fauna and wildlife in the study area.
4 8.	Status of avifauna their resident/ migratory/ passage migrants etc.
4 9.	Documentation of butterflies, if any, found in the area.
5 0.	Details of endemic species found in the project area.
5 1.	RET species-voucher specimens should be collected along-with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian Wildlife (Protection) Act, 1972.
5 2.	Existence of barriers and corridors, if any, for wild animals.
5 3.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the proposed project development and loss of biodiversity.
5 4.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
5 5.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
5 6.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplanktons, benthos etc.

5 7.	Fish and fisheries, their migration and breeding grounds.
5 8.	Fish diversity composition and maximum length & weight of the measured populations to be studied for estimation of environmental flow.
5 9.	Conservation status of aquatic fauna.
6 0.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.
6 1.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.
6 2.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
6 3.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
6 4.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
6 5.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
6 6.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
6 7.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
6 8.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other property, possession of cattle, type of house etc.
6 9.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any ethnic/indigenous groups that are getting affected by the project.

#### **Impact Prediction and Mitigation Measures**

1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
2.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources.
3.	Effect on soil, material, vegetation and human health.

4.	Impact of emissions from DG set used for power during the construction, if any, on air environment.
5.	Pollution due to fuel combustion in equipments and vehicles
6.	Fugitive emissions from various sources
7.	Changes in surface and ground water quality
8.	Steps to develop pisci-culture and recreational facilities
9.	Changes in hydraulic regime and downstream flow.
10.	Water pollution due to disposal of sewage
11.	Water pollution from labour colonies/ camps and washing equipment.
12.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) (a) due to considerable road construction / widening activity (b) interference of reservoir with the inflowing stream (c) blasting for commissioning of HRT, TRT and some other structures.
13.	Changes in land use / land cover and drainage pattern
14.	Immigration of labour population
15.	Quarrying operation and muck disposal
16.	Changes in land quality including effects of waste disposal
17.	River bank and their stability
18.	Impact due to submergence.
19.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
20.	Pressure on existing natural resources
21.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
22.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
2	Impact on fish migration and habitat degradation due to decreased flow of water

3.	
2 4.	Impact on breeding and nesting grounds of animals and fish.
2 5.	Impact on local community including demographic profile.
2 6.	Impact on socio-economic status
2 7.	Impact on economic status.
2 8.	Impact on human health due to water / vector borne disease
2 9.	Impact on increase traffic
3 0.	Impact on Holy Places and Tourism
3 1.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
3 2.	Positive and negative impacts likely to be accrued due to the project are listed.
<b>Environmental Management Plan</b>	
1.	null
2.	Biodiversity and Wildlife Conservation and Management Plan for the conservation and preservation of rare, endangered or endemic floral/faunal species or some National Park/Sanctuary/ Biosphere Reserve or other protected area is going to get affected directly or indirectly by construction of the project, then suitable conservation measures should be prepared in consultation with the State Forest Department and with the physical and financial details. Suitable conservation techniques (in-situ/ ex-situ) will be proposed under the plan and the areas where such conservation is proposed will be marked on a project layout map.
3.	Compensatory Afforestation shall be prepared by the State Forest Department in lieu of the forest land proposed to be diverted for construction of the project as per the Forest (Conservation) Act, 1980. Choice of plants for afforestation should include native and RET species, if any. This will be a part of the forest clearance proposal.
4.	Fisheries Conservation and Management Plan - a specific fisheries management measures should be prepared for river and reservoir. If the construction of fish ladder/ fish-way etc. is not feasible then measures for reservoir fisheries will be proposed. The plan will detail out the number of hatcheries, nurseries, rearing ponds etc. proposed under the plan with proper drawings. If any migratory fish species is getting affected then the migratory routes, time/season of upstream and downstream migration, spawning grounds etc will be discussed in details.

5.	Green Belt Development Plan along the periphery of the reservoir, approach roads around the colonies and other project components, local plant species must be suggested with physical and financial details. A layout map showing the proposed sites for developing the green belt should be prepared.
6.	Environmental Monitoring Programme to monitor the mitigatory measures implemented at the project site is required will be prepared. Provision for Environment Management Cell should be made. The plan will spell out the aspects required to be monitored, monitoring indicators/parameters with respect to each aspect and the agency responsible for the monitoring of that particular aspect throughout the project implementation.
7.	Catchment Area Treatment (CAT) Plan should be prepared micro-watershed wise. Identification of free draining/ directly draining catchment based upon Remote Sensing and Geographical Information System (GIS) methodology and Sediment Yield Index (SYI) method of AISLUS, Deptt. of Agriculture, Govt. of India coupled with ground survey. Areas or watersheds falling under 'very severe' and 'severe' erosion categories should be provided and required to be treated. Both biological as well as engineering measures should be proposed in consultation with State Forest Department for areas requiring treatment. Year-wise schedule of work and monetary allocation should be provided. Mitigation measures to check shifting cultivation in the catchment area with provision for alternative and better agricultural practices should be included.
8.	Study of Design Earthquake Parameters: A site specific study of earthquake parameters should be done. Results of the site specific earthquake design parameters should be approved by National Committee of Seismic Design Parameters, Central Water Commission (NCSDP), New Delhi.
9.	Dam Break Analysis and Disaster Management Plan The outputs of dam break model should be illustrated with appropriate graphs and maps clearly bringing out the impact of Dam Break scenario. To identify inundation areas, population and structures likely to be affected due to catastrophic floods in the event of dam failure. DMP will be prepared with the help of Dam Break Analysis. Maximum water level that would be attained at various points on the downstream in case of dam break will be marked on a detailed contour map of the downstream area, to show the extent of inundation. The action plan will include Emergency Action and Management plan including measures like preventive action notification, warning procedure and action plan for co-ordination with various authorities.
10.	Reservoir Rim Treatment Plan for stabilization of land slide / land slip zones, if any, around the reservoir periphery is to be prepared based on detailed survey of geology of the reservoir rim area. Suitable engineering and biological measures for treatment of identified slip zones to be suggested with physical and financial schedule. Layout map showing the landslide/landslip zones shall be prepared and appended in the chapter.
11.	Muck Disposal Plan- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m away from the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites and approach roads to be given. Financial out lay for this may be given separately. Detailed muck transportation plan delineating the path ways, number of trucks, quantity of muck to be transported along with monitoring mechanism using latest technology, shall be prepared.
12.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
13.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio-economic survey coupled with the outcome of public consultation held. The R&R package shall be

	prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
1 4.	Public Health Delivery Plan including the provisions of drinking water supply for local population shall be in the EIA/EMP Report. Status of the existing medical facilities in the project area shall be discussed. Possibilities of strengthening of existing medical facilities, construction of new medical infrastructure etc. will be explored after assessing the need of the labour force and local populace.
1 5.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Panchayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
1 6.	Labour Management Plan for their Health and Safety.
1 7.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
1 8.	Energy Conservation Measures for the work force during construction with physical and financial details. Alternatives will be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use is curbed.
1 9.	Environmental safeguards during construction activities including Road Construction.
2 0.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
2 1.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

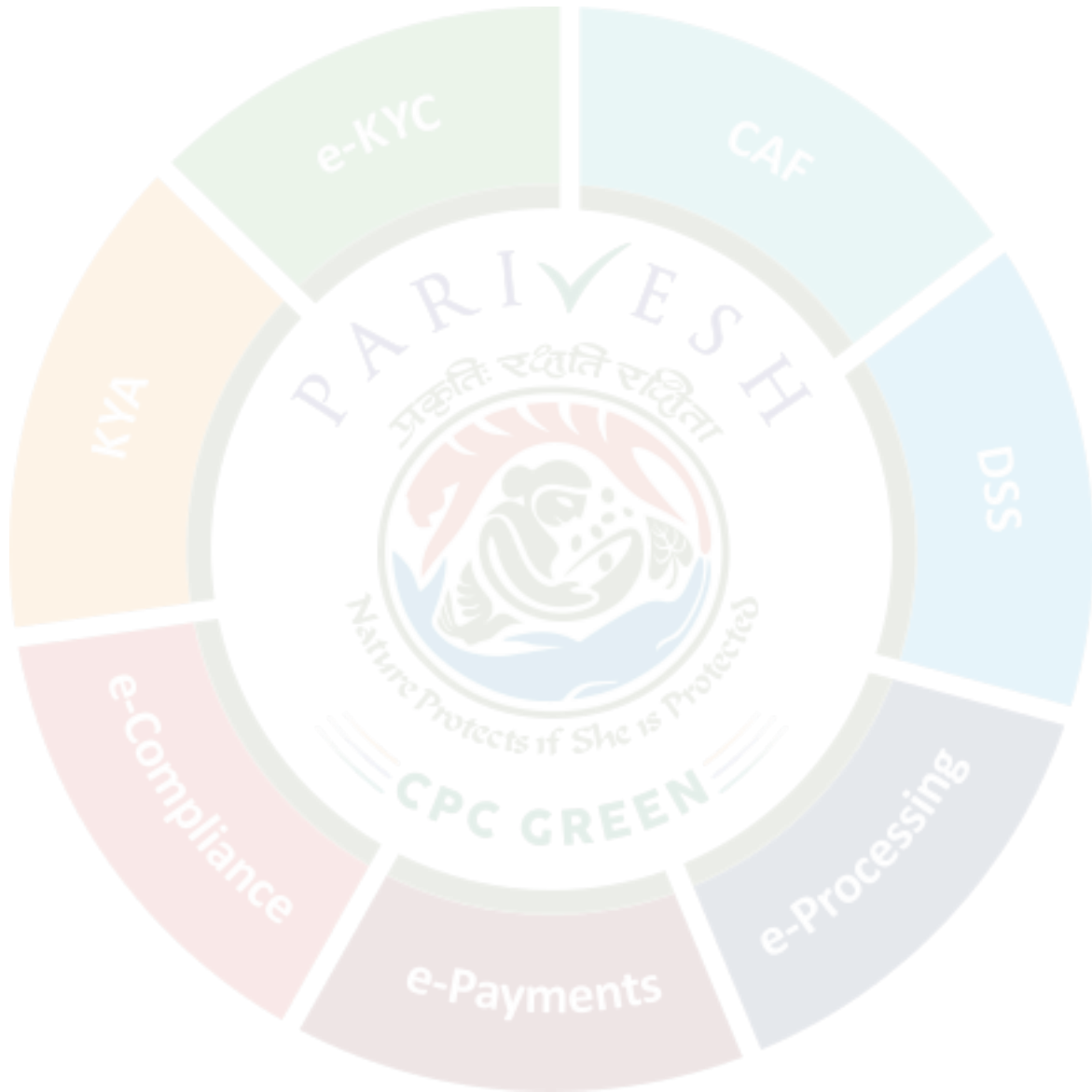
#### 4. Any Other Item(s)

N/A
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#### 5. List of Attendees

Sr. No.	Name	Designation	Email ID	Remarks
1	Prof G J Chakrapani	Chairman, EAC	cha*****@gmail.com	
2	Dr J V Tyagi	Member (EAC)	jvt*****@gmail.com	
3	Shri Kartik Sapre	Member (EAC)	kar*****@gmail.com	
4	Shri Ajay Kumar Lal	Member (EAC)	akl*****@gmail.com	
5	Dr A K Sahoo	Member (EAC)	ami***@gmail.com	Absent
6	Dr Uday Kumar R Y	Member (EAC)	uda*****@yahoo.com	
7	Dr J A Johnson	Member (EAC)	jaj@wii.gov.in	

8	Shri Rakesh Goyal	Member	goy*****@nic.in	
9	Shri Balram Kumar	Member	emo***@nic.in	
10	Yogendra Pal Singh	Scientist - F	yog*****@nic.in	



**MINUTES OF THE 54<sup>TH</sup> MEETING OF THE EXPERT APPRAISAL COMMITTEE FOR RIVER VALLEY AND HYDROELECTRIC PROJECTS HELD ON 08<sup>TH</sup> MAY, 2026 THROUGH VIRTUAL MODE.**

The 54<sup>th</sup> meeting of the EAC for River Valley & Hydroelectric Projects organized by the Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi, was held on 08<sup>th</sup> May, 2026 through Virtual Mode, under the Chairmanship of Prof. G. J. Chakrapani. The list of Members present in the meeting is at **Annexure**.

**Confirmation of the Minutes of the 53<sup>rd</sup> EAC meeting:**

The Minutes of the 53<sup>rd</sup> meeting held on 29<sup>th</sup> April and 30<sup>th</sup> April, 2026.

**Corrigendum to the Minutes of previous EAC meeting:**

**[A]. Corrigendum to the Minutes of the 50<sup>th</sup> EAC meeting held on 11<sup>th</sup> March, 2026**

**Agenda Item No. 50.2 Saundatti (1200 MW to 1600 MW) (Integrated Renewable Energy with Pumped Storage Project) in an area of 307.42 Ha (213.7 ha existing + 93.72 Ha additional) in Village Badli, Mallor, Yekkundi, etc., Sub District Savadatti, District Belagavi Karnataka by M/s Greenko Ka01 IREP Private Limited – Terms of Reference (ToR) – reg.**

**[Proposal No. IA/KA/RIV/571168/2026; F. No. J-12011/11/2018-IA.I-(R)]**

The EAC noted that due to typographical errors at certain places, the project capacity had been incorrectly mentioned as 1200 MW instead of 1260 MW. Therefore, based on the documents submitted by the PP on Parivesh Portal it has been clarified that the existing capacity of the project is 1260 MW and the proposed expansion is from 1260 MW to 1600 MW.

**[B]. Corrigendum to the Minutes of the 52<sup>nd</sup> EAC meeting held on 13.04.2026 in the Minutes of the 52<sup>nd</sup> EAC meeting held on 13<sup>th</sup> April, 2026**

**Agenda Item No. 52.3: Chentikheda Major Irrigation Project (15,300 ha CCA) in an area of 1369.35 located at Aroda, Pachnia, and Garhi etc., Sub-District Vijaypur & Sabalgarh, District Sheopur & Morena, Madhya Pradesh by M/s Water Resource Department Sabalgarh, District Morena, MP – Environmental Clearance (EC) – reg.**

**[Proposal No. IA/MP/RIV/557462/2026; F. No. J-12011/28/2024-IA.I (R)]**

The above-mentioned proposal has been considered by the EAC in its 52<sup>nd</sup> meeting

held on 13.04.2026. The minutes of the meeting and all the project documents are available on PARIVESH portal. However, EAC noticed that there is some inadvertent typographical error in certain paragraphs of the EAC deliberation part of the minutes of the instant project mentioned as under:

*“.....The EAC noted that the project site is located within 10 km of Kuno National Park, an ecologically sensitive and protected area. In view of the proximity to the National Park, the Committee emphasized the requirement of prior clearance from the National Board for Wildlife (NBWL) under the provisions of the Wildlife (Protection) Act, 1972. The Committee took note that the Project Proponent has applied for wildlife clearance, and the proposal has been registered with reference/application no. WL/MP/IRRIG/541262/2025 for consideration by the NBWL.*

*The EAC inquired about the downstream impacts of the project and observed that the dam proposed on*

*The EAC opined that the project shall be considered further only after obtaining the requisite wildlife clearance and submission of recommendations of the Standing Committee of NBWL, along with a site-specific Wildlife Conservation Plan addressing potential impacts on fauna, habitat, and ecological connectivity. ....”*

Now, the EAC opined that the deliberations of the EAC of above-mentioned agenda item shall be read as:

*“.....The EAC noted that the project site is located within 10 km of Kuno National Park, an ecologically sensitive and protected area. In view of the proximity to the National Park, the Committee emphasized the requirement of prior clearance from the National Board for Wildlife (NBWL) under the provisions of the Wildlife (Protection) Act, 1972. The Committee took note that the Project Proponent has applied for wildlife clearance, and the proposal has been registered with reference/application no. WL/MP/IRRIG/541262/2025 for consideration by the NBWL.*

*The EAC opined that the project shall be considered cleared subject to obtaining the requisite wildlife clearance and submission of recommendations of the Standing Committee of NBWL, along with a site-specific Wildlife Conservation Plan addressing potential impacts on fauna, habitat, and ecological connectivity. ....”*

### **Agenda Item No. 54.1**

**Panaura Close loop Pumped Storage Project (1500 MW) in an area of 236.37 Ha located at Sub District Robertsganj, District Sonbhadra, Uttar Pradesh by M/s Adani Hydro Energy Five Limited – Environmental Clearance (EC) - reg.**

**[Proposal No. IA/UP/RIV/570960/2026; F. No. J-12011/14/2024-IA-I(R)]**

**54.1.1** The proposal is for grant of Environmental Clearance (EC) to the project for Panaura Close loop Pumped Storage Project (1500 MW) in an area of 236.37 Ha located at Sub District Robertsganj, District Sonbhadra, Uttar Pradesh by M/s Adani Hydro Energy Five Limited.

**54.1.2:** The Project Proponent and the accredited Consultant M/s. R S Envirolink Technologies Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

- i. The Panaura PSP, proposed by Adani Hydro Energy Five Limited, is located near the Village Panaura in the Robertsganj Tehsil and Villages Chananee and Arugur in the Obra Tehsil of Sonbhadra District, Uttar Pradesh.
- ii. The upper reservoir is proposed to be located on flat / gradually sloping land which is suitable for creating the desired gross storage capacity of 11.48 Mm<sup>3</sup>. Out of 11.48 Mm<sup>3</sup>, the live storage capacity is 11.15 Mm<sup>3</sup> by keeping FRL & MDDL at EL 550.0 m & EL 532.0 m respectively. For creating this storage, it is proposed to construct a Concrete Gravity Dam with maximum height of 28.0 m for the length of 1608m.
- iii. Similarly, the lower reservoir is proposed to be located in the natural depression which is suitable for creating the desired gross storage capacity of 13.09 Mm<sup>3</sup>. Out of 13.09 Mm<sup>3</sup>, the live storage capacity is 12.84 Mm<sup>3</sup> by keeping FRL and MDDL at EL 216.0 m & EL 176.0 m respectively. For creating this storage, it is proposed to construct a Geomembrane Faced Rockfill/ Concrete Dam with maximum height of 82.5m (Concrete) and 53.5m (Rockfill) for the length of 1292 m.
- iv. Both the reservoirs are planned to be interconnected through water conductor system and the reversible generator pump turbine would be installed in the deep pit powerhouse. The quantum of water required for initial/one time filling of reservoirs (i.e. 11.15 MCM) shall be pumped from nearby Son River.
- v. The project proposal was considered by the Expert Appraisal Committee (River Valley and Hydropower Projects) in its 12<sup>th</sup> meeting held on 18-19<sup>th</sup> July 2024 and recommended for grant of Terms of Reference (ToRs) for the project. The ToR has been issued by Ministry vide ToR Identification No.: TO24A0000UP5969698N dated 07.09.2024.

- vi. The geographical co-ordinate of the project Latitude 24°32'50.58"N, Longitude 83°24'24.84"E (Upper Reservoir) and Latitude 24°31'30.04"N and Longitude 83°24'40.03"E (lower Reservoir).
- vii. The Panaura Pumped Storage Project (1500 MW) envisages construction of 28m high & 1608m long Dam at Upper Reservoir; 3 Nos. of Upper Dam Intake diffuser type; 2 Nos. 7.0m Dia. 865m long and 4 no. 5.2m/4.6m dia. 576.0m/343.0m long steel lined pressure shaft; 1 Nos. 5.3m Dia. 879.0m long and 2 no. 3.6m dia. 901.0m long steel lined unit pressure shaft; Underground Power House, 178 m x 26 m x 52 m; 4 Unit of 300 MW and 2 Units of 150 MW Francis reversible pump-turbine; 366m long concrete lined TRT 8.2m dia. 2 nos. and 6.0m dia. 1 no.; 82.5m high & 461 long dam concrete dam and 53.5m high & 831m long rockfill dam at Lower reservoir; 3 Nos. of Lower Reservoir Intake Diffuser Type; Pothead Yard.
- viii. **Land requirement:** The total land requirement for the project works out to approximately 236.37 ha which includes 230.12 ha forest land & 6.25 ha non-forest land.
- ix. **Demographic details in 10 km radius of project area:**  
The study area comprises a total of 56 villages, out of which 2 villages viz., Gurar and Mahona are uninhabited. These villages are located in Robertsganj & Obra tehsils in Sonbhadra district of Uttar Pradesh and Kharaundhi & Ketar tehsils in Garhwa district of Jharkhand. Total population in the study area is 67601, belonging to 13856 households, and the average family size is 4-5 members. Of the total population, male population is 35919 (53.13%) and female population is 31682 (46.86%). The sex ratio is 882 females per 1,000 males. Children population (0-6 age group) is 19.39% of total population in the study area villages. Total percentage of Scheduled Tribe and Scheduled Caste population in the study area is 29.60% and 20.30% respectively. Literacy rate in the study area is 57.91%. Around 43.42% of the total population are workers, among them, 38.38% are main workers while 61.61% are marginal workers. Among specific occupational categories, 12.40% are cultivators, 67.24% are agricultural labourers, 4.05% are household industrial workers and the rest 16.30% are other workers constitute 16.30%.
- x. **Water requirement:** One-time water will be pumped from nearby Son River to the proposed lower reservoir and used cyclically for energy storage and discharge. The one-time filling requirement is 13.42 MCM and annually 1.6 MCM.
- xi. **Project Cost:** The estimated project cost is Rs 7463.64 Crore. Total capital cost earmarked towards Environment Management Plan is Rs. 2008.01 lakh and the Recurring cost (operation and maintenance) will be about Rs. 395.39 lakh per annum (Rs. 1,581.57 lakh for 4 years).
- xii. **Project Benefit:** Approx. 1200 persons will be engaged during construction phase. The project proposes to allocate Rs. 2000.00 Lakh towards CER (as per Ministry's OM dated 30<sup>th</sup> Sep 2020).

- xiii. **Environmental Sensitive area:** There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site except Kaimur Wildlife Sanctuary located in Bihar, ESZ boundary is about 7.8 km from nearest project component. River Son is flowing at a distance of 800 m in eastern direction.
- xiv. **MoU / any other clearance/ permission signed with State government:** Memorandum of Understanding (MOU) No. 24/REN/0000028126 signed with the Government of Uttar Pradesh on 16/05/2024 for the development of project.
- xv. **Resettlement and rehabilitation:** The entire private land identified for the project falls in Panaura village of Robertsganj Tehsil and Arugur village of Obra Tehsil of Sonbhadra District, Uttar Pradesh. The private land identified for the projects belongs to landowner families who will be losing their partial agricultural land holding and some temporary structures constructed in agricultural land. None of the families will be losing any house or any other assets. None of them is getting displaced due to the project from the above land procurement. None of them is getting displaced due to the project from the above land procurement. Private land identified for the project will be acquired as per Section 2 and Part (a) of Sub-Section 3 of The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCTLARR), 2013.
- xvi. **Scheduled – I species:** As per Wildlife Protection Amendment Act, 2022, 10 mammals (Blackbuck, Sambar, Jackal, Jungle Cat, Indian Grey Mongoose, Stripped Hayena, Sloth Bear, Common Leopard, Bengal Fox and Indian Crested Porcupine); 4 bird (Brahminy Kite, Red-Headed Vulture, Indian Peafowl and Mottled wood owl); and 7 herpetofauna (Indian Sand Boa, Indian Chameleon, Indian Rat snake, Indian cobra, King cobra, Russell's Viper and Bengal Monitor Lizard) species are listed as Schedule I species.
- xvii. **Alternative Studies:**

All alternate schemes were identified using Google Earth and subsequently marked on the toposheet. Based on a preliminary assessment of general site characteristics, key features of each scheme were compared. It is observed that all schemes either partially or entirely fall within forest areas; however, none of the locations are situated within an eco-sensitive zone. In all cases, the upper reservoir is accessible from Panaura Village, while the lower reservoir can be approached via the Yadunathpur–Jaradag–Chandari road, which passes through Chananee and Arugur villages. The schemes were compared with respect to plant capacity, upper and lower dam height, length of water conductor system, L/H ratio, submergence area, forest area, etc. The upper reservoir has been selected over the hills on bigger catchment for storage whereas lower reservoir is in the valley formation near the foot of the hills. The contours of the proposed project area has been taken from the SRTM based DEM data and accordingly heads and reservoir storages have been worked out. Based on the storage requirement for 6 Hrs, the reservoir area and dam

height have been selected. The water conductor system align along the ridge connecting upper and lower reservoir. The source of initial filling and to meet the demand of annual evaporation losses, the nearby water source is Son River for all schemes. The identification of the forest land has been done based on the toposheet.

## **OPTIMIZATION OF SELECTED SCHEME**

Based on the final scheme selection, the scheme has been further studied with various plant capacity of 900 MW, 1200 MW & 1500 MW with increase in storage capacity for generation of 6 hours. For pumped storage scheme, the feasibility generally depends upon the higher capacity of the installed capacity. Hence the scheme of 1500 MW comprising of 4 units of 300 MW & 2 units of 150 MW is proposed for the project.

## **WATER CONDUCTOR ALTERNATIVES**

The location of upper reservoir and lower reservoir is fixed as per the topography and storage requirement. Further, various alternative of the water conductor system were studied for the geotechnical investigation based on the underground power house. Further, based on the transient studies it has also been assessed that no negative pressure was encountered in the WCS and the speed/ pressure rise are within the permissible limit in all cases of transient for various alternatives.

During the preliminary studies, WCS with Underground Power house was envisaged and proposed which comprise of two intake and steel lined pressure shaft of 6.5m dia. 887m & 847m long bifurcated into four unit penstock of 4.6m dia. for each unit of 300MW. While one intake and pressure shaft of 4.8m dia. 803m long bifurcated into two unit penstock of 3.6m for each 150MW unit. The concrete lined unit TRT of 6.0m proposed for each unit of 300MW. Two unit TRT combining into single about 752m & 738m long TRT of 8.2m dia. Similarly, the concrete lined unit TRT of 4.6m proposed for each unit of 150MW. Two unit TRT combining into single 727m long TRT of 6.0m diameter. Investigations has been carried out for this alternative as well apart from the other alternatives with surface power house.

