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

Minutes of AGENDA FOR 15TH MEETING OF EXPERT APPRAISAL COMMI TTEE OF meeting River Valley and Hydroelectric Projects held from 13/09/2024 to 13/09/2024 **Date:** 26/09/2024

MoM ID: EC/MOM/EAC/110072/9/2024

Agenda ID: EC/AGENDA/EAC/110072/9/2024

Meeting Venue: N/A

Meeting Mode: Virtual

Date & Time:

13/09/2024	10:30 AM	05:30 PM

1. Opening remarks

The 15th 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 through Virtual mode, under the Chairmanship of Prof. G. J. Chakrapani.

2. Confirmation of the minutes of previous meeting

Confirmation of the Minutes of the 14th EAC meeting:

The Minutes of the Meeting held on 14th EAC meeting on 30th August, 2024 – 31st August, 2024 were confirmed with following corrections:

Correction in the Minutes of the 13th EAC meeting:

The Member Secretary informed the EAC that an agenda item (no 13.4) was deliberated in the 13th EAC meeting held on 12.08.2024 related to the proposal [vide Proposal No. IA/RJ/RIV/416873/2023] for grant of Environmental Clearance (EC) for construction of Shahpur Pumped Storage Project (2520 MW) in an area of 624.1702 Ha located at Kaloni, Baint and Mungawali villages, Shahabad Tehsil, District Baran, (Rajasthan) by M/s Greenko Energies Private Limited. The EAC recommended the proposal for grant of Environmental Clearance with suitable environmental safeguards. The PP has represented thereafter that capacity of the project got mentioned as