However, during core drilling, it has been found that proposed underground power house is to be located in shale band as per the cores of bore holes. GSI, after site visit during February 2025, suggested that locating underground power in shale band is not appropriate. Thus, surface power house options were explored.

## **SURFACE POWER HOUSE**

The surface power house locations were explored near the lower dam on left bank. The maximum cutting for power house shall varies between 63m to 72m from the deepest excavation level about 32m to 41m from service bay level. The power house locations were studied with two orientation power house longitudinal axis in North-south & East – West direction. A surface power of size 26m wide and 178.0m long (including service bay) with 20m long unloading bay is proposed for housing four units of 300 MW and two

units of 150 MW. Power house pit is proposed to be backfilled with concrete up to service bay level and remaining portion with compacted backfill up to finished top level around power house so that surface drainage flows with gravity. In case of emergency during the excavation of power house pit, evacuation may be carried out through open excavation required for tail race tunnel.

Three alternatives of WCS were studied considering surface power house.

### **Alternate 1: WCS with provision of Surge Shaft and Surface Power House**

This alternative envisages surface power house with longer axis in the direction of North-South. It comprises of concrete lined two Nos. 8.2m diameter & 1295.0m long HRT for large units and one No. 6.0m diameter and 1215.0m long HRT for smaller units joining at the bottom of the two Nos. 20.0m & one No. 14.0m surge shaft. Thereafter, steel lined individual penstock/ pressure shaft (four Nos.) having 6.0m diameter and 495.0m long are envisaged for large units from the bottom of the two Nos. surge shaft. Subsequently, diameter have been reduced to 5.2m and thereafter to 4.60m for feeding to four large size units. For smaller size units, two Nos. steel lined penstock of 4.0m diameter and 1481.0m long take off from the smaller size surge shaft for feeding to the two Nos. smaller size units. The concrete lined unit TRT of 6.0m is proposed for each unit of 300MW and after combining of two unit, the TRT is 8.2m diameter and about 203.0m long. Similarly, the concrete lined unit TRT of 4.6m is proposed for each unit of 150MW and after combining two unit, the TRT is 6.0m diameter is about 150.0m long. In this alternative, alignment of power necessitated a bend in penstock upstream of power house as shown below in the layout. Further, in this alternative, 20.0m diameter surge shaft has about 40.0m underground portion and about 35.0m above ground due to topographical constraints.

### **Alternate 2: WCS with provision of Surge Shaft and Surface Power House (alignment modified)**

Alternative 2 has been further modified by changing orientation of power house so that bend in penstock upstream of power house could be avoided for smooth flow of water during generation/ pumping. However, this necessitates increase in length of concrete dam portion at lower reservoir.

This alternative also envisages surface power house with longer axis in the direction East-West. It also comprises of concrete lined two Nos. 8.2m diameter & 1303.0m long HRT for large units and one No. 6.0m diameter and 1215.0m long HRT for smaller units joining at the bottom of the two Nos. 20.0m & one No. 14.0m surge shaft. Thereafter, steel lined individual penstock/ pressure shaft (four Nos.) having 6.0m diameter and 515.0m long are envisaged for large units from the bottom of the two Nos. surge shaft. Subsequently, diameter have been reduced to 5.2m and thereafter to 4.60m for feeding to four large size units. For smaller size units, two Nos. steel lined penstock of 4.0m diameter and 1416.0m long take off from the smaller size surge shaft for feeding to the two Nos. smaller size units. The concrete lined unit TRT of 6.0m is proposed for each

unit of 300MW and after combining of two unit, the TRT is 8.2m diameter and about 366.0m long. Similarly, the concrete lined unit TRT of 4.6m is proposed for each unit of 150MW and after combining two unit, the TRT is 6.0m diameter is about 220.0m long. In this alternative, bend in penstock upstream of power house is not required as shown below in the layout. Further, in this alternative also, it is not feasible to construct the surge shaft completely underground due to topographical constraints.

**Alternate 3: WCS with Approach Channel and Surface Power House**

Alternative 2 has been further modified with proposal of wide channel from the upper reservoir and thereafter construction of intake at the end of channel in order to eliminate the requirement of the surge shaft as 20.0m diameter surge shaft has about 40.0m underground portion and about 35.0m above ground. Further, In view of excavation of 820m long upper approach channel, HRT has also been eliminated and therefore steel lined penstock will take off from the intake structure.

Thus, in this alternative, upper intake structure is envisaged at the end of 820.0m long channel and thereafter it comprises of two Nos. steel lined penstock/ pressure shaft having 7.0m diameter & 865.0m long for large units. These two penstock/ pressure shafts divided into four Nos. 5.2m diameter and finally reduced to 4.60m diameter for feeding to four large size units. For smaller size units, one Nos. steel lined penstock having 5.3m diameter and 879.0m long is envisaged from upper intake thereafter it bifurcates in to 3.6m for feeding to the two Nos. smaller size units. The concrete lined unit TRT of 6.0m is proposed for each unit of 300MW and after combining of two unit, the TRT is 8.2m diameter and about 366.0m long. Similarly, the concrete lined unit TRT of 4.6m is proposed for each unit of 150MW and after combining two unit, the TRT is 6.0m diameter is about 220.0m long.

**SELECTION OF FINAL ALTERNATIVE**

Based on the techno-economic comparison of all three alternatives, the Alternative-3 have shorted water conductor system & found to be safe in transient study with max. liner thickness limited to 56mm. Also, there is no surge shaft requirement and thus proposed for the further DPR studies.

xviii. **Baseline Environmental Scenario:**

Period	November 2024-December 2024					
AAQ parameters at 10 locations (Min. & Max.)	<b>Core Zone</b>					
	<b>Parameter</b>	<b>Unit</b>	<b>Min</b>	<b>Max</b>	<b>Avg</b>	<b>Standards</b>
	PM <sub>2.5</sub>	µg/m <sup>3</sup>	17.40	21.70	19.55	60
	PM <sub>10</sub>	µg/m <sup>3</sup>	39.10	45.60	42.35	100
	SO <sub>2</sub>	µg/m <sup>3</sup>	4.10	7.70	5.90	80
	NO <sub>2</sub>	µg/m <sup>3</sup>	7.50	9.30	8.40	80

	<b>Buffer Zone</b>					
	<b>Parameter</b>	<b>Unit</b>	<b>Min</b>	<b>Max</b>	<b>Avg</b>	<b>Standards</b>
	PM <sub>2.5</sub>	µg/m <sup>3</sup>	18.10	25.60	21.85	60
	PM <sub>10</sub>	µg/m <sup>3</sup>	41.60	50.30	45.95	100
	SO <sub>2</sub>	µg/m <sup>3</sup>	5.20	8.50	6.85	80
NO <sub>2</sub>	µg/m <sup>3</sup>	6.10	12.20	9.15	80	
<b>Incremental I GLC Level</b>	<b>Core Zone</b>					
	<b>Criteria Pollutant</b>	<b>Unit</b>	<b>Baseline Concentration [A]</b>	<b>Predicted incremental value considering worst case stability class [B]</b>	<b>Total GLC [A]+[B]</b>	
	PM <sub>10</sub>	µg/m <sup>3</sup>	45.6	13.68	59.28	
	PM <sub>2.5</sub>	µg/m <sup>3</sup>	21.7	6.51	28.21	
	SO <sub>2</sub>	µg/m <sup>3</sup>	7.3	8.76	16.06	
	NO <sub>2</sub>	µg/m <sup>3</sup>	9.1	10.92	20.02	
	<b>Buffer Zone</b>					
	<b>Criteria Pollutant</b>	<b>Unit</b>	<b>Baseline Concentration [A]</b>	<b>Predicted incremental value considering worst case stability class [B]</b>	<b>Total GLC [A]+[B]</b>	
	PM <sub>10</sub>	µg/m <sup>3</sup>	48.9	0	48.9	
	PM <sub>2.5</sub>	µg/m <sup>3</sup>	25.6	0	25.6	
SO <sub>2</sub>	µg/m <sup>3</sup>	8.2	0	8.2		
NO <sub>2</sub>	µg/m <sup>3</sup>	10.7	0	10.7		
<b>River water samples (5 samples)</b>	<b>Core Zone</b>					
	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Standards</b>	
	1	pH	7.4	7.75	8.5	
	2	Total Dissolved Solids, mg/L	34	110	500	
	3	Dissolved Oxygen (mg/l)	7.6	7.8	6	
4	Chloride (as Cl), mg/L	24	30	250		

	5	Total Hardness (as CaCO <sub>3</sub> ), mg/L	97.4	104	300	
	6	Biological Oxygen Demand (mg/l)	3	3.9	2	
	7	Chemical Oxygen Demand (mg/l)	16.8	17.5	0	
	8	Total Coliform (MPN/100 ml)	48	420	50	
<b>Buffer Zone</b>						
	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Standards</b>	
	1	pH	7.04	7.83	8.5	
	2	Total Dissolved Solids, mg/L	37	227	500	
	3	Dissolved Oxygen (mg/l)	7.1	8.3	6	
	4	Chloride (as Cl), mg/L	28.8	32.8	250	
	5	Total Hardness (as CaCO <sub>3</sub> ), mg/L	83.2	111.4	200	
	6	Biological Oxygen Demand (mg/l)	1.8	3.2	2	
	7	Chemical Oxygen Demand (mg/l)	7.1	17.1	0	
	8	Total Coliform (MPN/100 ml)	21	485	50	
<b>Pond water samples quality at -- locations</b>	-					
<b>Ground Water samples at 10 locations</b>	<b>Core Zone</b>					
	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Desired Limits</b>	<b>Permissible Limits</b>
	1	pH	7.17	7.27	6.5	8.5
	2	Total Dissolved Solids, mg/L	188	590	500	2000
	3	Chloride (as Cl), mg/L	20	23	250	1000
	4	Total Hardness (as CaCO <sub>3</sub> ), mg/L	26	27.2	200	600
5	Fluoride (as F), mg/L	0.12	0.12	1	1.5	

<b>Buffer Zone</b>						
S. No.	Parameters	Min	Max	Desired Limits	Permissible Limits	
1	pH	6.55	7.37	6.5	8.5	
2	Total Dissolved Solids, mg/L	73	646	500	2000	
3	Chloride (as Cl), mg/L	19	26	250	1000	
4	Total Hardness (as CaCO <sub>3</sub> ), mg/L	24.2	31.3	200	600	
5	Fluoride (as F), mg/L	0.05	0.15	1	1.5	

Noise levels Leq (Day & Night) at 10 locations	Zone	Category	Leq Day dB(A)		Leq Night dB(A)		Prescribed Limits	
			From	To	From	To	Day	Night
	Core	Residential	50.0	54.0	33.6	35.5	55	45
Buffer	Residential	51.7	55.0	34.0	37.2	55	45	

Soil Quality at 10 Locations	<b>Core Zone</b>				
	S. No.	Parameters	Min	Max	Prescribed Limits
	1	Calcium (mg/kg)	450	479	500
	2	Magnesium (mg/kg)	188	190	500
	3	Nitrogen (kg/ha)	263	309	500
	4	Phosphorus (kg/ha)	11.1	12.6	50
	5	Potassium (kg/ha)	288	322	500
	6	Carbon (%)	0.57	0.75	4
	7	Sodium Absorption Ratio	1.37	1.58	10
8	Salinity (ppt)	0	0	0	

<b>Buffer Zone</b>				
S. No.	Parameters	Min	Max	Prescribed Limits
1	Calcium (mg/kg)	328	571	500
2	Magnesium (mg/kg)	152	259	500
3	Nitrogen (kg/ha)	214	295	500
4	Phosphorus (kg/ha)	9.9	14.7	50
5	Potassium (kg/ha)	229	312	500
6	Carbon (%)	0.55	0.8	4
7	Sodium Absorption Ratio	1.3	1.6	10
8	Salinity (ppt)	0	0	0

<b>Flora &amp; Fauna</b>	<p>Schedule-I species observed in the study area:</p> <p>As per Wildlife Protection Amendment Act, 2022, 10 mammals (Blackbuck, Sambar, Jackal, Jungle Cat, Indian Grey Mongoose, Stripped Hayena, Sloth Bear, Common Leopard, Bengal Fox and Indian Crested Porcupine); 4 bird (Brahminy Kite, Red-Headed Vulture, Indian Peafowl and Mottled wood owl); and 7 herpetofauna (Indian Sand Boa, Indian Chameleon, Indian Rat snake, Indian cobra, King cobra, Russell's Viper and Bengal Monitor Lizard) species are listed as Schedule I species.</p>
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xix. **Details of Solid waste/ Hazardous waste generation/ Muck and its management:**

- Sanitation and Solid Waste Management Plan– The implementation of the Sanitation and Solid Waste Management Plan, including provision of infrastructure, training, and strict adherence to waste segregation, transportation, and disposal protocols, will be carried out at regular intervals throughout the construction period. The solid waste will be transported for disposal at the designated landfill sites. The landfill shall have impervious clay at the bottom-most layers. The second layer shall be impervious liner (Geomembrane), the third layer will be of sand, after that well-compacted solid waste is to be put over the sand, then again, a layer of clay, finally a layer of soil. Vegetation shall be grown on the topmost layers. It will give a good aesthetic view of the landfill.
- For Disposal of hazardous waste vendors authorized by State Pollution Control Committee shall be engaged.
- Following the utilization of muck across various project components and deposition of the same within the reservoir areas, the remaining quantity of muck requiring disposal is estimated at 7,61,503 cum. This volume will be utilised for levelling the undulating terrain beneath Water Conductor System, Site Office, Workshop, Labour Camps and Batching Plant. Total capacity of these sites is 9,66,547 cum. All the sites are around 800m away from HFL.

xx. Public Hearing for the proposed project has been conducted by the State Pollution Control Committee on 17.11.2025 at Village Panaura, Tehsil Robertsganj, District Sonbhadra. The main issues raised and replies by the user agency during the public hearing are:

**Suggestions/ Comments Given by Stakeholders**

Issues/Comments/Observations	Reply by the User Agency
Shri Imran Ali of Village Panaura, Sonbhadra welcomed the project and stated that the company will indeed pay for land that is recorded in the land revenue record in the name of a person.	Private land required for the project will be purchased based on consultation, negotiation, and mutual consent with the landowners under the supervision of the district administration, in

<b>Issues/Comments/Observations</b>	<b>Reply by the User Agency</b>
<p>However, some people do not own land, and those who live in the forest should also be given compensation. Shri Imran Ali requested that, keeping his experiences in mind, the officials of the project should pay attention to the ground situation.</p>	<p>accordance with the provisions of the 'Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013' and the notification number '98/I-13-2014-5KA(25)-2013T.C' issued by the State Government of Uttar Pradesh on October 22, 2014.</p>
<p>Shri. Abrar Ali, from Village Panaura, Sonbhadra, while welcoming the project, inquired about what percentage of people would receive employment in this company. Additionally, a request was made to provide free education and employment.</p>	<p>Provision for a Skill Development Center has been made under the Local Development Plan to provide self-employment opportunities and make local people self-reliant. Financial provisions have been made under the Local Development Plan to arrange for drinking water in the villages within the project area. There is a provision for compensatory afforestation on equivalent non-forest land in exchange for the forest land required for the project. A green belt will be developed around the project area. Under the Local Area Development Plan, financial provisions have been set aside for the strengthening of road routes as part of basic infrastructure development in the project area.</p>
<p>Shri Raj Kumar, Village Pradhan of Panaura, while welcoming the project, echoed the demand for free education and employment opportunities for the local population. He informed that Nagwa is a Naxal-affected area and requested the project proponent to consider establishment of a degree college, provision of free medicines, and supply of free electricity to the local community.</p>	<p>Local residents will be given employment in the project based on skills. Under the Company's Corporate Social Responsibility (CSR) scheme, educational and healthcare facilities will be extended to the surrounding areas.</p>
<p>Shri Istkar Ali, Village Panaura, Sonbhadra, while welcoming the project, thanked the company for</p>	<p>During the project construction phase, approximately 1,200 skilled and semi-skilled workers will be required, and during the project operation phase, 150</p>

Issues/Comments/Observations	Reply by the User Agency
<p>opening. Requested that at least 50% of jobs be given to local people.</p>	<p>skilled and semi-skilled workers will be required. Local people will get direct and indirect employment opportunities from the project. At the same time, affected families will be provided employment on the basis of seniority/eligibility. Local people will also be given contracts in construction works as per their qualifications. As required, local vehicles will be engaged in construction activities.</p>
<p>Mohd. Umar, from Village Panaura, Sonbhadra, while welcoming the project, has informed that with the arrival of the Adani Company, a bright future is visible. He stated that without worrying about the land, people in Dala, Renukoot, and Obra have received employment due to the setting up of factories, and poverty has also been alleviated. We want a factory to open in Panaura so that the people here get employment and poverty is eliminated. Along with this, we want facilities for skill development, as well as sewing machines and computers/laptops, to be provided free of cost so that everyone can become educated.</p>	<p>In order to make the unemployed youth of the village skilled, they will first be trained under skill development. Following this, they will be given priority for employment in the project according to their qualifications. Through the company's CER scheme, education and medical facilities will be provided in the surrounding areas</p>
<p>Sh. Santosh Kumar, Village Pradhan of Chananee, Sonbhadra, while welcoming the project, has informed that we are all tribals. Along with fair compensation for the land that will be taken from us, one job should be provided to each affected family and a free health center should be built.</p>	<p>Those who have land, houses, etc., in their name will be given full compensation through mutual consent, and educated people will be given employment in the project based on their skills. Health camps will be organized in the surrounding areas from time to time</p>

xxi. Status of Litigation Pending against the proposal, if any. **No**

xxii. The brief details of the project are as under: -

S. No.	Description	Upper Dam	Lower Dam
<b>1</b>	<b>LOCATION</b>		
A	State	Uttar Pradesh	
B	District	Sonbhadra	
C	Taluka/ Village	Robertsganj	
D	Latitude	24°32'50.58"N	24°31'30.04"N
E	Longitude	83°24'24.84"E	83°24'40.03"E
f	Nallah	Minor nallah draining Into Son (Sone) River	
g	Road	Robertsganj to Panaura via MDR 160E (43km) and thereafter village road	
h	Nearest Rail Head	Sonbhadra Railway Station, 50km from Project Site	
i	Nearest Airport	Varanasi, 145 km from Project Site	
<b>2</b>	<b>HYDROLOGY</b>		
a	Catchment Area	1.0 km <sup>2</sup>	7.0 km <sup>2</sup>
b	Design Flood	29.84 m <sup>3</sup> /s	269.84 m <sup>3</sup> /s
c	Quantity of Water Required for Daily 6 hrs Power Generation	11.06 Mm <sup>3</sup>	11.06 Mm <sup>3</sup>
<b>3</b>	<b>RESERVOIRS</b>		
a	MWL	El. 550.50 m	El. 217.50 m
b	FRL	El. 550.00 m	El. 216.00 m
c	MDDL	El. 532.00 m	El. 176.00 m
d	Gross Storage at FRL	11.48 Mm <sup>3</sup>	13.09 Mm <sup>3</sup>
e	Gross Storage at MDDL	0.33 Mm <sup>3</sup>	0.25 Mm <sup>3</sup>
f	Live Storage	11.15 Mm <sup>3</sup>	12.84 Mm <sup>3</sup>
<b>3.1</b>	<b>Dams</b>		
a	Dam Type	Concrete Gravity Dam	Geomembrane Faced Rockfill/ Concrete Dam
b	Total Length	1608.00	1292.00
c	Top of Dam	El. 552.00 m	El. 219.50 m
d	Deepest Bed Level	El. 524.00 m	El. 166.00 m
e	Max. Height	28.0m	82.5m (Concrete) 53.5m (Rockfill)
<b>3.2</b>	<b>Spillway</b>		
a	Spillway Type & Size	Ungated (6 bays of 8.25m)	Gated (2 bays of 6.0m x 6.0m)

S. No.	Description	Upper Dam	Lower Dam
b	Crest Level of Spillway	El. 550.00m	El. 207.00
<b>4</b>	<b>INTAKE</b>		
a	Type	Horizontal - 3 No.	Horizontal - 3 No.
b	Trash Rack Size (Each Intake)	Larger Unit -3 Bays of 7.7m (W)x 12.0m(H) Smaller Unit -2 Bays 6.0m (W)x 12.0m(H)	Larger Unit -3 Bays of 7.7m (W)x 12.7m(H) Smaller Unit -2 Bays 6.0m (W)x 12.7m(H)
c	Intake Gate Size	Larger Unit -7.0mx7.0m Smaller Unit- 5.3mx5.3m	Larger Unit -8.2mx8.2m Smaller Unit-6.0mx6.0m
<b>5</b>	<b>PRESSURE SHAFT</b>		<b>Smaller Units</b>
a	Number	2 nos. / 4 nos.	1 no. / 2 nos.
b	Shape	Circular	Circular
c	Diameter	7.0m / 5.2m, 4.6m	5.3m / 3.6m
d	Length	865.0m / 576.0m , 343.0m	879.0m / 901.0m
e	Lining	Steel	Steel
<b>6</b>	<b>POWER HOUSE</b>		
a	Type	Deep pit Surface	
b	Installed Capacity	6 no's (4 X 300 MW & 2 X 150 MW)	
c	Size	178 m x 26 m x 52 m	
d	C/L of Unit	RL 132.00 m	
e	Service bay level	RL 148.30 m	
f	Control Room Building	178 m x 9 m x 29.5 m	
<b>7</b>	<b>TAILRACE TUNNEL</b>		<b>Smaller Unit</b>
a	Number	4 nos./ 2 nos.	2 nos./ 1 no.
b	Length	50.0 m / 366.0 m	50.0 m / 218.0 m
c	Shape	Circular	Circular
d	Diameter	6.0 m / 8.2 m	4.6 m / 6.0 m
e	Lining	Concrete	Concrete
<b>8</b>	<b>ELECTRO-MECHANICAL EQUIPMENT</b>		
<b>10.1</b>	<b>Powerhouse</b>		
a	Type	Surface	
b	Center Line of Unit	El. 132.00 m	
c	Service bay level	El. 148.30 m	
d	Unloading Bay Level	El. 166.00 m	
<b>10.2</b>	<b>Electromechanical Equipment</b>		

S. No.	Description	Upper Dam	Lower Dam
a	Pump Turbine	Francis type, vertical shaft reversible pump-turbine	
b	Total No of units	6 no's (4 X 300 MW & 2 X 150 MW)	
c	Cumulative Design Discharge	509.33 m <sup>3</sup> /s (Turbine Mode) 396.65 m <sup>3</sup> /s (Pump Mode)	
10.2.1		300 MW Turbines	150 MW Turbines
	Pump Turbine	Francis type, vertical shaft reversible pump-turbine	Francis type, vertical shaft reversible pump-turbine
	Turbine Capacity	300 MW	150 MW
	Turbine Design Discharge	101.82 m <sup>3</sup> /s for each Unit	51.02 m <sup>3</sup> /s for each Unit
	Rated Head in Turbine Mode	335.07 m	334.34 m
	Pump Capacity	335 MW	169 MW
	Pump Design Discharge	79.30 m <sup>3</sup> /s for each Unit	39.73 m <sup>3</sup> /s for each Unit
	Rated Head in Pump Mode	349.77 m	350.21 m
	Synchronous speed	273.73 rpm	375 rpm
10.2.2	Generator-Motor		
	Type	Three phase, alternating current salient pole synchronous, generator motor with vertical shaft	Three phase, alternating current salient pole synchronous, generator motor with vertical shaft
	Number of units	4 Units	2 Units
	Rated Capacity	Generator – 300 MW Motor Input –336 MW	Generator – 150 MW Motor Input –169 MW
	Rated Voltage	18 KV	18 KV
10.2.3	Motor Generator Transformer	OFWF type Three-Phase transformers with OFF Circuit tap changer (OCTC)	OFWF type Three-Phase transformers with OFF Circuit tap changer (OCTC)
	Number of units	4 Units	2 Units
	Rated Capacity of each unit	355 MVA	178 MVA
	Voltage Ratio	Primary – 18 KV; Secondary - 420 kV adjustable range of the secondary voltage: -5% to +5% in 2.5% steps	Primary – 18 KV; Secondary - 420 kV adjustable range of the secondary voltage: -5% to +5% in 2.5% steps

S. No.	Description	Upper Dam	Lower Dam
<b>10.3</b>	<b>400 kV Gas Insulated Switchgear</b>	(GIS)	
a	Type of GIS	Indoor Type	
b	No. of GIS units	One Set (11 Bays)	
c	Location	GIS Building (above Motor Generator transformers)	
d	Scheme	Double Busbar Arrangement with bus coupler	
<b>10.4</b>	<b>Power Evacuation</b>		
a	Voltage Level (KV)	400 KV	
b	No. of Transmission lines	Double Circuit Transmission Line	
c	Conductor	(GIS)	
d	Terminating at	Indoor Type	

xxiii. The salient features of the project are as under: -

- EAC Meeting Details:**

EAC meeting/s	54 <sup>th</sup> Meeting
Date of Meeting/s	08.05.2026
Date of earlier EAC meetings	18-19 <sup>th</sup> July 2024 (Scoping Clearance)

- Project details:**

Name of the Proposal	Panaura Pumped Storage Project (1500 MW)
Proposal No.	IA/UP/RIV/570960/2026
Location (Including Coordinates)	Near Panaura village in the Robertsganj Tehsil and Chananee and Arugur villages in the Obra Tehsil of Sonbhadra District, Uttar Pradesh. Upper Reservoir: Latitude 24°32'50.58"N and Longitude 83°24'24.84"E Lower Reservoir: Latitude 24°31'30.04"N and Longitude 83°24'40.03"E.
Company's Name	M/s Adani Hydro Energy Five Limited
CIN no. of Company/user agency	U35105GJ2024PLC156613
Accredited Consultant and certificate no.	Name: R S Envirolink Technologies Pvt. Ltd. Certificate No.: NABET/EIA/25-28/RA 0415

Project location (Coordinates /River/ Reservoir)	Near Panaura village in the Robertsganj Tehsil and Chananee and Arugur villages in the Obra Tehsil of Sonbhadra District, Uttar Pradesh. Upper Reservoir: Latitude 24°32'50.58"N and Longitude 83°24'24.84"E Lower Reservoir: Latitude 24°31'30.04"N and Longitude 83°24'40.03"E. Water for initial filling will be lifted from the Son River to the proposed lower reservoir and used cyclically for energy storage and discharge
Inter- state issue involved	No
Proposed on River/ Reservoir	Water for initial filling will be lifted from the Son River
Type of Hydro-electric project	Off-stream Closed Loop Pumped Storage Project
Seismic zone	III

• **Category details:**

Category of the project	A
Capacity / Cultural command area (CCA)	1500 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	-

• **ToR/EC Details:**

ToR Proposal No.	<ul style="list-style-type: none"> <li>IA/UP/RIV/472012/2024 (Fresh TOR)</li> <li>IA/UP/RIV/525467/2025 (Transfer of TOR)</li> </ul>
EAC meeting date	18-19th July 2024 (Scoping Clearance)
ToR Letter No.	<ul style="list-style-type: none"> <li>TOR Identification No.: TO24A0000UP5969698N (Fresh TOR)</li> <li>TOR Identification No.: TO25A0000UP5358865T (Transfer of TOR)</li> </ul>
ToR grant Date	<ul style="list-style-type: none"> <li>07.09.2024 (Fresh TOR)</li> <li>30.04.2025 (Transfer of TOR)</li> </ul>
Cost of project	Rs. 7463.64 Crore
Total area of Project	236.37 Ha
Height of Dam from River Bed (EL)	<ul style="list-style-type: none"> <li>Upper Dam: 28 m Concrete Gravity Dam (from deepest foundation level)</li> <li>Lower Dam: 82.5m Concrete Dam and 53.5m Geomembrane Faced Rockfill Dam (from deepest foundation level)</li> </ul>

Details of submergence area	<ul style="list-style-type: none"> <li>• Upper Reservoir: 11.48 Mm<sup>3</sup> Gross Storage at FRL</li> <li>• Lower Reservoir: 13.09 Mm<sup>3</sup> Gross Storage at FRL</li> </ul>
District to provide irrigation facility (if applicable)	NA
Details of tunnels on upper level & lower level and length of canal (if applicable)	<ul style="list-style-type: none"> <li>• Upper Dam: 2 Nos. 7.0m Dia. 865m long and 4 no. 5.2m/4.6m dia. 576.0m/343.0m long steel lined pressure shaft</li> <li>• Lower Dam: 1 Nos. 5.3m Dia. 879.0m long and 2 no. 3.6m dia. 901.0m long steel lined unit pressure shaft</li> </ul>
No. of affected Village	Two (2): Panaura village of Robertsganj Tehsil and Arugur village of Obra Tehsil of Sonbhadra District, Uttar Pradesh
No. of Affected Families	
Project Benefits	<p><b>Social Benefits</b> A number of marginal activities and jobs will be available to the locals during the construction phase. Local Area Development, facilities in education, medical, transportation, road network and other infrastructure. An opportunity for small-scale and cottage industries to develop in the area.</p> <p><b>Financial Benefits</b> Project has been designed to meet the peaking requirement during weekdays in the southern region grid and in the state of Uttar Pradesh. The energy output of the project with an installed capacity of 1500 MW has been estimated as 3121 MU annually. The levelized cost of generation of the project has been found to be Rs 8.25 /kWh considering cost of pumping @ Rs 3.00 /kWh.</p>
R&R details	<p>The entire private land identified for the project falls in Panaura village of Robertsganj Tehsil and Arugur village of Obra Tehsil of Sonbhadra District, Uttar Pradesh. The private land identified for the projects belongs to landowner families who will be losing their partial agricultural land holding and some temporary structures constructed in agricultural land. None of the families will be losing any house or any other assets. None of them is getting displaced due to the project from the above land procurement.</p> <p>Private land identified for the project will be acquired as per Section 2 and Part (a) of Sub-Section 3 of The</p>

	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCTLARR), 2013.
Catchment area/ Command area	Both Upper and Lower reservoirs are proposed to be constructed on a stream, which further downstream joins Son River at its left bank. The catchment area of these streams at the dam of both the reservoirs is 7.0 sq km.
Types of Waste and quantity of generation during construction/ Operation	<ul style="list-style-type: none"> <li>• Muck during construction – 7.61 lakh cum (to be disposed)</li> <li>• Municipal Solid Waste during construction - Degradable (380 Kg/day for 1500 persons), Non degradable (100 Kg/day for 1500 persons)</li> </ul>
Material used for blasting and its composition as per DGMS standards.	One magazine of 25 MT capacities would be sufficient to meet the requirement of the project. A mobile explosive van shall be deployed to carry explosive at the site of use at upper and lower dam area. Movement of van should be done with armed guards and proper documentation recommended by PESO.
E-Flows for the Project	The project is an off-stream closed loop pumped storage scheme. The catchment yield shall be released to downstream of lower reservoir. Lower Reservoir will block two small rivulets, however, diversion of these rivulets being blocked by the lower dam is not found to be practical, therefore, appropriate provisions are made in the dams designs for releasing all the water of the upper and lower reservoir's catchment and provision. Hence, E-flow is not required for the scheme.
Is Projects earlier studied in Cumulative Impact assessment & Carrying Capacity studies(CIA&CC) for River in which project located. If yes then  a) E-flow with TOR/Recommendation by EAC as per CIA&CC study of River Basin.  b) If not the E-Flows maintain criteria for sustaining river ecosystem.	No

Details on provision of fish pass	The project is an off-stream closed loop pumped storage scheme. Water for initial filling will be lifted from the Son River to the proposed lower reservoir and used cyclically for energy storage and discharge. Both the proposed upper and lower reservoirs are artificial reservoirs and are not located on any active streams.
Project benefit including employment details (no of employee)	About 1200 workers (labour and staff) would be engaged during the peak construction period, out of which 350 people will be engaged permanently and about 850 will be temporary labour for the construction work. It is expected that 90% of the total workforce shall be available from the State of Uttar Pradesh. After completion of the project only a staff of about 150 technical people shall be required for the operation of the project.
Area of Compensatory Afforestation (CA) with tentative no of plantation.	230.12 ha; tentative no. of plantation – 2,50,000
Previous EC details	-
EC Compliance Report by R.O, MOEF&CC	-
No. of trees/saplings proposed in view of 'Ek Ped Maa Ke Naam' campaign	500

- **Electricity generation capacity:**

Powerhouse Installed Capacity	1500 MW
Generation of Electricity Annually	3121 MU
No. of Units	6 (4 X 300 MW & 2 X 150 MW)

- **Muck Management Details:**

No. of proposed disposal area/ (type of land-Forest/Pvt land)	Following the utilization of muck across various project components and deposition of the same within the reservoir areas, the remaining quantity of muck requiring disposal is estimated at 7,61,503 cum. This volume will be utilised for levelling the undulating terrain beneath Water Conductor System, Site Office, Workshop, Labour Camps and Batching Plant. Total capacity of these sites is 9,66,547 cum.
Cross section of proposed muck area, Height of muck	Submitted

with slope.	
Distance of muck disposal area (location), from muck generation sources (project area)/River, HFL of proposed muck disposal area.	800 m from HFL.
Total Muck Disposal Area	-
Estimate Muck to be generated	7,61,503 cum (to be disposed off)
Transportation	The generated muck will be carried in dumper trucks covered with heavy duty tarpaulin properly tied to the vehicle in accordance with best international practices. All precautionary measures will be followed during the dumping of muck. All dumpers will be well maintained to avoid any chances of loose soil from being falling during transportation. All routes will be periodically wetted with the help of sprinklers prior to the movement of dumper trucks. Dumping would be avoided during the high-speed wind, so that suspended particulate matters (SPM) level could be maintained. Further, dumping will be avoided during heavy traffic. After the dumping the surface of dumps will be sprayed with water with the help of sprinklers and then compacted.
Monitoring mechanism for Muck Disposal Transportation	The provisions of Monitoring have been kept under proposed Environmental Monitoring Plan.

- **Land Area Breakup:**

Private land	6.25 ha
Government land	0.00
Forest Land	230.12 ha
Total Land	236.37 ha
Submergence area/Reservoir area	182.10 ha (upper and lower reservoirs)
Additional information (if any)	-

- **Presence of Environmentally Sensitive areas in the study area**

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes/ No	Details of Certificate/ letter/ Remarks
Reserve Forest/ Protected Forest Land	No	No project component falls in any notified protected area. Nearest Protected Area to

National Park	No	the Project Components is Kaimur Wildlife Sanctuary (Bihar), ESZ boundary is about 7.8 km from nearest project component. Nearest Protected Area to the Project Components in Uttar Pradesh is Kaimur Wildlife Sanctuary (U.P.), which is about 26 km from nearest project component.
Wildlife Sanctuary	No	
Archaeological sites monuments/ historical temples etc.	No	
Additional information (if any)	-	

**Availability of Schedule-I species in study area:** As per Wildlife Protection Amendment Act, 2022, 10 mammals (Blackbuck, Sambar, Jackal, Jungle Cat, Indian Grey Mongoose, Stripped Hayena, Sloth Bear, Common Leopard, Bengal Fox and Indian Crested Porcupine); 4 bird (Brahminy Kite, Red-Headed Vulture, Indian Peafowl and Mottled wood owl); and 7 herpetofauna (Indian Sand Boa, Indian Chameleon, Indian Rat snake, Indian cobra, King cobra, Russell's Viper and Bengal Monitor Lizard) species are listed as Schedule I species.

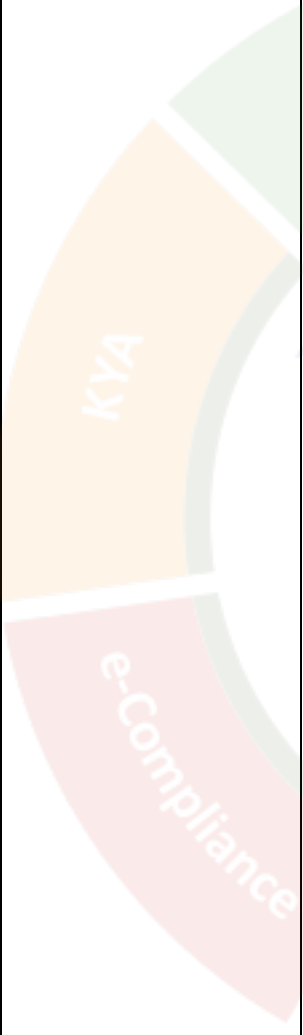
● **Public Hearing (PH) Details**

Advertisement for PH with date	“Dainik Jagran” and “Hindustan Times” dated 13.10.2025
Date of PH	17/11/2025
Venue	Village Panaura, Tehsil Robertsganj, District Sonbhadra
Chaired by	Additional District Magistrate (Namami Gange & Rural Water Supply), District Sonbhadra
Main issues raised during PH	<ul style="list-style-type: none"> <li>i. Requests were made to extend compensation not only to recorded landowners but also to forest dwellers and non-title holders, considering ground realities.</li> <li>ii. Strong demand for employment for local people, with some stakeholders suggesting a fixed percentage (e.g., 50%) and preference for affected families.</li> <li>iii. Need for skill development programs and support for self-employment (e.g., training, sewing machines, computers/laptops).</li> <li>iv. Requests for free education, establishment of educational institutions (e.g., degree college), and access to learning resources.</li> </ul>

	<p>v. Demand for free medical facilities, health centers, and regular healthcare support in the project area.</p> <p>vi. Concerns regarding improvement in drinking water supply, roads, electricity, and overall village infrastructure.</p> <p>vii. Emphasis on inclusive development, given the socio-economic vulnerability of tribal populations and the Naxal-affected nature of the region.</p> <p>viii. General support for the project with expectations of poverty alleviation, local economic growth, and improved quality of life.</p> <p>Complete issues raised during PH and clarification given by Project Proponent has been submitted.</p>
No. of people attended	322

• **Brief of base line Environment:**

Particulars	Details
<b>Period of baseline data collection/ Sampling period.</b>	<b>Winter</b>
Soil	November 2024
Air Environment	November 2024-December 2024
Noise & Traffic	November 2024
Water Quality	November 2024
Vegetation	November 2024
Faunal	November 2024
Socio-economic	November 2024
Brief description on hydrology and water assessment as per the approved Pre-DPR:	<p>The Panaura PSP is proposed between two reservoirs i.e. reservoir and lower reservoir (both are to be constructed newly) and one-time water will be pumped from nearby Son River to the proposed lower reservoir and used cyclically for energy storage and discharge. The one-time filling requirement is 13.42 MCM and annually 1.6 MCM.</p> <p>The upper and lower reservoirs are formed along the minor stream/nala draining into the reservoirs. The upper reservoir has catchment area of 1.0 sq.km, whereas the lower reservoir has a catchment of 7.0 sq.km. that drains the runoff into the reservoir. The yield into the reservoir is assumed to be exactly proportional to area. Based on the 50 year rainfall data, the</p>

	<p>90% dependable work out to be 2005 and annual rainfall 558.3 mm and average rainfall is 902.01 mm.</p> <p>The average reservoir area (FRL &amp; MDDL) are 0.6 sq.km. for upper and 0.3 sq.km. for lower reservoir, thus the rainfall yield has been estimated considering runoff for catchment contribution only, whereas for reservoir contribution the runoff coefficient considered as 1. The reservoir yield for 90% dependable year is 0.46 MCM &amp; 2.466 MCM for upper &amp; lower reservoir respectively.</p> <p>The evaporation loss for the proposed upper and lower reservoir has been also worked out using the CWC manual on evaporation control in reservoir, 2006.</p> <p>The maximum annual evaporation loss is estimated as 1.5 MCM and has been adopted for the planning purposes. However, evaporation loss may be reduced by adopting some effective measures such as floating umbrellas, etc. The seepage loss from the reservoir also has been worked out based on the assumed permeability of Quarzite rock which are generally in the order of 10-5 to 10-6 cm/sec and accordingly seepage through reservoir bed has been worked out as 0.083 MCM. However, the same shall be reconfirmed after the detailed investigation. Considering the project as off-stream with a small catchment having vegetation's, the sediment volume is generally insignificant.</p> <p>The gross storage at FRL of Upper &amp; Lower reservoir is 11.48 &amp; 13.09 MCM respectively and hydraulic head are 11.60 m &amp; 23.40 m respectively. The upper reservoir falls in intermediate category while lower falls in large category as per IS 11223:1985. Hence, the design flood for upper &amp; lower reservoir would be PMF.</p> <p>The project is located in the Ganga basin, hence the rainfall of 10,000 year return period has been adopted from CWC PMP atlas which is 450mm. Accordingly, based on the empirical formula, the design flood for upper &amp; lower reservoir have been worked out as 35 cumecs &amp; 350 cumecs respectively. The diversion flood for lower reservoir have been worked out as 165 cumecs based on the 25 year return period flood.</p>
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	The gross storage capacity available at EL. 550.0 m is estimated as 11.48 MCM, which is considered as FRL. The gross storage capacity available at EL. 216.0 m is estimated as 13.09 MCM, which is considered as FRL. The total quantum of water required for initial filling of both reservoirs together is worked out to 13.42 MCM (Gross storage of UR + Gross storage of LR – water requirement) which will be pumped from the nearby Son River.
Additional detail (If any)	-

- **Court case details: Nil**
- **Status of other statutory clearances**

Particulars	Letter no. and date
Status of Stage- I FC	Online Proposal No. FP/UP/HYD/IRRIG/545346/2025 submitted on 28/07/2025. Currently, pending at UA due to EDS by MS after PSC-I
Approval of Central Water Commission	Feasibility report on the hydrological aspects are cleared by CWC, Hydrology (N) Directorate vide their file no. 1/UP/22/10/2024-Hyd(N), dated 04-12-2024.
Approval of Central Electricity Authority	Chapter on Power Potential Studies has been approved by HPPI Division, CEA vide file no. CEA-HY-14-20/6/2024-HPPI Division dated 06-01-2025.
Additional detail (If any)	
<b>Is FRA (2006) done for FC-I</b>	No

- **Details of the EMP**

#### Cost for Implementing Environmental Management Plan

S. No.	Component of EMP	Capital Cost (Rs. in lakh)	Recurring Cost (Rs. in lakh)				Total Cost (Rs. in Lakh)
			Year 1	Year 2	Year 3	Year 4	
1	Biodiversity & Wildlife Conservation & Management Plan	235.50	0.00	0.00	0.00	0.00	235.50

2	Fisheries Conservation and Management Plan	59.00	0.00	0.00	0.00	0.00	<b>59.00</b>
3	Green Belt Development Plan	0.00	6.00	6.00	15.87	18.86	<b>46.73</b>
4	Catchment Area Treatment Plan	212.76	0.00	0.00	0.00	0.00	<b>212.76</b>
5	Disaster Management Plan	225.00	31.25	31.25	31.25	31.25	<b>350.00</b>
6	Muck Dumping and Management Plan	62.00	63.00	3.00	2.00	0.00	<b>130.00</b>
7	Landscaping, Restoration of Quarry, and Construction Sites	0.00	80.00	78.64	160.50	160.50	<b>479.64</b>
8	Public Health Delivery System	129.00	32.25	32.25	32.25	32.25	<b>258.00</b>
9	Sanitation and Solid Waste Management Plan	149.40	37.35	37.35	37.35	37.35	<b>298.80</b>
10	Energy Conservation Measures	41.00	60.50	60.50	60.50	60.50	<b>283.00</b>
11	Labour Management Plan	16.40	16.40	16.40	16.40	16.40	<b>82.00</b>
12	Control of Air, Noise and Water Pollution	0.00	20.00	20.00	20.00	20.00	<b>80.00</b>
13	Environmental Monitoring Programme	0.00	37.95	52.75	52.75	52.75	<b>196.20</b>
14	Watershed Development Plan	877.95	0.00	0.00	0.00	0.00	<b>877.95</b>
	<b>Total</b>	<b>2008.01</b>	<b>384.70</b>	<b>338.14</b>	<b>428.87</b>	<b>429.86</b>	<b>3589.58</b>

#### Cost for R&R and CER

S. No.	Components	Capital Cost (Rs. in lakh)
1	Rehabilitation and Resettlement Plan	0.00
2	Corporate Environment Responsibility (CER)	2000.00
	<b>Total</b>	<b>2000.00</b>

#### Cost for Compensatory Afforestation, Net Present Value and Value of Trees to be Felled

S. No	Components	Capital Cost (Rs. in lakh)
1	Compensatory Afforestation	2301.20
2	Net Present Value (NPV)	2204.04
3	Value of Trees to be affected	94.72
	<b>Total</b>	<b>4599.96</b>

### 54.1.3 The EAC during deliberations noted the following:

- The EAC deliberated on the information submitted and presented during the meeting, observing that the proposal is for the grant of Environmental Clearance (EC) to the project for Panaura Close loop Pumped Storage Project (1500 MW) in an area of 236.37 Ha located at Sub District Robertsganj, District Sonbhadra, Uttar Pradesh by M/s Adani Hydro Energy Five Limited.
- The project is listed under S.N.1(c) of the Schedule to the Environmental Impact Assessment (EIA) Notification as a Category 'A' project, which requires appraisal at the Central level by the Expert Appraisal Committee (EAC).
- The EAC, constituted under the provisions of the EIA Notification, 2006, and comprising expert members/domain experts in various fields, examined the proposal submitted by the Project Proponent, including the EIA/EMP reports prepared and submitted by the Consultant accredited by QCI/NABET on behalf of the Project Proponent.
- The EAC noted that the Project Proponent has provided an undertaking affirming that the data and information provided in the application and enclosures are accurate to the best of their knowledge, with no suppression of information in the EIA/EMP reports. The proponent also acknowledged that if any part of the data/information submitted is found to be false or misleading at any stage, the project will be rejected, and any Environmental Clearance granted will be revoked at the risk and cost of the Project Proponent.
- The EAC observed that earlier Terms of Reference issued by MoEF&CC vide letter no. J-12011/14/2024-IA-I(R) dated 07.09.2024 to the project, subsequently, transfer of ToR was further issued on 30.04.2025 from M/s Adani Green Energy Limited to M/s Adani Hydro Energy Five Limited.
- The EAC noted that the baseline study was carried out for one season (from November 2024 - December 2024), which is as per requirement decided by the MoEF&CC for closed loop PSP and all the parameters are within the prescribed norms. Additionally, it was noted by the EAC that the total land requirement is about 236.37 ha which includes 230.12 ha forest land & 6.25 ha non-forest land. It was further noted that for diversion of 230.12 ha forest land the application vide proposal no. FP/UP/HYD/IRRIG/545346/2025 dated 19.07.2025 has been submitted to obtain Stage-I Forest Clearance which is still pending. The PP informed that private land acquisition is also underway; however, the private land owners have shown willingness to provide their land through agreement.
- The EAC noted that the Public hearing was conducted on 17.11.2025 at Village Panaura, Tehsil Robertsganj, District Sonbhadra and chaired by Additional District Magistrate (Namami Gange & Rural Water Supply), District Sonbhadra. Public notice mentioning venue location, date and time published in the "Dainik Jagran" and "Hindustan Times"

dated 13.10.2025. The EAC discussed the concerns raised during the Public Hearing (PH) and reviewed the action plan submitted by the PP to address these issues. After detailed deliberation, the Committee found the action plan satisfactory, recognizing that the proposed mitigation measures adequately respond to stakeholder's concerns.

- The Committee noted that One-time water will be pumped from nearby Son River to the proposed lower reservoir and used cyclically for energy storage and discharge. The one-time filling requirement is 13.42 MCM and annually 1.6 MCM. The hydrology of the project has been appraised by the CWC vide letter no.1/UP/22/10/2024-Hyd(N) dated 04-12-2024; whereas project layout appraisal was done vide CWC letter No. T-16044/4/2024-HCD(NW) dated 20.06.2025. The Central Electricity Authority (CEA) vide letter No. CEA-HY-14-20/6/2024-HPPI Division dated 06.01.2025 has appraised the proposal.
- The committee considered that due to the proximity of multiple PSPs within the same river basin, a Cumulative Environmental Impact Assessment (CEIA) has been undertaken by the PP to assess the combined and interactive environmental impacts of upstream and downstream developments within the corridor. The CEIA study focuses on assessing the integrated and cumulative impacts on key environmental components, including land use and land cover, water resources, biodiversity, forest areas, socio-economic conditions, and overall ecological balance. Particular attention has been given to potential cumulative effects on the hydrological regime of the Son River, forest ecosystems, and the livelihoods and well-being of local communities within the study area. The CEIA establishes that cumulative impacts associated with PSP clustering are significant but manageable, provided mitigation is implemented in a coordinated, corridor-level manner. The proposed mitigation and environmental management strategy shifts the focus from isolated project compliance to system-level environmental stewardship, ensuring that development of large-scale energy storage infrastructure proceeds without exceeding the carrying capacity of the regional environment or communities.
- Further, it has been observed that Kaimur Wildlife Sanctuary, located at an aerial distance of about 6.9 km from the project site, has an ESZ notified on 30.12.2015 (Bihar State) and all project components are situated outside the notified ESZ area. Accordingly, the Committee deliberated that the project does not attract the provisions of Wildlife Clearance under the Wildlife (Protection) Act, 1972, as amended. However, in view of the proximity of ESZ the Committee advised the PP to ensure compliance with all applicable wildlife and environmental safeguards during construction and operation phases.
- The EAC noted that the total estimated project cost is Rs. 7,463.64 Crore. The Committee further noted that a capital cost of Rs. 2,008.01 lakh has been earmarked towards implementation of the EMP. In addition, recurring expenditure towards operation and maintenance of the EMP has been proposed at Rs. 395.39 lakh per annum, aggregating to Rs. 1,581.57 lakh over a period of four years. Therefore, total EMP budget equates to Rs. 3589.58 Lakhs. The EAC suggested to revise the EMP budget emphasizing on the issues related wildlife habitat improvement and sustainability of river eco system. As advised by

EAC, the PP revisited the EMP budget and revised the cost upwards focusing on budget for biodiversity and wildlife management, river ecology, river/nalla protection and fish conservation, muck management and green belt. Out of total project cost i.e. Rs. 7,463.64 crore revised EMP budget works out to be Rs. 73.41 crore, which is 0.984% (approx. 1%) of the total project cost.

- The revised EMP details are as under:

S. No.	Component of EMP	Capital Cost (Rs. in lakh)	Recurring Cost (Rs. in lakh)				Total Cost (Rs. in Lakh)
			Year 1	Year 2	Year 3	Year 4	
1	Biodiversity & Wildlife Conservation & Management Plan	635.00	0.00	0.00	0.00	0.00	635.00
2	River/Nalla Protection and Fisheries Conservation and Management Plan	159.00	0.00	0.00	0.00	0.00	159.00
3	Green Belt Development Plan	0.00	54.00	54.00	93.48	105.44	306.92
4	Catchment Area Treatment Plan	212.76	0.00	0.00	0.00	0.00	212.76
5	Disaster Management Plan	200.00	62.50	62.50	62.50	62.50	450.00
6	Muck Dumping and Management Plan	212.00	188.00	188.00	187.00	230.00	1005.00
7	Landscaping, Restoration of Quarry, and Construction Sites	0.00	160.00	157.28	321.00	321.00	959.28
8	Public Health Delivery System	358.00	64.50	64.50	64.50	64.50	616.00

9	Sanitation and Solid Waste Management Plan	298.80	74.70	74.70	74.70	74.70	<b>597.60</b>
10	Energy Conservation Measures	82.00	101.00	101.00	101.00	101.00	<b>486.00</b>
11	Labour Management Plan	248.00	98.00	98.00	98.00	98.00	<b>640.00</b>
12	Control of Air, Noise and Water Pollution	0.00	50.00	50.00	50.00	50.00	<b>200.00</b>
13	Environmental Monitoring Programme	0.00	37.95	52.75	52.75	52.75	<b>196.20</b>
14	Watershed Development Plan	877.95	0.00	0.00	0.00	0.00	<b>877.95</b>
	<b>Total</b>	<b>3283.51</b>	<b>890.65</b>	<b>902.73</b>	<b>1104.93</b>	<b>1159.89</b>	<b>7341.71</b>

**54.1.4** The EAC after examining the information submitted and detailed deliberations recommended the proposal for grant of Environmental Clearance by the Ministry to Panaura Close loop Pumped Storage Project (1500 MW) in an area of 236.37 Ha located at Sub District Robertsganj, District Sonbhadra, Uttar Pradesh by M/s Adani Hydro Energy Five Limited, under the provisions of EIA Notification, 2006 and as amended time to time with subject to compliance of applicable Standard EC conditions and following specific environmental safeguard conditions:

**[A] Environmental management and Biodiversity conservation:**

- i. Stage-I FC shall be obtained before grant of EC.
- ii. The water of rainfall yield of self-catchment of the reservoir shall be released to downstream through body of dam/ barrage/ embankment etc.
- iii. The Environmental Management Plan (EMP) shall be strictly adhered to as submitted in the EIA/EMP reports. The budgetary provisions for implementation of EMP, shall be fully utilized and not to be diverted to any other purpose. In case of revision of the project cost or due to price level change, the cost of EMP shall also be updated proportionately.
- iv. The contract clause limiting the No. of vehicles used during excavation and transportation shall followed scrupulously and the same shall informed to the ministry.
- v. Ambient Air Quality Monitoring Stations for real time data to be installed at project

- site before commencement of the construction, shall be displayed at project site and its report to be submitted to IRO, MoEF&CC.
- vi. No vehicle purchase shall be allowed from funds earmarked for implementation of Wildlife Conservation plan. Measures for minimizing the human–animal conflict specially for black bear and leopard be suitably incorporated in the wildlife conservation plan in consultation with State Forest Department.
  - vii. 10000 plants shall be planted around the muck disposal area and the survival of plants shall be submitted with the 6 monthly compliance report.
  - viii. Plantation of saplings shall be carried out as a part of the tree plantation campaign "Ek Ped Ma Ke Naam" and the details of the same shall be uploaded in the MeriLiFE Portal (<https://merilife.nic.in>).
  - ix. Watershed development plan prepared shall be implemented within 10 km radius of the project. At least one existing water body in each village within the study area shall be conserved/rejuvenate/restore in consultation with the local authorities. Implementation status be submitted in the 6 monthly compliance report to the concerned regional office of the Ministry.
  - x. PP shall prepare time bound reclamation and restoration plan for restoration of batching plant in consultation with the Forest Department and same shall be submitted to IRO, MoEF&CC and shall be fully implemented within five years of commissioning of the project.
  - xi. The reservoir sedimentation study shall be conducted periodically to determine the actual amount of water available in the reservoir.
  - xii. PP shall optimize the road design by restricting the width to 7 meters along straight stretches and providing additional widening only at hairpin bends or U-turns, wherever essential, so as to minimize forest land diversion and reduce tree cutting to the extent possible.
  - xiii. All ephemeral and seasonal rivulets and springs in and around the project area shall be preserved in their natural condition without obstruction or diversion. Necessary measures shall be undertaken for their conservation and rejuvenation to maintain natural drainage and ecological flow.
  - xiv. A Wildlife Conservation Action Plan shall be prepared for the prominent species identified during the survey and investigation, in consultation with the State Forest and Wildlife Department, and implemented in letter and spirit with adequate budgetary provisions prior to commencement of project activities. The plan shall be submitted to the Regional office, MoEF&CC and implementation status of the same shall be submitted in six monthly compliance report.

**[B] Disaster Management:**

- i. Disposal of the excavated muck and its filling on the low-lying area with proper measures for the stabilization and greenery to minimize the impacts of the generated construction muck shall be taken up pari passu with construction work. A muck transportation plan shall be prepared and implemented. The movement of muck carrying vehicles shall be monitored through latest sensor-based technology to ensure

- the muck dumping at designated sites.
- ii. Stabilization of muck disposal sites using biological and engineering measures shall be taken up immediately to ensure that muck does not roll down the slopes and does not pollute the natural streams and water bodies in surrounding area. The plantation on muck disposal site with local species for restoration of ecology and environment of the project site area.
  - iii. Necessary control measures such as water sprinkling arrangements, and construction of paved roads leading to muck disposal sites etc. shall be taken up on priority to arrest fugitive dust at all the construction sites.
  - iv. Solid waste generated, especially plastic waste, etc. should not be disposed of as landfill material. It should be treated with scientific approach and recycled. Use of single-use plastics may be discouraged.
  - v. The Project Proponent shall obtain necessary approvals from Central Electricity Authority and Central Water Commission, as applicable, prior to commencement of construction activities and submitted to the Ministry/concerned Regional Office for record and compliance.
  - vi. Landslide and other heavy rain related disasters shall be taken care of through appropriate preventive measures during construction and operation of project.

**[C] Socio-economic:**

- i. Land acquired for the project shall be suitably compensated in accordance with the prevailing guidelines of the state government and provisions under Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
- ii. RO plant shall be installed in the project affected villages/nearby 5 villages and the maintenance shall be done by the project Authorities.
- iii. Solar panel be provided to the families living in rural areas within 10 km radius of project.
- iv. School up to 12<sup>th</sup> Standard shall be established and managed to provide free quality education for children from project affected villages/Tribal villages. Adequate transportation facilities shall also be provided to students to ensure connectivity and ease of access.
- v. 50 bed multi-specialty hospital shall be established to cater the need of tribal population/locals. The tribal population within 10 km radius of the project shall be given free of cost medical facility.
- vi. Skill development Centre shall be established within 10 km radius of the project and regular training programmes for development and promotion of traditional art/products of tribal/local population. The Skill Development Plan shall mandatorily include the following components:
  - Capacity building and skill enhancement programs aligned with local livelihood opportunities.

- Establishment of linkages with Industrial Training Institutes (ITIs) and other recognized training centres for imparting technical skills.
  - Provision of free or subsidized access to healthcare facilities in project-supported hospitals and health centres.
  - Support to educational institutions in the study area through free services, scholarships, infrastructure strengthening, and vocational guidance programs.
  - Special outreach initiatives for women, youth, and vulnerable groups within the SC/ST communities to ensure inclusive participation and benefits.
  - The Plan shall be implemented in a time-bound manner with clearly earmarked budgetary provisions, which shall not be diverted for any other purpose.
- vii. The PP shall submit annual progress reports on the implementation of the Skill Development Plan and associated community welfare measures to the Regional Office of the Ministry.
- viii. Bio-Gas plant shall be installed in the Project affected area for Utilizing Cattle waste (Cow Dung) into renewable source of fuel.
- ix. Preference in employment opportunities and admission to ITI institutions shall be given to Project Affected Families (PAFs).
- x. An institutional mechanism to be developed to ensure the preference of jobs to PAFs and SC/ST and also a policy for preferential treatment for award of sundry works to the PAFs and SC/ST and their dependents.
- xi. The compliance of above conditions shall be monitored by IRO, MoEF&CC and regularly site visit once in year. The compliance report of IRO shall be regularly submitted to MoEF&CC.

**[D] Miscellaneous:**

- i. After 5 years of the commissioning of the project, a study shall be undertaken regarding impact of the project on the environment. The study shall be undertaken by an independent agency.
- ii. A dedicated team to oversee environmental management activities (at project site) shall be set up comprising Environment Manager having post graduate qualification in Environmental Sciences/ Environment Engineering along with other supporting staff. The Environment Manager Shall report to Project Head directly.
- iii. PP should establish in house (at project site) environment laboratory for measurement of environment parameter with respect to air quality and water (surface and ground). A dedicated team to oversee environment management shall be setup which should comprise of Environment Engineers, Laboratory chemist and staff for monitoring of air, water quality parameters on routine basis.
- iv. PP shall procure construction material only from those Organizations having all valid legal/statutory clearances/permissions or necessary permission to be obtained for quarrying construction materials for the project as per the EIA Notification, 2006 and as amended thereof.

## **Agenda Item No. 54.2**

**Badagaon Close Loop Pumped Storage Project (1000 MW) in an area of 373.12 Ha located at Sub District Teonthar, District Rewa, Madhya Pradesh by M/s Renew Green (Tnj Two) Private Limited – Terms of References (TOR) – reg.**

**[Proposal No. IA/MP/RIV/575114/2026; F. No. J-12011/24/2026-IA.I(R)]**

**54.2.1** The proposal is for grant of Terms of Reference (ToR) to the project Badagaon Close Loop Pumped Storage Project (1000 MW) in an area of 373.12 Ha located at Sub District Teonthar, District Rewa, Madhya Pradesh by M/s Renew Green (Tnj Two) Private Limited.

**54.2.2** The Project Proponent and the accredited Consultant M/s Ind Tech House Consult, made a detailed presentation on the salient features of the project and informed that:

- i. The proposed project is an off stream closed loop PSP of 1000 MW capacity. it is proposed to construct two new reservoirs (upper and lower reservoir) by forming a Concrete Faced Rockfill Dam (CFRD). The FRL and MDDL of the upper reservoir is kept at EL 333.00 m & EL 317.00 m respectively with a gross storage of 18.00 MCM and live storage of 15.95 MCM. Similarly, the FRL and MDDL of the lower reservoir is kept at EL 136.00 m & EL 121.00 m with a gross storage of 15.30 MCM and live storage of 13.29 MCM.
- ii. The proposal is for Fresh ToR to the project for Badagaon Off-Stream Close Loop Pumped Storage Project (1000 MW) located at Dist. - Rewa, Madhya Pradesh by M/s. Renew Green (TNJ Two) Private Limited.
- iii. The upper reservoir of Badagaon PSP is proposed on the upper plateau region located northwest of the proposed lower reservoir comprising relatively flat terrain near Murli/Raksaha khurd village. The geographical coordinate of the upper reservoir is 24°56'42.96"N latitude and 81°45'56.88"E longitude. The upper reservoir is not located across any active streams having a marginal catchment area of 1.08 Sq.km. The upper reservoir is proposed on the slightly sloping plateau region having ground levels varying from EL.310m to EL.335m. The upper reservoir envisages excavation till bed level of EL.315m and construction of CFRD for a peripheral length of about 3983 m having average height of 23m from bed level. The dam top has been kept at EL.338m. The FRL and MDDL are fixed at EL.333 m and EL.317 m respectively with live storage capacity of 15.95 MCM and dead storage capacity of 2.04 MCM.
- iv. The Lower reservoir of Badagaon PSP is proposed near village Badagaon having geographical coordinate of 24°56'20.25"N latitude and 81°46'50.64"E longitude. The

lower reservoir is not located across any active streams having a marginal catchment area of 4.22 Sq.km. The lower reservoir is envisaged in a naturally available area with ground levels varying from EL 111.00 m to EL 141.00 m. and construction of CFRD for a peripheral length of 1739 m having average height of 26m from bed level. The FRL and MDDL of the lower reservoir are proposed at EL.136m and EL.121m respectively with live storage capacity of 13.29 MCM and dead storage of 2.01 MCM.

v. The geographical co-ordinate of the project are:

Reservoir	Latitude (N)	Longitude (E)
Lower Reservoir	24°56'20.25"N	81°46'50.64"E
Upper Reservoir	24°56'42.96"N	81°45'56.88"E

vi. The pump Storage Project envisages construction of: Upper and Lower reservoir with pump house, upper intake, buried penstock/ steel lined pressure shaft, powerhouse complex, tail race tunnel, lower intake, water pipelines.

vii. **Land requirement:** 373.1 ha [forest land - 261.5 Ha + non-forest land - 111.6 Ha].

viii. **Water requirement:** Water requirement for initial filling of reservoir is approx. 23 MCM. Estimated annual requirement of 2.50 MCM towards evaporation and transit loss makeup

ix. **Project Cost:** Estimated project cost is INR 4982.65 Cr.

x. **Project Benefit:**

- Annual energy generation: 3213.5 MU with 1.5 cycles/day
  - Peak power supply improves grid stability and meets demand
  - Levelized tariff: ~₹5.64/kWh (economically viable)
  - Return on equity: 17%
  - Supports renewable integration and reduces reliance on fossil fuels.
- Local people will be benefited due to direct and indirect job opportunity, training and social welfare initiative, improvement in road infrastructure etc.

xi. **Environmental Sensitive area:** There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site. Belan River is flowing at a distance of 6 KM in NE

direction.

**xii. MoU / any other clearance/ permission signed with State government:**

Letter from the Office of the Commissioner – New and Renewable Energy, Govt. of MP has been obtained on 20/01/2026. Initial stage of allotment published wherein preliminary details of the project is disclosed on the website [www.nred.mp.gov.in](http://www.nred.mp.gov.in).

**xiii. Alternative Studies:**

Three alternative layouts have been studied in detail, and the most technical and economical viable layout with minimal R&R issues has been selected for further study.

**Comparison of Alternatives**

Description	Alternative-I	Alternative-II	Alternative-III
<b>Upper Reservoir</b>			
Type of Reservoir & Dam	Artificial & CFRD	Artificial & CFRD	Artificial & CFRD
Excavated Bed Level (m)	EL 315m	EL 315m	EL 310m
FRL (m)	EL 332m	EL 333m	EL 326m
MDDL (m)	EL 315m	EL 317m	EL 312m
Dam Top (m)	EL 337m	EL 338m	EL 331m
Area at FRL (Ha)	100 Ha	104.50 Ha	109.10 Ha
Live Storage Capacity (MCM)	16.14 MCM	15.95 MCM	14.67 MCM
Avg. Dam Height from bed level (m)	24m	23m	23m
Length of Dam (km)	3.9 km	3.98 km	4.2 km
<b>Lower Reservoir</b>			
Type of Reservoir & Dam	Artificial & CFRD	Artificial & CFRD	Artificial & CFRD
FRL (m)	EL 135m	EL 136m	EL 135m
MDDL (m)	EL 119m	EL 121m	EL 120m
Dam Top (m)	EL 140m	EL 141m	EL 140m
Area at FRL (Ha)	95	111.24 Ha	114.70 Ha
Live Storage Capacity (MCM)	13.34 MCM	13.29 MCM	15.65 MCM
Avg. Dam Height from bed level (m)	26m	26m	25m
Length of Dam (km)	2.9 km	1.74 km	2.70 km
<b>Water Conductor System (WCS)</b>			
Total Generation Discharge (m <sup>3</sup> /s)	596	594.16	611

<b>Description</b>	<b>Alternative-I</b>	<b>Alternative-II</b>	<b>Alternative-III</b>
Unit Discharge (m <sup>3</sup> /s)	149	148.54	153
Penstock/Pressure Shaft (m)	4 nos, 6.2m dia., ~avg 1120m long each	4 nos, 6.0m dia., ~1008m to 1071m long each	4 nos, 6.2m dia., ~avg 1090m long each
Upstream L/H Ratio	5.9	5.6	5.9
Upstream Surge Shaft	Not Required	Not Required	Not Required
Tail Race Tunnel (TRT)	4 nos, 7m dia., ~avg 236m long each	4 nos, 6.5m dia., ~143m to 190m long each	4 nos, 7m dia., ~avg 240m long each
Downstream Surge Requirement	Not Required	Not Required	Not Required
<b>Power House</b>			
Type of Powerhouse	Pit-type surface	Pit-type surface	Pit-type surface
Maximum Pit depth (m)	~60m	~52m	~80m
Type of Turbine & No. of Units	Reversible Francis Pump Turbine (Fixed) & 4 Nos.	Reversible Francis Pump Turbine (Fixed) & 4 Nos.	Reversible Francis Pump Turbine (Fixed) & 4 Nos.
<b>Power Potential</b>			
Max Net Head (m)	207	207	200
Min. Net Head (m)	174	176	171
Max Min Net Head Ratio	1.19	1.18	1.17
Peaking Hours (Hrs.)	6.22	6.26	6.26
Pumping Hours (Hrs.)	7.23	7.21	7.28
Total Installed capacity (MW)	1000 MW	1000 MW	1000 MW
Total Pump Capacity (MW)	1100 MW	1100 MW	1100 MW
Rated Net Head (m)	~190.15m	~190.63m	~185.30m
Cyclic Efficiency (%)	78.27%	79.10%	78.20%
Annual Energy (MU)	2157	2172	2171
<b>Land Requirement</b>			
Muck Generated (cum) approx.	60 lakh cum	50 lakh cum	70 lakh cum
Forest land (Ha)	207	261	218
Non forest land (Ha)	186	112	204
Total land (Ha)	393	373	422

<b>Description</b>	<b>Alternative-I</b>	<b>Alternative-II</b>	<b>Alternative-III</b>
<b>Lower Reservoir Area – General</b>			
Submergence area and R&R Issues	Major	Almost negligible	Major
Nallah diversion	Required	Not Required	Not Required

Among three alternatives, Alternative–II has been identified as the most suitable option from an overall environmental, social and techno-economic standpoint -

### **Environmental and R&R Aspects**

- Alternative–II is the only layout where the lower reservoir is located entirely away from village settlements. This eliminates the need for large-scale displacement and rehabilitation. In contrast, Alternative–I and Alternative–III involve submergence of inhabited areas, leading to major R&R implications, which are environmentally and socially disruptive and often associated with long-term livelihood and socio-economic impacts.
- Alternative–II does not involve any diversion of natural drainage channels or nallahs. Alternative–I requires diversion of a major nallah, which can alter natural hydrology, affect downstream ecosystems, and increase ecological imbalance.
- Although forest land requirement is little higher in Alternative–II, the overall land requirement (373 ha) is the lowest among all alternatives. Further, the land is largely contiguous and free from habitation, enabling better planning of mitigation measures such as compensatory afforestation and biodiversity management.
- Alternative–II has the shortest water conductor system and dam length for the lower reservoir, which reduces excavation, muck generation, and construction footprint. Lower intervention in natural terrain translates to reduced disturbance to local ecology, soil stability, and drainage patterns.
- The absence of habitation and drainage crossings in Alternative–II minimizes risks related to construction-stage impacts such as waterlogging, erosion, and accidental discharge affecting local communities and ecosystems.

### **Head Utilization & Installed Capacity:**

- Alternative–II and Alternative–I provides a higher rated net head (190.63 m and 190.15m respectively) compared to 185.30 m in Alternative–III, while maintaining a favorable head ratio (Max/Min head 1.18).
- Alternative–II yields the maximum annual energy (2172 MU) with efficient utilization of available head and an adequate peaking duration of about 6.26 hours. All the three alternatives have the same installed capacity of **1000 MW** with similar configuration of reversible Francis pump turbines.

### **Reservoir Layout & Dam Configuration:**

- The lower reservoir in Alternative II requires a **shorter dam length (1.74 km)**, resulting in reduced construction quantities and improved economy compared to Alternative I and Alternative III. Alternative I and Alternative III involves a significantly longer lower reservoir dam (**2.90 km and 2.70 km**) and larger submergence area extending into village settlement, leading to higher land requirement and significant R&R implications. The proposed Alternative I also requires diversion of major nalla crossing. The upper reservoir configuration in Alternative–II is comparable with Alternative–I, and is superior to Alternative–III due to the higher bed level, which contributes to increased available head.

#### **Water Conductor System & Powerhouse:**

- The water conductor system in Alternative II has the shortest length compared to other alternatives, and better L/H ratio. It is located in more favorable geological conditions with comparatively lesser overburden at the outlet portal of the upper-level pressure shafts. This facilitates ease in excavation, reduced support requirements and improved construction planning.
- The surface pit type powerhouse in Alternative II is located in an area with relatively low overburden and is devoid of nala/stream crossings, thereby minimizing dewatering requirements during construction. In Alternative I, the presence of thick overburden, stream crossings, likelihood of waterlogging and higher excavation depth would result in increased excavation, extensive dewatering measures and longer construction period and cost. In Alternative-III, the overall excavation depth is about 80m which is comparatively higher than Alternative-I (60m) & Alternative II (52m) overall excavation depth.

#### **xiv. Details of Solid waste/Hazardous waste generation/Muck and its management**

Muck	Approx. 50 lakh cum	Disposal into identified and approved non-forest land of 40 ha area
Solid wastes from labor camp	Approx. 250 TPA	Disposal in compliance with local norms
Plastic wastes	Approx. 10 TPA	Segregated wastes will be sold to registered recycler
E wastes	Approx. 2 TPA	Disposal through authorized vendor
Battery wastes	Approx. 3 TPA	Disposal through authorized vendor
Biomedical wastes from health center at labor camp	Approx. 5 TPA	Disposal to nearby Common BMWTF
Used oil from equipment & DG sets	Approx. 1 TPA	Sale to authorized recycler

#### **xv. Status of Litigation Pending against the proposal, if any – Nil**

xvi. **The silent features of the project are as under -**

- Project details:**

Name of the Proposal	Badagaon Off Stream Closed Loop Pumped Storage Project [1000MW] at Rewa Distict in Madhya Pradesh		
Location (Including coordinates)	Village: Badagaon, & Murli/Raksaha Khurd, Tehsil: Teonthar, District: Rewa, Madhya Pradesh		
	Reservoir	Latitude (N)	Longitude (E)
	Lower	24°56'20.25"	81°46'50.64"E
	Reservoir	N	
	Upper	24°56'42.96"	81°45'56.88"E
	Reservoir	N	
Inter- state issue involved	No		
Seismic zone	Seismic Zone-III		

- Category details:**

Category of the project	1(c) (i)– Standalone pump storage project, Category-A
Provisions	Nil
Capacity / Cultural command area (CCA)	Not Applicable
Attracts the General Conditions (Yes/No)	Yes, UP-MP interstate border is at aerial distance of 6.35 km on NNE
Additional information (if any)	Nil

- Electricity generation capacity:**

Powerhouse Installed Capacity	1000 MW
Generation of Electricity Annually	Total Annual Energy (Generation) (1 cycle/ 1.5 cycle) = 2172.4 MU/ 3213.5 MU
No. of Units	4 units of 250 MW each
Additional information (if any)	Nil

- ToR/EC Details:**

Cost of project	INR 4982.65 Crore
Total area of Project	373.1 ha [Forest land - 261.5 ha + non-forest land -

	111.6 ha]
Height of Dam from River Bed (EL)	Not Applicable
Length of Tunnel/Channel	4 nos. Penstock tunnels with varying lengths 1008m to 1071m 4 nos. of TRT of varying lengths of 143 m to 190 m.
Details of Submergence area	Upper reservoir area - 138.8 ha [Forest land] Lower reservoir area - 142.8 ha [Forest land – 93.3 ha + non-forest area – 49.5 ha]
Types of waste and quantity of generation during construction/ Operation	Construction Phase <ul style="list-style-type: none"> <li>• Muck – approx. 50 lakh cum</li> <li>• Solid wastes from labor camp – 250 TPA approx.</li> <li>• Plastic wastes – 10 TPA approx.</li> <li>• E wastes – 2 TPA approx.</li> <li>• Battery wastes – 3 TPA approx.</li> <li>• Biomedical wastes – 5 TPA approx.</li> <li>• Used oil [hazardous waste] – 1 TPA</li> </ul>
E-Flows for the Project	Not applicable
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	Not applicable
No. of trees/saplings proposed in view of 'Ek Ped Maa Ke Naam' campaign	Will be detailed in EIA report

• **Muck Management Details:**

No. of proposed disposal area/ (type of land- Forest/Pvt. land)	Non-forest land of area 40 ha
Muck Management Plan	Will be given in Final EIA report
Monitoring mechanism for Muck Disposal	Will be given in Final EIA report

- **Land Area Breakup:**

Private land	111.6 ha
Government land/revenue land	
Forest Land	261.5 ha
Total Land	373.1 ha
Submergence area/Reservoir area	Upper reservoir area - 138.8 ha [Forest land] Lower reservoir area - 142.8 ha [Forest land – 93.3 ha + non-forest area – 49.5 ha]
Additional information (if any)	-

- **Presence of Environmentally Sensitive areas in the study area**

Forest Land/Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate/Letter/ Remarks
Reserve Forest/Protected Forest Land	Yes	Teonthar P.F – aerial distance 6.9 km, West Dhakrabari R.F – Falls within project site.
National Park	No	Approval will be obtained for diversion of forest land.
Wildlife Sanctuary	No	

- **Court Case details:** Nil

- **Previous EC compliance and necessary approvals:**

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	Not Applicable
Status of Stage- I FC	Application is yet to submit
Additional detail (If any)	-
<b>Is FRA (2006) done for FC-I</b>	Will be submitted with the EIA report

- **Miscellaneous**

Particulars	Details
Details of consultant	Ind Tech House Consult NABET Accreditation valid upto 29/04/2029
Project Benefits	<ul style="list-style-type: none"> <li>• Annual energy generation: 3213.5 MU with 1.5 cycles/day</li> <li>- Peak power supply improves grid stability and</li> </ul>

	<p>meets demand</p> <ul style="list-style-type: none"> <li>- Levelized tariff: ~₹5.64/kWh (economically viable)</li> <li>- Return on equity: 17%</li> <li>- Supports renewable integration and reduces reliance on fossil fuels.</li> <li>• Local people will be benefited due to direct and indirect job opportunity, training and social welfare initiative, improvement in road infrastructure etc.</li> </ul>
Status of other statutory clearances	Will be obtained as per applicability
R&R details	Private lands will be purchased on mutual agreement between the PP and land owner. Detail R&R study will be conducted and submitted with the EIA report. If the total private land required exceeds the specified limits by the relevant rules notified by the State Government, if any, related to rehabilitation and resettlement under RFCTLARR, 2013 shall apply for the proposed Project.
Additional detail (If any)	-

#### 54.2.3 The EAC during deliberations noted the following:

- The Expert Appraisal Committee (EAC) deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of TOR for conducting EIA/EMP and Public hearing for Badagaon Close Loop Pumped Storage Project (1000 MW) in an area of 373.12 Ha located at Sub District Teonthar, District Rewa, Madhya Pradesh by M/s Renew Green (Tnj Two) Private Limited.
- The project/activity falls under Category A of item 1(c), 'River Valley Projects,' as per the Schedule of the Environmental Impact Assessment Notification, 2006, and requires appraisal at the Central level by the sectoral EAC in the Ministry.
- The EAC noted that as per the details submitted by the PP, the upper reservoir and lower reservoir are located away from any riverine system, therefore the current proposal is termed as a Closed Loop Pumped Storage Project.
- The EAC observed that the total land required for the project components and related works has been estimated to be about 373.1 ha; out of which 261.5 Ha is forest land and remaining 111.6 Ha is non-forest land. Diversion of forest land for non-forest purpose will be involved

for construction of project components. However, it was observed that the application for Stage-I Forest Clearance (FC) has not yet been submitted, which necessitates further action from the Project Proponent. The water requirement for initial filling of reservoir is approx. 23 MCM and estimated annual requirement of 2.50 MCM water from Belan River is required as the evaporation and transit loss makeup.

- Inter-state border of Madhya Pradesh and Uttar Pradesh is at aerial distance of 6.35 Km on NNE of project site. The EAC inquired about the presence of any wildlife corridor which may be disrupted by the proposed project. The PP could not give the satisfactory clarification in this regard. The EAC suggested to get this issue examined in consultation with State Forest and Wildlife Department and submit necessary permission/NOC in this regard along with EIA/EMP report.
- The EAC noted that there is a presence of numerous water falls which reflects the good health of the ecosystem in the region. Accordingly, it was suggested to map all such fresh water sources including ponds, small streams, rivulets etc within the study area and prepare watershed development plan in consultation with expert government research institute so as to maintain the ecological integrity of the region.
- The EAC observed that a letter from the Office of the Commissioner, New and Renewable Energy, Govt. of Madhya Pradesh has been obtained vide letter no. F/NRE/2025-26/05-11/1326 dated 20/01/2026.

**54.2.4** The EAC based on the information submitted and as presented during the meeting, recommended the proposal for grant of Specific ToR issued by the Ministry for Close Loop Pumped Storage Projects vide OM dated 14.08.2023 for conducting EIA study for proposed construction of the project for Badagaon Close Loop Pumped Storage Project (1000 MW) in an area of 373.12 Ha located at Sub District Teonthar, District Rewa, Madhya Pradesh by M/s Renew Green (Tnj Two) Private Limited, under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR:

**[A] Environmental Management and Biodiversity Conservation:**

- i. A detailed action plan for large scale plantation of native species of plant sapling within 10 km radius of the project shall be prepared in consultation with State Forest Department. The monitoring mechanism to ensure the survival of saplings shall be finalized in consultation with ICFRE.
- ii. The PP will submit 10 years water availability data certified by the CWC/State Water Resource Department for quantity of water that is received annually by the small stream on which lower reservoir is proposed to be constructed.
- iii. The PP will submit a detailed plan and monitoring mechanism for releasing the self-catchment water of small stream draining in to river along with action plan for conservation and protection of other streams/rivulets draining in to upper and lower reservoirs.

- iv. Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 261.5 Ha of forest land involved in the project shall be submitted within stipulated time.
- v. Muck disposal site and other components such as Township, site office, Stacking area and batching plant shall be located outside the forest area.
- vi. Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is not falling in any Ecological Sensitive Area, Wildlife Sanctuary/Tiger corridor/Elephant corridor within 10 km of Project site.
- vii. Transportation Plan for transporting construction materials shall be submitted. Separate chapter for risk assessment of such transportation through/within proposed the Wildlife Sanctuary shall be included in the EIA report, if any.
- viii. Environmental Cost Benefit Analysis shall be done in terms of loss of Forest ecosystem due to diversion of Forest land/loss of biodiversity, water availability, water uses for generation of hydro power and Ecological flows.
- ix. The baseline data collection will cover the changes in biological and ecological profile of the region after monsoon with worst-case scenario study and critical mineral assessment.
- x. Calculation and values of GHGs (CO<sub>2</sub>, CH<sub>4</sub> etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.
- xi. The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report.
- xii. Quantitative values of Impact modelling of environmental parameters shall be submitted for during construction and operation. Also, mitigation measures shall be submitted in terms of construction and operation phase.
- xiii. Conducting site-specific ecological study emphasizing on riverine ecology viz. fishes diversity, fish migration, habitat and aquatic biota due to construction PSP. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
- xiv. Action plan for survival or diversion of the rivulets/stream, if any, leading to join river shall be submitted.
- xv. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Specific ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall

be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all seasons.

- xvi. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.
- xvii. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
- xviii. All fresh water resources viz. small streams, rivulets, water falls in the study area shall be mapped and a report be submitted along with EIA/EMP report.
- xix. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Indian Council of Agriculture Research (ICAR) Institutes/ Expert Govt. institutions and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.
- xx. Details of mineral zone, if any, in the study area, certified by Geological Survey of India or any other concerned Government Organization shall be submitted. The project area should not come up on any critical mineral zone, the same shall to be verified by GSI/NMDC.
- xxi. Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI.
- xxii. Combined Impact of projects proposed in the basin on carrying capacity and sustainability of Reservoir/ River /nala of catchment area due to tapping of water for filling reservoir shall be studied.
- xxiii. Action plan for handling the human-wildlife conflict in the study area shall be prepared in consultation forest & wildlife department and be submitted with EIA/EMP report.

**[B] Socio-economic Study:**

- i. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.
- ii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. A comparative chart of issues raised by General Public during Public Hearing and commitments made by the

Project Proponent will be prepared and submitted in the relevant chapter of EIA/EMP report.

- iii. The EIA/EMP shall include a detailed socio-economic assessment of the tribal population in the project-affected area based on primary data and community consultations. A Tribal Development Plan, prepared in consultation with the District Administration and Tribal Welfare Department, shall be submitted along with the EIA report.
- iv. PP shall submit the credible documents to show the status of land acquisition w.r.t project site from/through the concerned State Government as required under Ministry's OM dated 7<sup>th</sup> October, 2014 for the project land to be acquired.
- v. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land (if any) shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. Budget earmarked for R&R, CSR shall not be included in the cost of EMP.

**[C] Muck Management:**

- i. Details of quantity of muck generation component wise, types of muck (Excavation in tunnels, pressure shaft and powerhouse etc.) and disposal site/ transportation to be provided.
- ii. Details of muck management such as dumping sites and its locations, transportation plan along with monitoring mechanism for muck transportation, detailing the road map of project construction site/ indicating the distances from HFL, river, project construction site along with types of road etc.
- iii. Safety measures for avoiding spill over muck into the riverbed/streams and its flow into the river during the high discharge/ flood or monsoon period. Prepare plan for stabilization of muck disposal sites using biological and engineering measures to ensure that muck does not roll down the slopes and shall be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area.
- iv. Restoration plan for construction area including dumping site of excavated materials by levelling, filling up of burrow pits, landscaping etc.

**[D] Disaster Management:**

- i. Impact of Project activities (specially blasting and drilling) on the aquatic and terrestrial ecosystem, within study area to be studied and be incorporated in EIA/EMP report.

- ii. The muck dumping sites shall be located with a distance of 100 mts from HFL. The PP shall submit the detailed action plan for transportation of muck along with monitoring mechanism of movement of muck carrying trucks.

**[E] Miscellaneous:**

- i. Both capital and recurring expenditure under EMP shall be submitted.
- ii. Pre-DPR Chapters viz., Hydrology, Layout Map and Power Potential Studies duly appraised by CWC/CEA shall be submitted.
- iii. The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.
- iv. Drone video of project site shall be recorded and to be submitted.
- v. Detailed plan to restore wider roads and convert them into narrow up to 10m after construction of the project.
- vi. Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pumped storage projects shall be used for preparation of EIA/ EMP reports.
- vii. As per Ministry's OM dated 1<sup>st</sup> August, 2013, PP shall submit application to obtain prior approval of Central Government under the Forest Conservation Act, 1980 for diversion of forest land required for such projects will be submitted as soon as the actual extent of forest land required for the project is known to the project proponent, and in any case, within 6 months of issuance of ToR. However, no proposal will be put up before EAC without submission of application for forest clearance, wherever applicable.

**Agenda Item No. 54.3**

**Nayagaon Close loop Pumped Storage Project (2000 MW) in an area of 530.4 Ha located at Sub- District Soegaon, Sillod, Kannad and Phulambri, District Aurangabad (Chhatrapati Sambhajnagar), Maharashtra by M/s Greenko Mh01 Irep Private Limited – Terms of References (TOR) – reg**

**[Proposal No. IA/MH/RIV/577259/2026; F. No. J-12011/04/2020-IA-I (R)]**

**54.2.1** The proposal is for grant of Terms of Reference (ToR) to the project Nayagaon Close loop Pumped Storage Project (2000 MW) in an area of 530.4 Ha located at Sub- District Soegaon, Sillod, Kannad and Phulambri, District Aurangabad (Chhatrapati Sambhajinagar), Maharashtra by M/s Greenko Mh01 Irep Private Limited.

**54.2.2** The Project Proponent and the accredited Consultant M/s. R S Envirolink Technologies Pvt. Ltd, made a detailed presentation on the salient features of the project and informed that:

- i. Nayagaon Standalone Pumped Storage Project is an Off-stream Close Loop Pumped Storage Project. The project envisages construction of two new reservoirs and the surface powerhouse located in Soegaon Taluk in Aurangabad District (Chhatrapati Sambhajinagar) of Maharashtra state.
- ii. The Nayagaon Standalone Pumped Storage Project is proposed with installed capacity of 2000 MW and with a storage capacity of 12740 MWH. This Project is comprising of 5 larger units of 334 MW each and 2 smaller units of 165 MW each.
- iii. The Project will generate 2000 MW by utilizing a design discharge of 756 cumecs and rated head of around 304. The Nayagaon Standalone PSP will utilize 2285 MW to pump 0.61 TMC of water to the upper reservoir in 7.05 hours.
- iv. Upper reservoir is located in the flat/sloping ground with low height embankment to create the desired storage capacity and is away from all existing river systems and have no/very small catchment area.
- v. Similarly, the lower reservoir is proposed to be located across the existing seasonal nala which is right bank tributary of Hivra Nadi for creating the desired storage capacity and will have small catchment area. For first (one time) filling Water will be taken from Hivra Nadi and used cyclically for energy storage and discharge. After first filling water regime of Nala will remain more or less same as earlier because whatever water comes same will be released to downstream. Evaporation losses will be recouped during period whenever water is available in Hivra Nadi.
- vi. The project proposal was considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 31<sup>st</sup> EAC meeting held during 05.03.2020 and recommended for grant of Terms of References (ToRs) for the Project. The ToR has been issued by Ministry vide letter No.J-12011/04/2020-IA-I ; date 13.04.2020.
- vii. The geographical co-ordinate of the project is Upper reservoir is at Longitude: 75°21'45.71" East and Latitude is 20°27'17.77"North and that of Lower reservoir is at longitude 75° 20' 54.62" East and latitude is 20° 27' 26.25" North.

viii. The Nayagaon Off-Stream Closed Loop Pumped Storage Project (2000 MW) envisages construction of:

- Geomembrane Faced Rock fill Dam Embankment of weighted average height of around 16 m with maximum of 30 m height in upper reservoir and weighted average height of around 19 m with maximum of 37 m in lower reservoir for creation of Nayagaon OCPSP upper & lower reservoir with 0.66 & 0.65 TMC live storage capacity respectively
- 50.0 m high Power Intake Structure.
- 6 nos. of 1522 m long and 5m dia. circular steel lined Penstocks/ Pressure Shafts i.e., 768.8 m length is head race tunnel, 237.7 m long vertical pressure shaft and 515.3 m long Horizontal pressure shaft up to bifurcation point) will get bifurcated into 2 nos. near power house each of 3.6 m dia to feed 2 smaller units.
- The surface powerhouse in deep excavated trench has been planned to accommodate 7 units of Francis reversible type Turbines corresponding to 2000 MW (5 x 334 MW + 2 x 165 MW) installed capacity operating under a rated head of 303.31 m in generating mode & 318.54 m in pumping mode for larger unit and rated head of 300.62 m in generating mode & 321.82 m in pumping mode for smaller unit.

ix. **Land requirement:**

The total land requirement for proposed project is about 530.4 Ha; out of which 297.38 Ha is forest land and remaining 233.02 Ha is non-forest land.

x. **Demographic details in 10 km radius of project area:**

- Chhatrapati Sambhajnagar District lies on the Deccan plateau and is covered by the Deccan Traps.
- The district is located mainly in the Godavari River Basin and partly in the Tapti River Basin. The district lies between 19- and 20-degrees north longitude and between 74- and 76-degrees east latitude.
- The district covers an area of 10,100 km<sup>2</sup>, out of which 141.1 km<sup>2</sup> is urban area and 9,958.9 km<sup>2</sup> is rural. Chhatrapati Sambhajnagar district is a major tourism region in Marathwada.
- Administratively, the district comprises nine tehsils, Kannad, Soyagaon, Sillod, Phulambri, Aurangabad, Khuldabad, Vaijapur, Gangapur, and Paithan.
- The major occupation of this district is agriculture and about 84.2 % population is dependent on agriculture and allied sector.
- Agriculture plays an important role in the district economy. Agriculture in the Chhatrapati Sambhajnagar district is diversified, wide range of crops are grown in the district.
- Major food grains are Jowar, pearl millet, wheat & gram, among oilseeds Soybean is major crops while Cotton is major cash crops.

- Although basic amenities such as schools, healthcare centres, and road connectivity are present, they are still not fully developed.
- The proportion of Scheduled Tribe population in the project area is very low.

xi. **Water requirement:** The water requirement for the project for initial filling (one-time) is about 20.23 Mm<sup>3</sup> (0.70 TMC) and annual water requirement for recuperating losses in reservoir storage due to evaporation, transit and seepage etc. has been estimated to be about 1.21 Mm<sup>3</sup> (0.04 TMC).

xii. **Project Cost:** The estimated project cost is Rs 9564.31 Cr. Total capital cost earmarked towards environmental management plan is Rs 1490.27 lakhs and the Recurring cost (operation and maintenance) will be about Rs 5072.82 lakh.

xiii. **Project Benefit:** The project is expected to generate significant employment potential during both the construction and post-construction phases, contributing to local livelihood opportunities. Additionally, it will support the overall development of the area through the implementation of Corporate Social Responsibility (CSR) initiatives and comprehensive watershed development plans.

xiv. **Environmental Sensitive area:** The Nearest Protected Area to the proposed project is the Gautala Autramghat Wildlife Sanctuary situated in Chhatrapati Sambhajinagar and Jalgaon Districts of Maharashtra and extends over an area of 260.61 sq km. The Eco-sensitive Zone is spread over an area of 483.45 sq km with an extent of up to one kilometre from the boundary of Gautala Autramghat Wildlife Sanctuary is notified vide MoEF&CC's notification no. S.O. 3996(E) dated 9th December, 2016. All project components are outside the boundary of Wildlife Sanctuary. The aerial distance from the project component to the boundary of the wildlife sanctuary is about 11.50 km

xv. **MoU / any other clearance/ permission signed with State government:** MoU is entered with Maharashtra State Government on 15.07.2025 for a capacity of 2000 MW

xvi. **Resettlement and rehabilitation:** The landowner family may lose part of their total land, none of the landowners is losing any house or any other assets such as borewell, Cattle shed, trees etc. None of the landowner families are displaced due to the proposed project. The total private land proposed to be purchased through private negotiations. If the total private land required exceeds the specified limits by the relevant rules notified by the State Government, if any related to rehabilitation and resettlement under RFCTLARR, 2013 shall apply for the proposed Project.

xvii. **Scheduled –I species:** As per Wildlife Protection Amendment Act, 2022, Sambar Deer, Jackal, Common Leopard), Indian Fox, Jungle Cat, Indian Grey Mongoose, Stripped Hayena, Sloth Bear, Indian Crested Porcupine, Indian Peafowl, Mottled wood owl, Indian

Chameleon, Indian cobra, Russell's Viper, Indian Python, Indian Softshell Turtle and Bengal Monitor are the species listed under Schedule-I.

xviii. **Alternative Studies:** Based on comparison of three alternate layouts following conclusions could be drawn

1. In Alternate-2, the lower intake is connected to the lower reservoir compartment in which the volume of storage is less comparatively. Further, there is natural stream flowing along WCS alignment which may flood the pit type of powerhouse during heavy rainfall events and diverting the nala is also not found to be feasible during pre and post excavation. In view of above, Alternate-2 is not considered.
2. Alternative Layout 1 & 3 are same except for the type of powerhouse. On comparison, both options were found techno-economically feasible owing to good geological conditions of site. After preparing construction schedule & cost comparison for both alternatives, The major advantage of Alternative-1 is less construction time & cost compared to Alternative-3. No additional quarry site requirement for Alternative-1 pit type PH as sufficient rock fill is generated from surface power house excavation along with other project components excavation and thereby avoiding additional environmental issues. Hence, Alternate-1 layout with surface pit powerhouse is finalized for proposed Nayagaon PSP.

<b>Parameter</b>	<b>Alternative-1 (PIT PH – North)</b>	<b>Alternative-2 (PIT PH – South)</b>	<b>Alternative-3 (UG PH – North)</b>
Powerhouse Type	Surface Pit	Surface Pit	Underground
WCS Alignment	North of Temple	South of Temple	North of Temple
Intake Location	Optimal Storage	Lesser Storage	Optimal Storage
Flooding Risk	None	High – nala	None
Construction Period	Shorter	Moderate	Longer
Construction Cost	Lower	Moderate	Higher
Quarry Site Needed	No	No	Yes
Total Land (ha)	530.4	515 (Least)	530.03
Forest Land (ha)	297.38 (56%)	325 (63%)	323.13 (61%)
Non-Forest Land	233.02	190	206.90

(ha)			
Geological Suitability	Good	Good	Good
Environmental Issues	Minimal	Flooding + Nala	Quarry impacts
<b>VERDICT</b>	<b>✓ SELECTED</b>	<b>✗ REJECTED</b>	<b>✗ NOT PREFERRED</b>

xix. **Baseline Environmental Scenario:** The field surveys for the collection of primary data were initiated in June 2022 and were completed in May 2023, in accordance with the Terms of Reference (ToR) accorded by the EAC, MoEF&CC. A supplementary study was carried out during December 2025 - February 2026 for winter season. These surveys covered winter, pre-monsoon/summer, and monsoon seasons, focusing on the collection of data and information related to terrestrial ecology, physical and social environmental parameters.

<b>Period</b>	<b>From June 2022 to February 2026</b>			
<b>AAQ parameters at 6 locations (min. &amp; Max.)</b>	<b>Unit in <math>\mu\text{g}/\text{m}^3</math></b>			
	<b>Core</b>	<b>Min</b>	<b>Max</b>	<b>Standards</b>
	<b>PM<sub>2.5</sub></b>	39.9	63.1	60
	<b>PM<sub>10</sub></b>	18.5	37.8	100
	<b>SO<sub>2</sub></b>	4.3	6.7	80
	<b>NO<sub>2</sub></b>	5.1	7.9	80
	<b>Buffer</b>	<b>Min</b>	<b>Max</b>	
	<b>PM<sub>2.5</sub></b>	37.6	68	60
	<b>PM<sub>10</sub></b>	17.4	45.7	100
	<b>SO<sub>2</sub></b>	3.9	9	80
	<b>NO<sub>2</sub></b>	4.7	14	80

<b>Incremental GLC Level</b>	<b>Core Zone</b>					
	Criteria Pollutant [PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , Other parameters specific to the sector (Please specify)]	Unit [µg/m <sup>3</sup> ]	Baseline Concentration [A]	Predicted incremental value considering worst case stability class [B]	Total GLC [A]+[B]	
	PM10	µg/m <sup>3</sup>	28.15	21.11	49.26	
	PM2.5	µg/m <sup>3</sup>	51.50	6.18	57.68	
	SOx	µg/m <sup>3</sup>	5.50	8.25	13.75	
	NOx	µg/m <sup>3</sup>	6.50	9.75	16.25	
	<b>Buffer Zone</b>					
	Criteria Pollutant [PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , Other parameters specific to the sector (Please specify)]	Unit [µg/m <sup>3</sup> ]	Baseline Concentration [A]	Predicted incremental value considering worst case stability class [B]	Total GLC [A]+[B]	
	PM10	µg/m <sup>3</sup>	31.55	0	31.6	
	PM2.5	µg/m <sup>3</sup>	52.8	0	52.8	
	SOx	µg/m <sup>3</sup>	6.45	0	6.5	
	NOx	µg/m <sup>3</sup>	9.35	0	9.4	
	<b>River water samples (06 samples)</b>	<b>Core Zone</b>				
		<b>S. No</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Standards</b>
		1	pH	6.7	7.8	8.5
2		Total Dissolved Solids, mg/L	100	174	0	
3		Dissolved Oxygen (mg/l)	6.5	8.5	6	
4		Chloride (as Cl), mg/L	36.4	63	0	
5		Total Hardness (as CaCO <sub>3</sub> ), mg/L	98	137	0	

	6	Biological Oxygen Demand (mg/l)	2.6	4.5	3.0
	7	Chemical Oxygen Demand (mg/l)	10.9	19.7	0
	8	Total Coliform (MPN/100 ml)	136	313	50
<b>Buffer Zone</b>					
	<b>S. No</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Standards</b>
	1	pH	7	8	8.5
	2	Total Dissolved Solids, mg/L	106	202	0
	3	Dissolved Oxygen (mg/l)	6.4	8.2	6
	4	Chloride (as Cl), mg/L	28	63	0
	5	Total Hardness (as CaCO <sub>3</sub> ), mg/L	102	144	0
	6	Biological Oxygen Demand (mg/l)	2.5	4.4	3.0
	7	Chemical Oxygen Demand (mg/l)	10.5	19.2	0
	8	Total Coliform (MPN/100 ml)	183	270	50
<b>Pond water samples</b>	-				
<b>Groundwater samples quality at 10 location</b>	<b>Core Zone</b>				
	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Prescribed Limits</b>
	1	pH	7.7	7.8	6.5-8.5
	2	Total Dissolved Solids (mg/l)	107	1716	500 200
	3	Chloride (as Cl) (mg/l)	63	103	250 1000
	4	Total Hardness (as CaCO <sub>3</sub> ) (mg/l)	159	348	200 600
	5	Fluoride (mg/l)	0.12	0.22	1.0 1.5
<b>Buffer Zone</b>					

	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Prescribed Limits</b>			
	1	pH	7.5	8.2	6.5-8.5			
	2	Total Dissolved Solids (mg/l)	578	1073	500	200		
	3	Chloride (as Cl) (mg/l)	35	64	250	1000		
	4	Total Hardness (as CaCO <sub>3</sub> ) (mg/l)	101	225	200	600		
	5	Fluoride (mg/l)	0.18	0.33	1.0	1.5		
<b>Noise levels Leq (Day &amp; Night) at 6 locations</b>	<b>Noise Level</b>	<b>Zone</b>	<b>Leq Day dB(A)</b>		<b>Leq Night dB(A)</b>		<b>Prescribed Limits</b>	
			From	To	From	To	Day	Night
	Core	Residential	44.9	59.5	35.4	47.2	55	45
	Buffer	Residential	48.4	56.1	34.7	45.5	55	45
<b>Soil Quality at 10 Locations</b>	<b>Core Zone</b>							
	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Prescribed Limits</b>			
	1	Calcium (mg/kg)	190	475	500			
	2	Magnesium (mg/kg)	75	275	500			
	3	Nitrogen (kg/ha)	160	259	500			
	4	Phosphorus (kg/ha)	18.9	31.6	50			
	5	Potassium (kg/ha)	280	420	500			
	6	Carbon (%)	0.4	0.51	1			
	7	Sodium Absorption Ratio	1.4	2.37	10			
	8	Salinity (ppt)	0	0	0.01			

<b>Buffer Zone</b>				
1	Calcium (mg/kg)	126	523	500
2	Magnesium (mg/kg)	119	183	500
3	Nitrogen (kg/ha)	180	281	500
4	Phosphorus (kg/ha)	17.8	31.3	50
5	Potassium (kg/ha)	310	452	500
6	Carbon (%)	0.34	0.57	1
7	Sodium Absorption Ratio	1.07	2.9	10
8	Salinity (ppt)	0	0	0.01

<b>Flora &amp; Fauna</b>	<p>Schedule-I species observed in the study area:</p> <p>As per Wildlife Protection Amendment Act, 2022, Sambar Deer, Jackal, Common Leopard), Indian Fox, Jungle Cat, Indian Grey Mongoose, Stripped Hayena, Sloth Bear, Indian Crested Porcupine, Indian Peafowl, Mottled wood owl, Indian Chameleon, Indian cobra, Russell's Viper, Indian Python, Indian Softshell Turtle and Bengal Monitor are the species listed under Schedule-I.</p>
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xx. **Details of Solid waste/ Hazardous waste generation/ Muck and its management:** The solid waste will be transported for disposal at the designated landfill sites. The landfill shall have impervious clay at the bottom most layers. The second layer shall be impervious liner (Geo membrane), third layer will be of sand, after that well compacted solid waste is to be put over the sand, then again, a layer of clay, finally a layer of soil. Vegetation shall be grown on the topmost layers. It will give a good aesthetic view of landfill.

Net Quantity of Muck to be rehabilitated/disposed-off is estimated as 3.81 MCUM (approx.). Keeping the above requirement and topography of the area, two muck disposal sites have been identified. Area of Muck disposal Site – 1 is 15.03 Ha and Area of Muck disposal Site – 2 is 10 Ha. The capacity of each muck disposal site – 1 & 2 are worked out to 3.69 MCum and 1.95 MCum respectively. Hence, total area of muck disposal site – 1 & 2 is about 25.03 Ha and Total capacity of both muck disposal sites are worked out to 5.64 MCum.

xxi. Public Hearing for the proposed project has been conducted by the State Pollution Control Board on November 08, 2023 in Chhatrapati Sambhajinagar (Aurangabad) district. The main issues raised during the public hearing are related to Employment opportunities for local youth.

xxii. Status of Litigation Pending against the proposal, if any: NA

xxiii. The details of the project are as under: -

S. No.	Description	Upper Dam (Proposed)	Lower Dam (Proposed)
<b>1</b>	<b>LOCATION</b>		
a)	State	Maharashtra	Maharashtra
b)	District	Chhatrapati Sambhajinagar	Chhatrapati Sambhajinagar
c)	Taluka / Village	Kannad/ Wadhod	Soegaon/ Wadi Sutonda
d)	Latitude	20° 27' 17.77" N	20° 27' 26.25" N
e)	Longitude	75° 21' 45.71" E	75° 20' 54.62" E
f)	River	-	-
g)	Nearest rail head	Pachora	Pachora
h)	Nearest international airport	Chhatrapati Sambhajinagar	Chhatrapati Sambhajinagar
<b>2</b>	<b>HYDROLOGY</b>		
a)	Catchment Area	1.43 km <sup>2</sup>	8.85 km <sup>2</sup>
b)	Design Flood	44.0 m <sup>3</sup> /s	218 m <sup>3</sup> /s
c)	Quantity of water required daily for 6.37 hours power generation	17.33 Mm <sup>3</sup> ( 0.58 TMC)	
<b>3</b>	<b>DAMS / RESERVOIRS</b>	<b>Upper Dam (Proposed)</b>	<b>Lower Dam (Proposed)</b>
	MDDL	RL 690.00 m	RL 376.00 m
	FRL	RL 710.00 m	RL 400.00 m
	MWL	RL 710.00 m	RL 400.94 m
d)	Top of Dam	RL 713.00 m	RL 403.00 m
	Live Storage	18.688 Mm <sup>3</sup> (0.66 TMC)	18.4 Mm <sup>3</sup> (0.65 TMC)
f)	Dead Storage	0.85 Mm <sup>3</sup> (0.03 TMC)	0.566 Mm <sup>3</sup> (0.02 TMC)
g)	Gross Storage	19.538 Mm <sup>3</sup>	18.97 Mm <sup>3</sup>

		(0.69 TMC)	(0.67 TMC)
h)	Length of Dam	3985.00 m	993.00 m
i)	Maximum Height of Dam	30.00 m	37.00 m
j)	Average Height of Dam	16.00 m	19.00 m
k)	Type of Spillway	-	Ogee (Ungated)
l)	Length of Spillway	-	20.00 m
m)	Design Flood		218 m <sup>3</sup> /s
n)	Crest Level of Spillway	-	400.00 m
<b>4</b>	<b>APPROACH CHANNEL</b>		
a)	Type & Shape	Shotcrete lined & Trapezoidal	
b)	Length of channel	751.50 m	
c)	Length of Transition Portion	198.24 m (90 m to 138 m)	
d)	Bed width	90 m	
e)	Full supply depth	5.00 m	
f)	Bed slope of Channel	1(V) in 4500(H) in channel	
g)	Bed slope of Transition Portion	1(V): 20(H)	
<b>5</b>	<b>UPPER INTAKE</b>		
	Type	Diffuser Type	
	No. of Vents	3 nos	
	Size of Each Intake	23.00 m (W) including piers x 10.50 m (H) for larger unit & Smaller unit.	
d)	Length of each Intake's diffuser	45.00 m for larger & smaller unit	
e)	Elevation of Intake centre line	EL + 678.50 m	
f)	Elevation of Intake bottom	EL + 676.00 m	
g)	Trash rack type	Vertical with inclination of 15°	
h)	Size of Trash rack	3 no. of 5.70 m (W) x 10.50 m (H) for each larger unit & Smaller unit	
i)	Numbers & Size of Intake Service Gate	6 nos. of 7.90 m (W) x 5.00 m (H)	
j)	Numbers & Size of Intake Stop log Gate	1 No. of 7.90 m (W) x 5.00 m (H) with Moving Gantry	
<b>6</b>	<b>HEADRACE TUNNEL</b>		
<i>I</i>	<u>Intake Tunnel (up to Exit portal)</u>		
a)	Number	6 no.	
b)	Type	Finished steel lined - circular	

c)	Diameter	5.00 m
d)	Design discharge	126.00 m <sup>3</sup> /s
e)	velocity in the tunnel	6.42 m/s
<b>II</b>	<b><u>Pressure shaft</u></b>	
a)	Type	Finished steel lined - circular
b)	Number of Pressure Shaft	Total 6 No. of Independent Penstocks & 1 No. bifurcated into 2 nos. near powerhouse to feed smaller units.
c)	Diameter of Main Pressure Shaft	5.00 m
d)	Design Discharge of each Main Penstock	126 m <sup>3</sup> /s
e)	Velocity in the Main Penstock	6.42 m/s
f)	Dia. Of Branch Penstock/ Pressure Shaft	3.60 m
g)	Design Discharge in each branch penstock	63 m <sup>3</sup> /s
h)	Velocity in branch penstock	6.19 m/sec
i)	Length of Penstock	1522 m
j)	Length of each branch penstock	96.55 m
<b>7</b>	<b>POWERHOUSE</b>	
	Installed Capacity	5 x 334 MW & 2 x 165 MW
	C/L of Unit	EL + 330.00 m
c)	Service bay level	EL + 349.00 m
d)	Unloading bay level	EL + 349.00 m
<b>8</b>	<b>LOWER INTAKE</b>	
a)	Type	Diffuser Type
b)	No. of Vents	3 nos
c)	Size of each Intake	23.00 m (W) including piers x 10.50 m (H)- Larger unit.
		20.00 m (W) including piers x 7.00 m (H)- Smaller unit
d)	Length of each Intake's Diffuser	40.00 m for Larger Unit
		43.00 m for Smaller Unit
e)	Elevation of Intake center line	EL + 367.75 m – Larger Unit
		EL + 366.80 m – Smaller unit
f)	Elevation of Intake bottom	EL + 364.50 m
g)	Trash rack type	Vertical with inclination of 15°

h)	Size of Trash rack Panel	3 no. of 5.70 m (W) x 10.50 m (H) for each larger unit	
		3 no. of 4.70 m (W) x 7.00 m (H) for each smaller unit	
i)	Numbers & Size of Intake Service Gate	5 no. of 6.50 m (W) x 6.50 m (H)	
		2 no. of 5.50 m (W) x 4.60 m (H)	
j)	Numbers & Size of Intake Stop log Gate	1 No. – 6.50 m (W) x 6.50 m (H) with Moving Gantry	
		1 No. – 5.50 m (W) x 4.60 m (H) with Moving Gantry	
<b>9</b>	<b>TAILRACE TUNNEL</b>		
	Number	7 no.	
b)	Type	Concrete Lined - Circular	
	Diameter	6.50 m (For Larger unit)	
		4.60 m (For Smaller Unit)	
d)	Velocity	5.35 m/s (For Larger unit)	
		4.77 m/s (For Smaller Unit)	
	Invert Level	EL + 364.50 m	
<b>10</b>	<b>TAILRACE CHANNEL</b>		
a)	Type & Shape	Shotcrete lined & Trapezoidal	
b)	Length of channel	1908.4 m	
c)	Length of Transition Portion	152.72 m (90 m to 156.50 m)	
d)	Bed width	90 m	
e)	Full supply depth	4.50 m	
f)	Bed slope of Channel	1 in 5000 in channel	
g)	Bed slope of Transition Portion	1(V): 20 (H)	
<b>11</b>	<b>ELECTROMECHANICAL EQUIPMENT</b>		
I	<i>Pump Turbine</i>	<b>Larger Unit</b>	<b>Smaller Unit</b>
a)	Type	Vertical Reversible Francis Pump Turbine	
b)	Number of Units	7 No. (5 x 334 MW + 2 x 165 MW)	
c)	Each Turbine Capacity	334 MW	165MW
d)	Each Pump Capacity	379 MW	195 MW
e)	Rated Gross Head	311.33 m	311.33
f)	Maximum Gross Head	334.00 m	334.00 m
g)	Minimum Gross Head	290.00 m	290.00 m
h)	Head Loss		
	Generation	8.03 m	10.71 m
	Pumping	7..21 m	10.49 m
i)	Rated Head		

	Generation	303.31 m	300.62 m
	Pumping	318.54 m	321.82 m
j)	Rated discharge		
	Generation	126.00 m <sup>3</sup> /s	63.00 m <sup>3</sup> /s
	Pumping	113.00 m <sup>3</sup> /s	58.00 m <sup>3</sup> /s
k)	Synchronous Speed	250.00 rpm	300.00 rpm
III	<u>Main Power Transformer</u>	<b>Larger Unit</b>	<b>Smaller Unit</b>
a)	Type	Outdoor Single-Phase Power transformers with Off- Circuit tap Changer (OCTC)	Outdoor Single-Phase Power transformers with Off- Circuit tap Changer (OCTC)
b)	Number of units	15 Nos. i.e., 3 nos. per unit	6 Nos. i.e., 3 nos. per unit
c)	Rated Capacity of each unit	Single Phase, 21 kV/400kV, 120 MVA	Single Phase, 21 kV/400kV, 120 MVA
d)	Rated Voltage	Primary – 21.0 kV; Secondary - 400 kV adjustable range of the secondary voltage: -10% to +10% (3KV/ Tap)	Primary – 21.0 kV; Secondary - 400 kV adjustable range of the secondary voltage: -10% to +10% (3KV/ Tap)
	Ratio of length of water conductor system to design head	4.35	
<b>12</b>	<b>ANNUAL POWER</b>		
a)	Daily hours of generation	6.37 Hours	
b)	Daily hours of pumping	7.05 Hours	
c)	Annual generation	4415.28 Mu	
d)	Annual pumping	5585.88 Mu	
e)	Cycle Efficiency	79.04%	
<b>13</b>	<b>400 kV Gas Insulated Switchgear</b>		
a)	Type of GIS	Indoor Type	
b)	No. of GIS units	1 No.	
c)	Location	Inside Powerhouse	
d)	Scheme	Double Busbar Arrangement with bus coupler	
<b>14</b>	<b>POWER EVACUATION</b>		
a)	Voltage Level	400 kV	
b)	No. of Circuits	Two Double Circuit (2 x DC/DC)	

c)	No. of Transmission Lines	Two 400 kV double circuit transmission line on lattice towers from Nayagaon PSP pothead yard to 400 kV MSETCL Substation at Waluj of Maharashtra State.
d)	Conductor	ACSR Twin Moose
e)	Length of Transmission Lines/ Purpose	Transmission Lines are of 70 km (approx.) length for evacuation of Stored Power from Nayagaon PSP during Generating mode and for input power to PSP during pumping mode.
<b>15</b>	<b>PRELIMINARY PROJECT COST (2022-23 Price Level)</b>	
a)	Civil works	3652.27 Cr.
b)	Electro-mechanical works including Power Evacuation	3010.10 Cr.
c)	Total cost (including FC)	6662.37 Cr.
d)	IDC & others	2901.94 Cr.
e)	Total cost	9564.31 Cr

xxiv. The salient features of the project are as under: -

- Project details:**

Name of the Proposal	Nayagaon Off-Stream Closed Loop Pumped Storage Project (2000 MW)
Location (Including coordinates)	Project is located in Nayagaon, Wadi Sutonda, Jangli Kotha, Palashi, Banoti, Ghorkhund, Gondegaon villages of Soegaon Tehsil and Wadhod village of Kannad Tehsil of Chhatrapati Sambhajnagar (Aurangabad) district, Maharashtra Upper Reservoir- Latitude: 20°27'17.77"North Longitude: 75°21'45.71" East Lower Reservoir- Latitude: 20°27'26.25"North Longitude: 75°20'1'54.62" East
Inter- State Issue involved	No
Seismic zone	Zone-II

- **Category details:**

Category of the project	1(c)
Provisions	-
Capacity / Cultural command area (CCA)	2000 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	NA

- **Electricity generation capacity:**

Powerhouse Installed Capacity	2000 MW
Generation of Electricity Annually	4415.28 MU
No. of Units	7 nos. (5 X 334 MW+2 X 165 MW)
Additional information (if any)	NA

- **ToR/EC Details:**

Cost of project	9564.31 Cr
Total area of Project	530.4 Ha
Height of Dam from River Bed (EL)	Upper Reservoir: 30 m & Lower Reservoir: 37 m
Length of Tunnel/ Channel	1908.4 m (Tailrace Channel 7 nos)
Details of Submergence area	372.84 Ha
Types of Waste and quantity of generation during construction/ Operation	Major waste generation is muck from excavation. Total quantity of excavated material is worked out as 9.08 Mcum
E-Flows for the Project	NA
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR / Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	NA
No. of trees/ saplings proposed in view of 'Ek Ped Maa Ke Naam' campaign	500

• **Muck Management Details:**

No. of proposed disposal area/ (type of land Forest/ Pvt. land)	Non-Forest Land – 25 Ha, comprising of 2 Muck disposal sites MDS- 1 – 15.03 Ha MDS- 2 -10 Ha
Muck Management Plan	The total quantity of muck generated is 9.08 Mcum, in which 6.36 Mcum of excavated muck is expected to be reutilized for Road Development, Protection works and Embankment of upper & lower reservoirs. The Rehabilitation plan of muck dumping site includes engineering and biological measures and has been incorporated in EIA report.
Monitoring mechanism for Muck Disposal	Properly covered Dumper trucks will be used for transportation.

• **Land Area Breakup:**

Private land	233.02 Ha
Government land	-
Forest Land	297.38 Ha
Total Land	530.40 Ha
Submergence area/ Reservoir area	372.84 Ha
Additional information (if any)	-

• **Presence of Environmentally Sensitive areas in the study area**

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate/ letter/ Remarks
Reserve Forest/ Protected Forest Land	Yes	<ul style="list-style-type: none"> <li>• 297.38 Ha forest land to be diverted. Application for the diversion of forest land is submitted and it is under processing.</li> <li>• The project is located around 11.5 km from Gautala</li> </ul>
National Park	No	
Wildlife Sanctuary	No	

		<p>Autramghat Wildlife Sanctuary.</p> <ul style="list-style-type: none"> <li>• Since all the project components are outside the boundary of Wildlife Sanctuary, wildlife clearance is not applicable.</li> </ul>
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- **Court case details: Nil**
- **Previous EC compliance and necessary approvals:**

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	NA
Status of Stage- I FC	Under Process
Additional detail (If any)	None
Is FRA (2006) done for FC-I	No

- **Miscellaneous**

Particulars	Details
Details of consultant	<p>M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (<i>NABET Accredited Consultant Organization</i>) Certificate No : NABET/EIA/25-28/RA0415 Validity : August 15, 2028 Contact Person: Mr. Ravinder Bhatia Name of Sector: River Valley and Hydroelectric Projects Category : A MoEF Schedule: I(C) Address : 403, Bestech Chambers, Block-B, Sushant Lok Phase I, Sector 43, Gurugram, Haryana - 122009 E-mail : ravi@rstechnologies.co.in Land Line : (0124) 4295383 Cellular : (+91) 9810136853</p>
Project Benefits	The project is expected to generate significant employment potential during both the

	construction and post-construction phases, contributing to local livelihood opportunities. Additionally, it will support the overall development of the area through the implementation of Corporate Social Responsibility (CSR) initiatives and comprehensive watershed development plans
Status of other statutory clearances	<ul style="list-style-type: none"> <li>• Forest Clearance - Online application seeking forest diversion for around 297.38 Ha submitted in Parivesh portal vide proposal No. FP/MH/HYD/IRRIG/545934/2025.</li> <li>• Allocation of 0.78 TMC of water has been approved by Tapi Irrigation Development Corporation, Jalgaon (under WRD) for the development of the Nayagaon Off-Stream Closed Loop Pumped Storage Project vide letter dated 12/12/2024.</li> </ul>
R&R details	Applicable. Based on the findings of the socio economic studies and survey, an appropriate R&R compensation package as per the provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement, 2013 (RFCTLARR, 2013) and respective State R&R Policy in vogue has been formulated.
Additional detail (If any)	NA

#### 54.3.3 The EAC during deliberations noted the following:

- The Expert Appraisal Committee (EAC) deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of TOR for conducting EIA/EMP and Public hearing for Nayagaon Close loop Pumped Storage Project (2000 MW) in an area of 530.4 Ha located at Sub- District Soegaon, Sillod, Kannad and Phulambri, District Aurangabad (Chhatrapati Sambhajanagar), Maharashtra by M/s Greenko Mh01 Irep Private Limited.

- The project/activity falls under Category A of item 1(c), 'River Valley Projects,' as per the Schedule of the Environmental Impact Assessment Notification, 2006, and requires appraisal at the Central level by the sectoral EAC in the Ministry.
- The EAC noted that the Terms of Reference (TOR) for the Nayagaon Pumped Storage Project (2000 MW) was issued by MoEF&CC vide letter dated 13.04.2020 in favour of Greenko Energies Private Limited. Subsequently, the TOR was transferred vide letter dated 11.11.2025 in favour of Greenko MH01 IREP Private Limited from Greenko Energies Private Limited. As per provisions mentioned under MoEF&CC Gazette Notification S.O. 751 ( E) dated 17.02.2020 the validity of TOR for river valley and Hydro-electric project is 5 years. It was observed that the application for grant of EC was submitted on 10.04.2026 i.e. after expiry of validity of TOR; hence, the same was not accepted. Therefore, the present proposal for seeking a fresh TOR for the Nayagaon Pumped Storage Project (2000 MW) has been submitted on 01.05.2026 and being considered in the present meeting.
- During the deliberations the committee noted that although the proposed Upper Reservoir to be located away from any riverine system but lower reservoir is proposed to be located across the existing seasonal nala which is right bank tributary of Hivra Nadi. Since the lower reservoir will be located on non-perennial nallah, the committee opined that the project shall be categorized as an open-loop project rather than a closed-loop PSP.
- The EAC observed that the project is stated to be located in Soegaon Taluk of Chhatrapati Sambhajnagar District (formerly Aurangabad). However, the details furnished by the PP on the PARIVESH Portal indicated that the project spans two districts, namely Aurangabad District and Jalgaon District. In this regard, the PP, vide letter dated 06.05.2026, clarified that the project is entirely located within a single district, i.e., Chhatrapati Sambhajnagar District. In view of the above, the Committee opined that the project may be considered as falling within a single district, namely Chhatrapati Sambhajnagar (formerly Aurangabad) District, Maharashtra. However, the PP shall obtain and submit appropriate authorization/confirmation from the competent State authorities of both Aurangabad and Jalgaon districts, certifying that the entire project area falls exclusively within Chhatrapati Sambhajnagar District.
- The EAC noted that the total land required for the project components and related works has been estimated to be about 530.4 Ha; out of which 297.38 Ha is forest land and remaining 233.02 Ha is non-forest land. Diversion of forest land for non-forest purpose will be involved for construction of project components. However, it was observed that the application for Stage-I Forest Clearance (FC) has been submitted vide proposal no. FP/MH/HYD/IRRIG/545934 on December 23, 2025 for the diversion of 297.38 ha of forest land. The PP informed that currently, the proposal is pending at DFO/CF/Nodal Officer after acceptance in PSC-I.
- The EAC also noted that there is change in land from earlier ToR granted by the Ministry on 13.04.2020, accordingly a comparative assessment of land required for the project at

different stage is mentioned as under:

Description	As per earlier ToR	Draft EIA Report submitted for PH	Present proposal
Capacity (MW)		2000	
Forest (Ha)	187.79	195.97	297.38
Non-Forest (Ha)	300.43	333.35	233.02
Total (Ha)	488.22	529.32	530.40

- The EAC noted that the total water requirement for initial reservoir filling of the project is estimated to be about 20.23 Mm<sup>3</sup> (0.70 TMC), which is a one-time requirement, whereas the annual water requirement for recuperating losses due to evaporation, seepage, transit losses, etc. has been estimated as 1.21 Mm<sup>3</sup> (0.04 TMC). The Committee further noted that water for the project is proposed to be lifted from the upstream of Hivra Dam on the Hivra River, a tributary of the Girna River in the Tapi River Basin. The Committee also noted that water allocation for development of the Nayagaon Off-Stream Closed Loop Pumped Storage Project has been approved by Tapi Patbandare Vikas Mahamandal under the Water Resources Department (WRD), vide letter dated 12.12.2024.
- The EAC noted that there are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site. However, it has been informed that nearest Protected Area to the proposed project is the Gautala Autramghat Wildlife Sanctuary situated in Chhatrapati Sambhajinagar and Jalgaon Districts of Maharashtra and it has been notified vide MoEF&CC's notification no. S.O. 3996(E) dated 9<sup>th</sup> December, 2016. It was further informed that all project components are outside the boundary of Wildlife Sanctuary. The aerial distance from the project component to the boundary of the wildlife sanctuary is about 11.50 km.
- The EAC observed that Memorandum of Understanding was signed between Department of Water Resources, Government of Maharashtra on July 15, 2025 through SPV: Greenko MH01 IREP Private Limited for development of Nayagaon Pumped Storage Project of capacity 2000 MW.

**54.3.4** The EAC based on the information submitted and as presented during the meeting, recommended the proposal for grant of Specific ToR issued by the Ministry for Open Loop Pumped Storage Projects vide OM dated 14.08.2023 for conducting EIA study with Public consultation for proposed construction of the project for Nayagaon Pumped Storage Project (2000 MW) in an area of 530.4 Ha located at Sub- District Soegaon, Sillod, Kannad and Phulambri, District Aurangabad (Chhatrapati Sambhajinagar), Maharashtra by M/s Greenko Mh01 Irep Private Limited, under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR:

**[A] Environmental Management and Biodiversity Conservation:**

- i. The Project Proponent shall ensure that the entire project area falls within a single district, i.e., Chhatrapati Sambhajnagar District (formerly Aurangabad). In this regard, the Project Proponent shall obtain and submit appropriate authorization/confirmation from the competent State authorities of Aurangabad District and Jalgaon District, certifying that the project does not extend beyond the administrative boundary of Chhatrapati Sambhajnagar District. The said confirmation shall be submitted to the Ministry/concerned Regional Office prior to commencement of construction activities for record and compliance.
- ii. Impact of construction activities on natural streams/springs/aquifers shall be studied and accordingly conservation action plan shall be prepared in consultation with expert government research institute after detailed mapping of the study area.
- iii. A detailed action plan for large scale plantation of native species of plant sapling within 10 km radius of the project shall be prepared in consultation with State Forest Department. The monitoring mechanism to ensure the survival of saplings shall be finalized in consultation with ICFRE.
- iv. The PP will submit 10 years water availability data certified by the CWC/State Water Resource Department for quantity of water that is received annually by the small stream on which lower reservoir is proposed to be constructed.
- v. The PP will submit a detailed plan and monitoring mechanism for releasing the self-catchment water of small stream draining in to river along with action plan for conservation and protection of other streams/rivulets draining in to upper and lower reservoirs.
- vi. Explore the possibilities for reducing the Forest land requirement.
- vii. Muck disposal site and other components such as Township, site office, Stacking area and batching plant shall be located outside the forest area.
- viii. Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is not falling in any Ecological Sensitive Area, Wildlife Sanctuary/Tiger/elephant corridor/Critically polluted area within 10 km of Project site.
- ix. Transportation Plan for transporting construction materials shall be submitted. Separate chapter for risk assessment of such transportation through/within proposed the Wildlife Sanctuary shall be included in the EIA report, if any.
- x. Environmental Cost Benefit Analysis shall be done in terms of loss of Forest ecosystem due to diversion of Forest land/loss of biodiversity, water availability, water uses for

generation of hydro power and Ecological flows.

- xi. The baseline data collection will cover the changes in biological and ecological profile of the region after monsoon with worst-case scenario study and critical mineral assessment.
- xii. Calculation and values of GHGs (CO<sub>2</sub>, CH<sub>4</sub> etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.
- xiii. The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report.
- xiv. Quantitative values of Impact modelling of environmental parameters shall be submitted for during construction and operation. Also, mitigation measures shall be submitted in terms of construction and operation phase.
- xv. Conducting site-specific ecological study emphasizing on riverine ecology viz. fishes diversity, fish migration, habitat and aquatic biota due to construction PSP. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
- xvi. Action plan for survival or diversion of the rivulets/stream, if any, leading to join river shall be submitted.
- xvii. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Specific ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all seasons.
- xviii. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.
- xix. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
- xx. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Indian Council of Agriculture Research (ICAR) Institutes/ Expert Govt. institutions and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.

- xxi. Details of mineral zone, if any, in the study area, certified by Geological Survey of India or any other concerned Government Organization shall be submitted. The project area should not come up on any critical mineral zone, the same shall to be verified by GSI/NMDC.
- xxii. Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI.
- xxiii. Combined Impact of projects proposed on carrying capacity and sustainability of the natural stream/Reservoir/ River /nala of catchment area due to tapping of water for filling reservoir shall be studied.
- xxiv. In view of the project's location in ecologically sensitive areas, an EAC Sub-Committee shall undertake a site visit prior to consideration of the proposal for grant of Environmental Clearance. The Project Proponent shall facilitate the said visit, and the proposal shall be considered for Environmental Clearance only after submission of the site visit report by the EAC Sub-Committee.

**[B] Socio-economic Study:**

- i. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.
- ii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. A comparative chart of issues raised by General Public during Public Hearing and commitments made by the Project Proponent will be prepared and submitted in the relevant chapter of EIA/EMP report.
- iii. The EIA/EMP shall include a detailed socio-economic assessment of the tribal population in the project-affected area based on primary data and community consultations. A Tribal Development Plan, prepared in consultation with the District Administration and Tribal Welfare Department, shall be submitted along with the EIA report.
- iv. PP shall submit the credible documents to show the status of land acquisition w.r.t project site from/through the concerned State Government as required under Ministry's OM dated 7<sup>th</sup> October, 2014 as amended, for the project land to be acquired.
- v. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land (if any) shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. Budget earmarked for R&R, CSR shall not

be included in the cost of EMP.

**[C] Muck Management:**

- i. Details of quantity of muck generation component wise, types of muck (Excavation in tunnels, pressure shaft and powerhouse etc.) and disposal site/ transportation to be provided.
- ii. Details of muck management such as dumping sites and its locations, transportation plan along with monitoring mechanism for muck transportation, detailing the road map of project construction site/ indicating the distances from HFL, river, project construction site along with types of road etc.
- iii. Safety measures for avoiding spill over muck into the riverbed/streams and its flow into the river during the high discharge/ flood or monsoon period. Prepare plan for stabilization of muck disposal sites using biological and engineering measures to ensure that muck does not roll down the slopes and shall be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area.
- iv. Restoration plan for construction area including dumping site of excavated materials by levelling, filling up of burrow pits, landscaping etc.

**[D] Disaster Management:**

- i. Impact of Project activities (specially blasting and drilling) on the aquatic and terrestrial ecosystem, within study area to be studied and be incorporated in EIA/EMP report.
- ii. The muck dumping sites shall be located with a distance of 100 mts from HFL. The PP shall submit the detailed action plan for transportation of muck along with monitoring mechanism of movement of muck carrying trucks.

**[E] Miscellaneous:**

- i. Both capital and recurring expenditure under EMP shall be submitted.
- ii. Pre-DPR Chapters viz., Hydrology, Layout Map and Power Potential Studies duly appraised by CWC/CEA shall be submitted.
- iii. The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.
- iv. Drone video of project site shall be recorded and to be submitted.

- v. Detailed plan to restore wider roads and convert them into narrow up to 10m after construction of the project.
- vi. Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pumped storage projects shall be used for preparation of EIA/ EMP reports.

#### **Agenda Item No. 54.4**

**Panari Pumped Storage Project (1800 MW) in an area of 581.68 Ha located at Sub District Majhgawan and Panna, District Satna and Panna, Madhya Pradesh by M/s Panari Energy Private Limited – Terms of References (TOR) – reg.**

**[Proposal No. IA/MP/RIV/577091/2026; F. No. J- 12011/05/2020-IA. I(R)]**

**54.4.1** The proposal is for grant of Terms of Reference (ToR) to the project Panari Pumped Storage Project (1800 MW) in an area of 581.68 Ha located at Sub District Majhgawan and Panna, District Satna and Panna, Madhya Pradesh by M/s Panari Energy Private Limited.

**54.4.2** The Project Proponent and the accredited Consultant M/s. R S Envirolink Technologies Pvt. Ltd, made a detailed presentation on the salient features of the project and informed that:

- i. Panari Standalone Pumped Storage Project (PSP) of 1800 MW / 11160 MWH storage capacity, located at Panna District, Madhya Pradesh. The Panari Standalone PSP will comprise of two reservoirs which are to be constructed newly. The Project will generate 1800 MW by utilizing a design discharge of 966.00 Cumec and rated head of 213.30m. The Panari Standalone PSP will utilize 4874.60 MU to pump 0.766 TMC of water to the upper reservoir in 7.1 hours.
- ii. The upper reservoir is proposed to be located on flat / gradually sloping land which is suitable for creating the desired gross storage capacity of 0.961 TMC. Out of 0.961 TMC, the live storage capacity is 0.766 TMC and the dead storage capacity is 0.195 TMC by keeping FRL & MDDL at EL 408.00m & EL 390.00m respectively.
- iii. Similarly, Panari PSP lower reservoir is proposed to be created in the existing seasonal tributary / nala (Baghain Nadi) by constructing a gravity dam across the nala with an average height of 12m ( maximum height of 25m) to retain the desired gross storage capacity of 1.188 TMC in which the live storage capacity is 0.949 TMC and dead storage capacity is 0.239 TMC by keeping FRL and MDDL at EL 185.00m & EL 170.00m respectively.
- iv. The project proposal was considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 31<sup>st</sup> EAC meeting held during 05.03.2020 and recommended for grant

of Terms of References (ToRs) for the Project. The ToR has been issued by Ministry vide letter No.J-12011/05/2020-IA-I ; date 13.04.2020.

- v. The geographical co-ordinate of the project is Upper reservoir is at Longitude 80°28'17.18" East and Latitude is 24°54'44.79" North and that of Lower reservoir is at longitude 80°29'42.95" East and latitude is 24°54'1.98" North.
- vi. The Panari Pumped Storage Project (1800 MW) envisages construction of:
- Geomembrane-faced rockfill and cement sand gravel dams, 21 m average and 42 m maximum height in the upper reservoir, and 12 m average and 25 m maximum height in the lower reservoir, will form the Panari Upper reservoir with 0.766 TMC and the Panari Lower reservoir with 0.949 TMC live storage.
  - 6 no. of upper Intake Structure
  - Six 1087 m long, 6.0 m dia steel-lined penstocks (862 m surface, 104 m vertical, 121 m horizontal) will feed five 300 MW units. One 1031 m long, 6.0 m diameter penstock (844 m surface, 144 m vertical, 83 m horizontal) will bifurcate near the powerhouse into two 46 m long, 4.2 m diameter branches to feed two 150 MW units.
  - A surface powerhouse will house five 300 MW and two 150 MW reversible Francis turbines (all fixed-speed), operating under a rated head of 213.30 m in generating mode and 223.90 m in pumping mode.
- vii. **Land requirement:** The total land requirement for proposed project is about 581.68 Ha; out of which 520.66 Ha is forest land and remaining 61.02 Ha is non-forest land.
- viii. **Demographic details in 10 km radius of project area:** The study area for the proposed project primarily covers Panna and Satna districts in Madhya Pradesh. Panna district, in the north-eastern part of the state under Sagar Division, covers 7,135 sq. km and is known for its diamond mines. It has a population of 1,016,520 (Census 2011) with 533,480 males and 483,040 females, a population density of 142 per sq. km, a sex ratio of 905, and a literacy rate of 64.79% (male 74.14%, female 54.44%). Scheduled castes and tribes constitute 20.46% and 16.81% of the population, respectively. Satna district, in the Rewa Division and covering 7,502 sq. km, is a major agricultural area and a leading center for bidi manufacturing, employing over 100,000 villagers, especially women. Its population is 2,228,935 (1,157,495 males, 1,071,440 females), with a density of 297 per sq. km, a sex ratio of 926, and a literacy rate of 72.26% (male 81.37%, female 62.45%). Scheduled castes and tribes account for 17.88% and 14.36% of Satna's population, respectively.
- ix. **Water requirement:** The water requirement for the project for initial filling (one-time) is about 39.16 Mm<sup>3</sup> (1.383 TMC) and the net annual evaporation losses will be around 20% of the live storage of the project i.e. 4.33 Mm<sup>3</sup> (0.153 TMC) will be recouped annually during monsoon period.

- x. **Project Cost:** The estimated project cost is Rs 10512.38 Cr. Total capital cost earmarked towards environmental management plan is Rs 1573.06 lakh and the Recurring cost (operation and maintenance) will be about Rs 4614.78 lakh.
- xi. **Project Benefit:**  
**Employment Generation:** Panari Standalone PSP is planned to be completed in 48 months. At peak construction, around 3600 persons may be engaged, out of which about 1200 will be from local population/surrounding villages and about 2400 will be skilled/semiskilled from other areas. All local persons will come from their homes. After commissioning, about 200 persons will be required, from local areas or migrated from other areas. The project would also create direct and indirect employment opportunities due to reliable power supply, contract works during construction and operation phase, etc.  
**Local Area Development** Total project cost is Rs. 10512.38 Crore (with IDC). An amount of Rs. 15.00 crore has been earmarked for local area development to improve quality of life of local residents, especially those whose land will be acquired. They will have opportunities of skill development, education, better medical and health care, improved local infrastructure, along with green belt development, restoration and greening of the project and surrounding area.
- xii. **Environmental Sensitive area:**  
The Forest land of proposed project area falls in the North-Eastern Tiger Corridor associated with the Panna Tiger Reserve. The nearest Protected Area is Panna Tiger Reserve. The nearest distance between the project component and the Buffer Zone of the Tiger Reserve is about 18.20 km and that of Core Zone of the Tiger Reserve is about 36.05 km. Application for Wildlife clearance vide proposal no. WL/MP/HYD/551887/2025 was submitted in September 2025 and under process.
- xiii. **MoU / any other clearance/ permission signed with State government:**  
MoU is entered with Madhya Pradesh state government on 24.02.2025.
- xiv. **Resettlement and rehabilitation:** All the landowners will be losing their partial agricultural land holding and none of the families will be losing any house or any other assets, and none of them is getting displaced due to the project. The project affects 4 villages and 81 families, and the status of Rehabilitation & Resettlement is yet to start. With reference to Section 2 and Part (a) of Sub-Section 3 of RFCTLARR Act, 2013, the provisions apply where a private company purchases land beyond prescribed limits through private negotiations. As per Rule 22 of the Madhya Pradesh Rules, 2015, the limits are 50 hectares in urban areas and 1000 hectares in rural areas. The total private land proposed to be purchased is about 61.02 hectares, which is within the prescribed limits, and the land does not involve any habitation; hence, provisions relating to Rehabilitation and Resettlement are not applicable for the proposed Project.
- xv. **Scheduled –I species:** As per Wildlife Protection Amendment Act, 2022, Tiger, Northern Red Muntjac, Sambhar, Indian Fox, Jackal, Common Leopard, Common Jungle cat,

Striped hyaena, Sloth Bear, Porcupine, Lesser Adjutant, Python and Bengal Monitor lizard are the species listed under Schedule-I.

xvi. **Alternative Studies:** Alternative-3 has been selected for the Panari Standalone Pumped Storage Project as it offers the most techno-economically suitable layout among the three alternatives. While the upper and lower reservoir locations remain almost the same for all options, Alternative-3 optimizes the size and shape of the reservoirs in alignment with the water conductor system and powerhouse. Alternative-1 was discarded due to excessive water and land requirements, and Alternative-2 was rejected because it requires a long approach channel and situates the powerhouse in a deep valley. In contrast, Alternative-3 minimizes land use, reducing about 19 Ha compared to Alternative-2 and nearly 40% overall, uses the shortest water conductor system, involves minimal forest land, and avoids major social and resettlement issues, making it the most practical and efficient choice.

xvii. **Baseline Environmental Scenario:**

The field surveys for the collection of primary data were initiated in December 2021-22 and were completed in July-August 2022, in accordance with the Terms of Reference (ToR) accorded by the EAC, MoEF&CC. A supplementary study was carried out during December 2025 - January 2026 for winter season. These surveys covered winter, pre-monsoon/summer, and monsoon seasons, focusing on the collection of data and information related to terrestrial ecology, physical and social environmental parameters.

Period	From December 2021 to January 2026				
AAQ parameters at 6 locations (min. & Max.)	Unit in $\mu\text{g}/\text{m}^3$				
	Core		Min	Max	Standards
	PM <sub>2.5</sub>		32.9	47	60
	PM <sub>10</sub>		14.5	23.7	100
	SO <sub>2</sub>		5.1	6.7	80
	NO <sub>2</sub>		5.6	8.1	80
	Buffer		Min	Max	
	PM <sub>2.5</sub>		25.9	47	60
	PM <sub>10</sub>		10.5	23.7	100
	SO <sub>2</sub>		4.2	6.7	80
	NO <sub>2</sub>		5.2	8.1	80
	Incremental GLC Level	<b>Core Zone</b>			
Criteria Pollutant [PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , Other parameters specific to the sector (Please specify)]		Unit [ $\mu\text{g}/\text{m}^3$ ]	Baseline Concentration [A]	Predicted incremental value considering worst case stability class [B]	Total GLC [A]+[B]
PM <sub>10</sub>		$\mu\text{g}/\text{m}^3$	19.10	14.33	33.425
PM <sub>2.5</sub>		$\mu\text{g}/\text{m}^3$	39.95	15.98	55.93
SO <sub>x</sub>		$\mu\text{g}/\text{m}^3$	5.90	5.90	11.8
NO <sub>x</sub>		$\mu\text{g}/\text{m}^3$	6.85	6.85	13.7
<b>Buffer Zone</b>					

	Criteria Pollutant [PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , Other parameters specific to the sector (Please specify)]	Unit [µg/m <sup>3</sup> ]	Baseline Concentration [A]	Predicted incremental value considering worst case stability class [B]	Total GLC [A]+[B]
	PM10	µg/m <sup>3</sup>	17.1	0	17.1
	PM2.5	µg/m <sup>3</sup>	36.45	0	36.5
	SOx	µg/m <sup>3</sup>	5.45	0	5.5
	NOx	µg/m <sup>3</sup>	6.65	0	6.7
<b>River water samples (03 samples)</b>	<b>Core Zone</b>				
	<b>S. No</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Standard s</b>
	1	pH	7.2	8	8.5
	2	Total Dissolved Solids, mg/L	253.	338	0
	3	Dissolved Oxygen (mg/l)	5.8	7.5	6
	4	Chloride (as Cl), mg/L	28	60	0
	5	Total Hardness (as CaCO <sub>3</sub> ), mg/L	187.	239.	0
	6	Biological Oxygen Demand (mg/l)	2.5	3.5	3.0
	7	Chemical Oxygen Demand (mg/l)	8	11.6	0
	8	Total Coliform (MPN/100 ml)	157	285	50
	<b>Buffer Zone</b>				
	<b>S. No</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Standard s</b>
	1	pH	7.3	7.8	8.5
	2	Total Dissolved Solids, mg/L	247	312	0
	3	Dissolved Oxygen (mg/l)	6.6	7.6	6
	4	Chloride (as Cl), mg/L	40	49	0
	5	Total Hardness (as CaCO <sub>3</sub> ), mg/L	209.	251.	0
	6	Biological Oxygen Demand (mg/l)	2.4	3	3.0
7	Chemical Oxygen Demand (mg/l)	7.7	9.8	0	
8	Total Coliform (MPN/100 ml)	210	300	50	
<b>Pond water samples</b>	-				
<b>Groundwat er water samples quality at 7 location</b>	<b>Core Zone</b>				
	<b>S. No.</b>	<b>Parameters</b>	<b>Mi</b>	<b>Max</b>	<b>Prescribed Limits</b>
	1	pH	7.2	7.9	6.5-8.5
	2	Total Dissolved Solids (mg/l)	156	741	500 200

	3	Chloride (as Cl) (mg/l)	20	86	250	1000		
	4	Total Hardness (as CaCO <sub>3</sub> ) (mg/l)	98.	242.	200	600		
	5	Fluoride (mg/l)	0.1	0.44	1.0	1.5		
<b>Buffer Zone</b>								
	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Prescribed Limits</b>			
	1	pH	7.1	7.8	6.5-8.5			
	2	Total Dissolved Solids (mg/l)	163	943	500	200		
	3	Chloride (as Cl) (mg/l)	29	110	250	100		
	4	Total Hardness (as CaCO <sub>3</sub> ) (mg/l)	114.	310.	200	600		
	5	Fluoride (mg/l)	0.22	0.7	1.0	1.5		
<b>Noise levels Leq (Day &amp; Night) at 6 locations</b>	<b>Noise Level</b>	<b>Zone</b>	<b>Leq Day dB(A)</b>		<b>Leq Night dB(A)</b>		<b>Prescribed Limits</b>	
			Fro	To	Fro	To	Day	Night
	Core	Residential	45.8	61.	35.4	47.	55	45
	Buffer	Residential	44.8	59	34.7	45.	55	45
<b>Soil Quality at 10 Locations</b>	<b>Core Zone</b>							
	<b>S. No.</b>	<b>Parameters</b>	<b>Min</b>	<b>Max</b>	<b>Prescribed Limits</b>			
	1	Calcium (mg/kg)	430	555	500			
	2	Magnesium (mg/kg)	258	331	500			
	3	Nitrogen (kg/ha)	260	300	500			
	4	Phosphorus (kg/ha)	13.4	19	50			
	5	Potassium (kg/ha)	190	264	500			
	6	Carbon (%)	0.63	0.83	1			
	7	Sodium Absorption Ratio	0.57	1.04	10			
	8	Salinity (ppt)	0	0	0.01			
	<b>Buffer Zone</b>							
	1	Calcium (mg/kg)	390	650	500			
	2	Magnesium (mg/kg)	234	387	500			
	3	Nitrogen (kg/ha)	220	337	500			
	4	Phosphorus (kg/ha)	12.2	29.5	50			
	5	Potassium (kg/ha)	150	286	500			
6	Carbon (%)	0.43	0.8	1				
7	Sodium Absorption Ratio	0.52	1.17	10				
8	Salinity (ppt)	0	0	0.01				

<b>Flora &amp; Fauna</b>	<p>Schedule-I species observed in the study area:</p> <p>As per Wildlife Protection Amendment Act, 2022, Tiger, Northern Red Muntjac, Sambhar, Indian Fox, Jackal, Common Leopard, Common Jungle cat, Striped hyaena, Sloth Bear, Porcupine, Lesser Adjutant, Python and Bengal Monitor lizard are the species listed under Schedule-I.</p>
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xviii. **Details of Solid waste/ Hazardous waste generation/ Muck and its management:**

The solid waste will be transported for disposal at the designated landfill sites. The bio-degradable portion of the solid waste would be disposed of by composting. Project will identify authorized vendors for recycling or disposal of Hazardous waste like used batteries, used oil and used oil filters. The total quantity of muck likely to be generated from excavation including construction of roads is about 11.19 Mcum. The entire excavated material, after the reutilization, is proposed to be dumped in two locations i.e, Muck disposal Site- 1 and Muck disposal Site -2 having area of 17.68 ha and 6.14 ha respectively.

xix. Public Hearing for the proposed project has been conducted by the State Pollution Control Board on May 19, 2023 in Panna and Satna districts of Madhya Pradesh. The main issues raised during the public hearing are related to Employment opportunities for local youth.

xx. Status of Litigation Pending against the proposal, if any: NA

xxi. The details of the project are as under: -

1		<b>NAME OF THE PROJECT</b>	<b>Panari Standalone Pumped Storage Project</b>
2		<b>Location</b>	
	a	Country	India
	b	State	Madhya Pradesh
	c	District	Panna
	d	Village near Powerhouse	Panari
3		<b>Geographical Co-Ordinates</b>	
	a	Upper Reservoir- (Now Proposed)	
		Latitude	24°54'44.79" N
		Longitude	80°28'17.18" E
	b	Lower Reservoir - (Now Proposed)	
		Latitude	24°54'1.98"N
		Longitude	80°29'42.95"E
4		<b>Access To Project Site</b>	
	a	Airport	Khajuraho Airport – 87.8 kms from project site

	b	Rail head	Khajuraho Railway Station, 84.8 kms from project site
	c	Road	SH 49
	d	Port	International Sea Ports (Haldia) Pvt. Ltd. 1100 kms from project site
5		<b>Project</b>	
	a	Type	Standalone Pumped Storage Project
	b	Storage Capacity	11160 MWH
	c	Rating	1800 MW
	d	Peak Operation Duration	6.2 Hours
6		<b>Upper Reservoir (newly proposed)</b>	
	a	Live Storage	0.766 TMC
	b	Dead Storage	0.195 TMC
	c	Gross Storage	0.961 TMC
7		<b>Upper Dam</b>	
	a	Top Bund Level (TBL)	EL +411.00 m
	b	Full Reservoir level (FRL)	EL +408.00 m
	c	Min. Draw Down Level (MDDL)	EL +390.00m
	d	Type of Dam	Geomembrane Faced Rockfill Embankment Dam (GFRD) & Cement Sand Gravel Dam (CSG)
	e	Max. Height of Rockfill Embankment	42 m
	f	Length of Embankment/Dam	3712 m
	g	Top width of Embankment/Dam	7.00 m
8		<b>Lower Reservoir (newly proposed)</b>	
	a	Live Storage	0.949 TMC
	b	Dead Storage	0.239 TMC
	c	Gross Storage	1.188 TMC
9		<b>Lower Dam</b>	
	a	Top Bund Level (TBL)	EL +188.00 m
	b	Full Reservoir level (FRL)	EL +185.00 m
	c	Min. Draw Down Level (MDDL)	EL +170.00m
	d	Type of Dam	Concrete Gravity Dam
	e	Max. Height of Dam	25.00 m
	f	Length of Dam	114.00 m
	g	No. of Spillway	7 no.
	h	No & size spillway Service Gates	7 no. & 7.5m (W) X 10.0 m(H) – vertical lift gates
	i	No. & size of Stoplogs	7 no. & 7.5m (W) X 10.0 m(H) – vertical lift gates
	j	Design Flood	5647 Cumec
10		<b>Diversion Tunnel</b>	

	a	No. & Shape of Tunnel	2 no. & Circular Shaped
	b	Dia. of Tunnel	10 m
	c	Average Length of each Tunnel	700 m
	d	Design flood	2193 Cumec
11		<b>Approach Channel</b>	
	a	Type & Shape	Concrete lined & Trapezoidal
	b	Length of channel	1197.00 m
	c	Bed width	80.0 m
12		<b>Intake Structure</b>	
	a	Type	Diffuser Type
	b	No. of Intakes	6 nos.
	c	Size of Each Intake	26.1 m (W) x 8.70 m (H) including piers
	d	Elevation of Intake centre line	EL 377.50 m
	e	Elevation of Intake bottom	EL 374.40 m
	f	Design Discharge of each Intake	161.00 Cumec
	g	Numbers & Size of Intake Service Gate	6 nos. of 4.70 m (W) x 6.00 m (H)
	h	Numbers & Size of Stoplog Gate	1 set of 4.70 m (W) x 6.00 m (H)
13		<b>Penstock /Pressure Shafts</b>	
	a	Type	Steel lined - circular
	b	Number of Penstock/Pressure Shaft	6 Nos. - where in 1 no. will be bifurcated to two smaller units & 5 No. will be connected to each larger unit
	c	Diameter of Penstock/Pressure Shaft	6.00 m
	d	Dia. Of Branch Pressure Shaft	4.20 m
	e	Length of Penstock/Pressure Shaft (Along Large Unit) - 6.00 m	1087.0 m Buried penstock – 862.00 m Vertical Pressure Shaft – 104.00 m Bottom Horizontal Pressure Shaft – 121.00 m
	e	Length of Penstock/Pressure Shaft (Along Small Unit) – 6.00 m	1031.0 m Buried penstock – 844.00 m Vertical Pressure Shaft – 104.00 m Bottom Horizontal Pressure Shaft – 83.00 m
	f	Length of each branch Pressure Shaft (Small Unit) – 4.20 m	46.00 m
	g	Design Discharge in branch Pressure Shaft	80.50 Cumec (Small Unit)
	h	Design Discharge of each Penstock/Pressure Shaft	161.00 Cumec (Large Unit)
	i	Velocity in the Penstock/Pressure Shaft	5.70 m/sec
	j	Velocity in Branch Penstock	5.81 m/s
14		<b>Powerhouse</b>	

	a	Type	Surface Powerhouse
	b	Centre line of Unit	EL 140.00 m
	c	Dimensions (Excluding Service bay)	195.00 m(L) x 25.50 m(W) x 51.10 m(H)
	d	Size of Service Bay	55.00 m(L) x 25.50 m(W)
	e	Service bay level	EL 154.30 m
15		<b>Tail Race Tunnel</b>	
	a	Type & Shape	Concrete Lined – Circular
	b	Number of Tunnels	7 Nos. (5 nos. for large units + 2nos. for smaller units)
	c	Dia. of Tunnel	7.20 m for larger unit & 5.10 m for smaller unit
	d	Length of the Tunnel	165 m
	e	Design Discharge	161.00 Cumec from each large unit and 80.50 Cumec from each smaller unit
	f	Velocity in Tunnel	3.95 m/s in Large Unit & 3.94 m/s in Small Unit
16		<b>Tailrace Outlet</b>	
	a	Type	Bellmouth Type
	b	No. of Outlet	7 Nos. (5 nos. for Large Units + 2 nos. for Smaller Units)
	c	Size of each outlet	22.80 m (W) x 9.20 m (H) including piers for larger units 20.32 m (W) x 7.00 m (H) including piers for smaller units
	d	Elevation of outlet center line	EL 158.60 m for larger units & EL 157.60 m for smaller units.
	e	Elevation of Outlet bottom	EL 155.00
	f	Tailrace outlet Service Gate	5 Nos. of 5.60 m (W) x 7.20 m (H) for larger units 2 Nos. of 4.00 m (W) x 5.10 m (H) for smaller units
	g	Tail Race outlet Stoplog Gate	1 set of 5.60 m (W) x 7.20 m (H) for larger units
			& 1 set of 4.00 m (W) x 5.10 m (H) for smaller unit
17		<b>Electro-mechanical Equipment</b>	
	a	Pump Turbine	Francis type, vertical shaft reversible - pump turbine
	b	Total No of units	7 nos. (5X300MW + 2X150MW)
	c	Total Design Discharge (Turbine Mode)	966.00 Cumec
	d	Rated Head in Turbine mode	213.30 m (for Large Unit) 211.70 m (for Smaller Unit)

17.1		<b>300MW Turbines</b>	
	a	Total No of units	5 Units (All Fixed Speed)
	b	Turbine Design Discharge	161.00 Cumec
	c	Rated Pump Discharge	138.70 Cumec
	d	Pump Capacity	330 MW
	e	Rated Generation Head	213.30 m
	f	Rated Pumping Head	223.90 m
	g	Size of MIV	4.40 m (Butterfly Valve)
	h	Speed of Machine	214.28 RPM
	<b>I</b>	<b>Generator-Motor</b>	
	a	Type	Three (3) phase, alternating current synchronous generator motor semi umbrella type with vertical shaft
	b	Number of units	5 Units (5 x 300MW)
	c	Rated Capacity	Generator – 300 MW Pump Input – 330 MW
	d	Rated Voltage	18.0 KV
	<b>II</b>	<b>Power Transformer</b>	
	a	Type	Three Single Phase Power transformers with On Load tap changer (OLTC)
	b	Number of units	16 Numbers (3 Numbers/Unit + 1 Spare limb) i.e. Three Single Phase, <b>18 KV/400KV</b> , each <b>123 MVA</b> rating power transformers.
	c	Rated Capacity of each unit	Single Phase, 18 KV/400 KV, 123 MVA
	d	Rated Voltage	Primary – 18 kV; Secondary - 400 kV adjustable
			range of the secondary voltage: - 10% to In 1.25% steps +10%
17.2		<b>150 MW Turbines</b>	
	a	Total No. of units	2 Units (All Fixed Speed)
	b	Turbine Design Discharge	80.50 Cumec
	c	Rated Pump Discharge	69.40 Cumec
	d	Pump Capacity	165 MW
	e	Rated Generation Head	211.70 m
	f	Rated Pumping Head	224.80 m
	g	Size of MIV	3.10 m $\phi$ (Butterfly Valve)
	h	Speed of Machine	300 RPM
	<b>I</b>	<b>Generator-Motor</b>	
	a	Type	Three (3) phase, alternating current synchronous generator motor semi umbrella type with vertical shaft.
	b	Number of units	2 Units (2X150MW)
	c		Generator – 150 MW;

		Rated Capacity	Pump Input – 165 MW
	d	Rated Voltage	18.0 KV
	<b>II</b>	<b>Power Transformer</b>	
	a	Type	Three Single-Phase Power transformers with <b>ON Load Tap Changer (OLTC)</b>
	b	Number of units	6 Nos. i.e., 3 nos. per unit +1no. Spare Total: 7 nos.
	c	Rated Capacity of each unit	Single Phase, 18 kV/400kV, 62 MVA
	d	Rated Voltage	Primary – 18 kV; Secondary - 400 kV adjustable range of the secondary voltage: - 10% to +10% in 1.25% steps.
18		<b>POWER EVACUATION</b>	
	a	Voltage Level (KV)	400 KV
	b	No. of Transmission Lines	One 400 KV transmission line with double circuit.
	c	Total Length	One 400 KV Double Circuit Transmission Line with Quad Moose Conductor of length <b>165 KMs (appx.)</b> from PSP will be connected to PowerGrid Orai <b>765/400 KV</b> Sub Station, Jalaun, Uttar Pradesh for evacuation of generated Power and for Supply of power during pumping mode.

xxii. The salient features of the project are as under: -

- **EAC Meeting Details:**

EAC meeting/s	54 <sup>th</sup> EAC meeting
Date of Meeting/s	08.05.2026
Date of earlier EAC meetings	31 <sup>st</sup> EAC meeting, dt 05.03.2020 (TOR)

- **Project details:**

Name of the Proposal	Panari Pumped Storage Project
Location (Including coordinates)	The proposed Panari Pumped Storage Project is located near Panari village, Tehsil Panna of District Panna and near Salikpur, Kaunhari, Pahauwa & Kathwaria villages of Majhgawan Tehsil, District Satna of Madhya Pradesh.

	The geographical co-ordinates of the proposed upper reservoir are at latitude 24°54'44.79" N and longitude is 80°28'17.18" E and that of lower reservoir are at 24°54'1.98"N and 80°29'42.95"E.
state issue involved	No
ic zone	Zone II

- Category details:**

Category of the project	1 (c)
Provisions	Standalone Pumped Storage Project
Capacity / Cultural command area (CCA)	1800 MW
Attracts the General Conditions (Yes/No)	Yes
Additional information (if any)	NA

- Electricity generation capacity:**

Powerhouse Installed Capacity	1800 MW
Generation of Electricity Annually	3869.70 MU
No. of Units	5 X 300MW + 2 X 150MW
Additional information (if any)	NA

- ToR/EC Details:**

Cost of project	10512.38 Crores
Total area of Project	581.68 Ha
Height of Dam from River Bed (EL)	Upper reservoir: Height of Embankment max-42 m & avg height-21 m  Lower reservoir: Height of Embankment max-25 m & avg height-12 m
Length of Tunnel/Channel	1197 m
Details of Submergence area	431.70 Ha
Types of Waste and quantity of generation during construction/ Operation	Major waste generation is muck from excavation. Total quantity of excavated material is worked out as 11.19 Mcum, in

	which 8.02 Mcum will be reutilized for construction.
E-Flows for the Project	NA
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin.  b) If not the E-Flows maintain criteria for sustaining river ecosystem.	NA
No. of trees/saplings proposed in view of 'Ek Ped Maa Ke Naam' campaign	500

- Muck Management Details:**

No. of proposed disposal area/(type of land-Forest/Pvt. land)	Two (Non-forest land), Muck Disposal Area I: 17.68 Ha & Muck Disposal Area II: 6.14 Ha, Capacity of 4.51 Mcum Ht- 26 m , Slope- 30o, Retaining wall Ht: 8 m
Muck Management Plan	The total quantity of muck generated is 11.19 Mcum, in which 8.02 Mcum of excavated muck is expected to be reutilized. The Rehabilitation plan of muck dumping site includes engineering and biological measures.
Monitoring mechanism for Muck Disposal	Properly and tightly covered Dumper trucks will be used

- Land Area Breakup:**

Private land	37.00 Ha
Government land	24.02 ha
Forest Land	520.66 Ha
Total Land	581.68 Ha
Submergence area/Reservoir area	433.7 Ha

Additional information (if any)	NA
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• **Presence of Environmentally Sensitive areas in the study area**

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate/ letter/Remarks
Reserve Forest/Protected Forest Land	Yes	<ul style="list-style-type: none"> <li>520.66 ha forest land will be diverted for the project. Application under consideration. Proposal No. FP/MP/HYD/IRRIG/421339/2023. Date of application: 08/03/2023.</li> <li>Since the project falls within the North-Eastern Tiger Corridor (Panna Tiger Corridor), NBWL recommendation required.</li> <li>Application for Wildlife clearance vide proposal no. WL/MP/HYD/551887/2025 was submitted in September 2025 and under process.</li> </ul>
National Park	No	
Wildlife Sanctuary	No	

• **Court case details: Nil**

• **Previous EC compliance and necessary approvals:**

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	NA
Status of Stage- I FC	Application under consideration Proposal No: FP/MP/HYD/IRRIG/421339/2023. Date of Application: 08/03/2023
Additional detail (If any)	NA
<b>Is FRA (2006) done for FC-I</b>	Yes

• **Miscellaneous**

Particulars	Details
Details of consultant	R S Envirolink Technologies Pvt. Ltd.

<p>Project Benefits</p>	<p><b>Employment Generation:</b> Panari Standalone PSP is planned to be completed in 48 months. At peak construction, around 3600 persons may be engaged, out of which about 1200 will be from local population/surrounding villages and about 2400 will be skilled/semiskilled from other areas. All local persons will come from their homes. After commissioning, about 200 persons will be required, from local areas or migrated from other areas. The project would also create direct and indirect employment opportunities due to reliable power supply, contract works during construction and operation phase, etc.</p> <p><b>Local Area Development</b> Total project cost is Rs. 10512.38 Crore (with IDC). An amount of Rs. 15.00 crore has been earmarked for local area development to improve quality of life of local residents, especially those whose land will be acquired. They will have opportunities of skill development, education, better medical and health care, improved local infrastructure, along with green belt development, restoration and greening of the project and surrounding area.</p>
<p>Status of other statutory clearances</p>	<ul style="list-style-type: none"> <li>• FC Application: Under Consideration. Application No: FP/MP/HYD/IRRIG/421339/2023. Date of Application: 08/03/2023</li> <li>• NBWL Application: Under Consideration. Application No: WL/MP/HYD/551887/2025 Date of application: 17/09/2025</li> </ul>
<p>R&amp;R details</p>	<p>All the land owners will be losing their partial agricultural land holding and none of the families will be losing any house or any other assets, and none of them is getting displaced due to the project. The project affects 4 villages and 81 families, and the status of Rehabilitation &amp; Resettlement is yet to start. With reference to Section 2 and Part (a) of Sub-Section 3 of RFCTLARR Act, 2013, the provisions apply where a private</p>

	company purchases land beyond prescribed limits through private negotiations. As per Rule 22 of the Madhya Pradesh Rules, 2015, the limits are 50 hectares in urban areas and 1000 hectares in rural areas. The total private land proposed to be purchased is about 61.02 hectares, which is within the prescribed limits, and the land does not involve any habitation; hence, provisions relating to Rehabilitation and Resettlement are not applicable for the proposed Project.
Additional detail (If any)	NA

#### 54.4.3 The EAC during deliberations noted the following:

- The Expert Appraisal Committee (EAC) deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of TOR for conducting EIA/EMP and Public hearing for Panari Pumped Storage Project (1800 MW) in an area of 581.68 Ha located at Sub District Majhgawan and Panna, District Satna and Panna, Madhya Pradesh by M/s Panari Energy Private Limited.
- The project/activity falls under Category A of item 1(c), 'River Valley Projects,' as per the Schedule of the Environmental Impact Assessment Notification, 2006, and requires appraisal at the Central level by the sectoral EAC in the Ministry.
- The EAC noted that earlier the Terms of Reference (TOR) for the Panari Pumped Storage Project (1800 MW) was issued by MoEF&CC vide letter dated 13.04.2020 in favour of Sri Siddharth Infratech & Services (I) Private Limited (SSISPL). Subsequently, the TOR was transferred vide letter dated 23.03.2026 in favour of Panari Energy Private Limited, a Special Purpose Vehicle (SPV) of Sri Siddharth Infratech & Services (I) Private Limited. As per provisions mentioned under MoEF&CC Gazette Notification S.O. 751 ( E) dated 17.02.2020 the validity of TOR for river valley and Hydro-electric project is 5 years. It was observed that the application for grant of EC was submitted on 10.04.2026 i.e. after expiry of validity of TOR; hence, the same was not accepted. Therefore, the present proposal for seeking a fresh TOR for the Panari Pumped Storage Project (1800 MW) has been submitted on 01.05.2026 and being considered in the present meeting.
- During the deliberations the committee noted that although the proposed Upper Reservoir to be located away from any riverine system but lower reservoir is proposed to be created in the existing seasonal tributary / nala (Baghain Nadi). Since the lower reservoir will be located on non-perennial nallah, the committee opined that the project shall be categorized as an open-loop project rather than a closed-loop PSP.

- The EAC noted that the total land required for the project components and related works has been estimated to be about 581.68 Ha; out of which 520.66 Ha is forest land and remaining 61.02 Ha is non-forest land. Diversion of forest land for non-forest purpose will be involved for construction of project components. However, it was observed that the application for Stage-I Forest Clearance (FC) has been submitted vide proposal no. FP/MP/HYD/IRRIG/421339 on March 08, 2023 for the diversion of 519.26 ha of forest land. Further, it was informed by the PP that Forest proposal was subsequently revised for diversion area of 520.66 ha due to changes in required forest land. The PP informed that the Advisory Committee (AC) discussed the Stage-I FC proposal in its meeting held on 27.02.2026 and EDS was raised by MOEF&CC and proposal is pending with the user agency for submission of EDS reply.
- The EAC noted that the land requirement proposed for various project components such as roads, stock yard, etc. appears to be on the higher side and may be optimized. In response, the PP submitted that necessary measures would be undertaken in this regard. The Committee opined that the PP shall optimize the land requirement to the extent feasible, and the revised details along with justification shall be incorporated in the EIA/EMP report.
- The EAC also noted that there is change in land from earlier ToR granted by the Ministry on 13.04.2020, accordingly a comparative assessment of land required for the project at different stage is mentioned as under:

Description	As per ToR	Draft EIA Report submitted for PH	Fresh proposal for TOR
Capacity (MW)		1800	
Forest (Ha)	1013.62	519.26	520.66
Non-Forest (Ha)	0	62.45	61.02
<b>Total (Ha)</b>	1013.62	581.71	581.68

- The EAC noted that the total water requirement for initial reservoir filling of the project has been estimated at approximately 39.16 MCM (0.766 TMC), which is a one-time requirement. The Committee further noted that the annual water requirement for replenishment of losses on account of evaporation, seepage, transit losses, etc., has been assessed at 4.33 MCM per annum. It was also observed that the proposed source of water for the project shall be Panari Nala (lower dam located across Baghain River), to be met from the self-catchment area.
- The EAC noted that the project falls within the NTCA-recognized North-Eastern Tiger Corridor linked with the Panna Tiger Reserve. The Committee further noted that the application for Wildlife Clearance has been submitted vide proposal No. WL/MP/HYD/551887/2025 in September, 2025, which has been recommended by the

State Board for Wildlife and is presently under consideration of the Standing Committee of the National Board for Wildlife.

- The Committee also observed that the Biodiversity Management and Wildlife Conservation Plan, with a total financial outlay of Rs. 413.58 lakh, has been duly approved by the Chief Wildlife Warden, Bhopal, vide letter dated 28.04.2025.
- The EAC observed that Memorandum of Understanding was signed between Government of Madhya Pradesh and Sri Siddharth Infratech & Services (I) Pvt. Ltd. through its SPV Panari Energy Pvt. Ltd. on February 24, 2025 for development of Panari Pumped Storage Project of capacity 1800 MW.

**54.4.4** The EAC based on the information submitted and as presented during the meeting, recommended the proposal for grant of Specific ToR issued by the Ministry for Open Loop Pumped Storage Projects vide OM dated 14.08.2023 for conducting EIA study with Public Consultation for proposed construction of the project for Panari Pumped Storage Project (1800 MW) in an area of 581.68 Ha located at Sub District Majhgawan and Panna, District Satna and Panna, Madhya Pradesh by M/s Panari Energy Private Limited, under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR:

**[A] Environmental Management and Biodiversity Conservation:**

- i. Impact of construction activities on natural streams/springs/aquifers shall be studied and accordingly conservation action plan shall be prepared in consultation with expert government research institute after detailed mapping of the study area.
- ii. A detailed action plan for large scale plantation of native species of plant sapling within 10 km radius of the project shall be prepared in consultation with State Forest Department. The monitoring mechanism to ensure the survival of saplings shall be finalized in consultation with ICFRE.
- iii. The PP will submit 10 years water availability data certified by the CWC/State Water Resource Department for quantity of water that is received annually by the small stream on which lower reservoir is proposed to be constructed.
- iv. The PP will submit a detailed plan and monitoring mechanism for releasing the self-catchment water of small stream draining in to river along with action plan for conservation and protection of other streams/rivulets draining in to upper and lower reservoirs.
- v. Explore the possibilities for reducing the Forest land requirement.
- vi. Muck disposal site and other components such as Township, site office, Stacking area and batching plant shall be located outside the forest area.

- vii. Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is not falling in any Ecological Sensitive Area, Wildlife Sanctuary/Tiger/elephant corridor/Critically polluted area within 10 km of Project site.
- viii. Transportation Plan for transporting construction materials shall be submitted. Separate chapter for risk assessment of such transportation through/within proposed the Wildlife Sanctuary shall be included in the EIA report, if any.
- ix. Environmental Cost Benefit Analysis shall be done in terms of loss of Forest ecosystem due to diversion of Forest land/loss of biodiversity, water availability, water uses for generation of hydro power and Ecological flows.
- x. The baseline data collection will cover the changes in biological and ecological profile of the region after monsoon with worst-case scenario study and critical mineral assessment.
- xi. Calculation and values of GHGs (CO<sub>2</sub>, CH<sub>4</sub> etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.
- xii. The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report.
- xiii. Quantitative values of Impact modelling of environmental parameters shall be submitted for during construction and operation. Also, mitigation measures shall be submitted in terms of construction and operation phase.
- xiv. Conducting site-specific ecological study emphasizing on riverine ecology viz. fishes diversity, fish migration, habitat and aquatic biota due to construction PSP. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
- xv. Action plan for survival or diversion of the rivulets/stream, if any, leading to join river shall be submitted.
- xvi. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Specific ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all seasons.
- xvii. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on

aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.

- xviii. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
- xix. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Indian Council of Agriculture Research (ICAR) Institutes/ Expert Govt. institutions and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.
- xx. Details of mineral zone, if any, in the study area, certified by Geological Survey of India or any other concerned Government Organization shall be submitted. The project area should not come up on any critical mineral zone, the same shall to be verified by GSI/NMDC.
- xxi. Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI.
- xxii. Combined Impact of projects proposed on carrying capacity and sustainability of the natural stream/Reservoir/ River /nala of catchment area due to tapping of water for filling reservoir shall be studied.

**[B] Socio-economic Study:**

- i. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.
- ii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. A comparative chart of issues raised by General Public during Public Hearing and commitments made by the Project Proponent will be prepared and submitted in the relevant chapter of EIA/EMP report.
- iii. The EIA/EMP shall include a detailed socio-economic assessment of the tribal population in the project-affected area based on primary data and community consultations. A Tribal Development Plan, prepared in consultation with the District Administration and Tribal Welfare Department, shall be submitted along with the EIA report.
- iv. PP shall submit the credible documents to show the status of land acquisition w.r.t project site from/through the concerned State Government as required under Ministry's OM dated 7<sup>th</sup> October, 2014 as amended, for the project land to be acquired.

- v. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land (if any) shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. Budget earmarked for R&R, CSR shall not be included in the cost of EMP.

**[C] Muck Management:**

- i. Details of quantity of muck generation component wise, types of muck (Excavation in tunnels, pressure shaft and powerhouse etc.) and disposal site/ transportation to be provided.
- ii. Details of muck management such as dumping sites and its locations, transportation plan along with monitoring mechanism for muck transportation, detailing the road map of project construction site/ indicating the distances from HFL, river, project construction site along with types of road etc.
- iii. Safety measures for avoiding spill over muck into the riverbed/streams and its flow into the river during the high discharge/ flood or monsoon period. Prepare plan for stabilization of muck disposal sites using biological and engineering measures to ensure that muck does not roll down the slopes and shall be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area.
- iv. Restoration plan for construction area including dumping site of excavated materials by levelling, filling up of burrow pits, landscaping etc.

**[D] Disaster Management:**

- i. Impact of Project activities (specially blasting and drilling) on the aquatic and terrestrial ecosystem, within study area to be studied and be incorporated in EIA/EMP report.
- ii. The muck dumping sites shall be located with a distance of 100 mts from HFL. The PP shall submit the detailed action plan for transportation of muck along with monitoring mechanism of movement of muck carrying trucks.

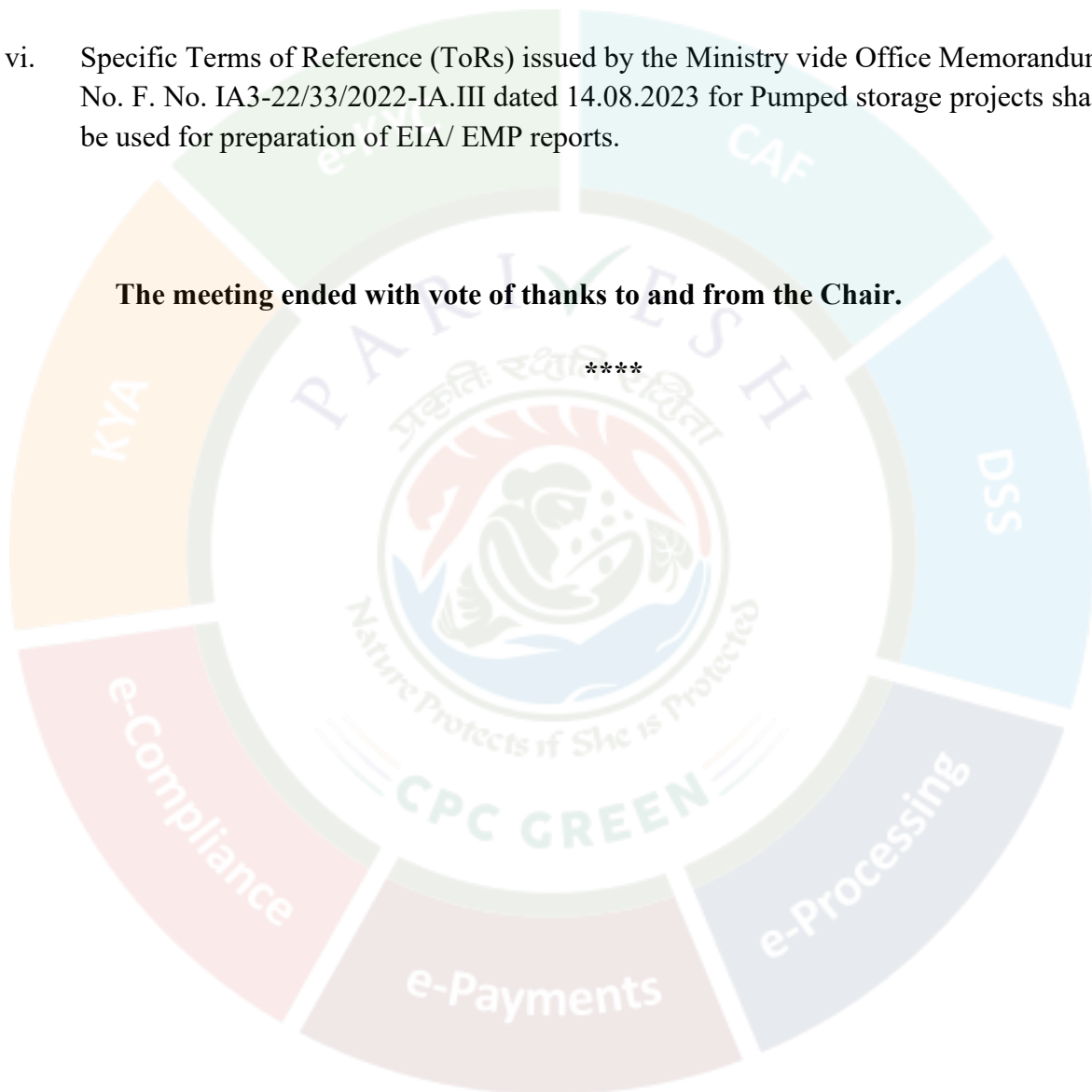
**[E] Miscellaneous:**

- i. Both capital and recurring expenditure under EMP shall be submitted.
- ii. Pre-DPR Chapters viz., Hydrology, Layout Map and Power Potential Studies duly appraised by CWC/CEA shall be submitted.
- iii. The PP should submit the photograph of monitoring stations & sampling locations. The

photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.

- iv. Drone video of project site shall be recorded and to be submitted.
- v. Detailed plan to restore wider roads and convert them into narrow up to 10m after construction of the project.
- vi. Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pumped storage projects shall be used for preparation of EIA/ EMP reports.

**The meeting ended with vote of thanks to and from the Chair.**



**ATTENDANCE**

S. No.	Name of Member	Role	Remarks
1.	Prof. Govind Chakrapani	Chairman	P
2.	Dr. Uday Kumar R Y	Member	P
3.	DR. J. V. Tyagi	Member	P
4.	Shri Ajay Kumar Lal	Member	P
5.	Shri Balram Kumar	Member Representative of Central Water Commission (CWC)	P
6.	Dr. Kartik Sapre	Member	P
7.	Shri Rakesh Goyal	Member Representative of Central Electricity Authority (CEA)	P
8.	Dr. J.A. Johnson	Representative of Wildlife Institute of India (WII)	P
9.	Dr. A. K. Sahoo	Representative of Central Inland Fisheries Research Institute (CIFRI),	A
10.	Shri Yogendra Pal Singh	Member Secretary	P

## APPROVAL OF THE CHAIRMAN

==== Forwarded message =====  
From: chakrapani govind <[chakrapani.govind@gmail.com](mailto:chakrapani.govind@gmail.com)>  
To: "Yogendra Pal Singh" <[yogendra78@nic.in](mailto:yogendra78@nic.in)>  
Cc: "govind chakrapani" <[govind.chakrapani@es.iitr.ac.in](mailto:govind.chakrapani@es.iitr.ac.in)>  
Date: Fri, 22 May 2026 12:19:23 +0530  
Subject: Re: Draft MOM of the 54th meeting of the EAC for River Valley & Hydroelectric Projects held on 8.05.2026-reg.  
==== Forwarded message =====

Approved.  
Chakrapani

On Fri, 22 May, 2026, 12:15 pm Yogendra Pal Singh, <[yogendra78@nic.in](mailto:yogendra78@nic.in)> wrote:

Sir,

The draft MOM of the 54th meeting of the EAC for River Valley & Hydroelectric Projects held on 8.05.2026, were circulated to all EAC Members. No comments received so far. Accordingly, the draft MoM attached herewith for Approval please.

With Regards,

**Yogendra Pal Singh**  
**Scientist 'F'**  
**Government of India**  
M/o Environment, Forest and Climate Change  
Room No. 236, 2nd Floor, Vayu Wing  
Indira Paryavaran Bhawan  
Jor Bagh, New Delhi-110003  
Tele-fax: 011-20819364

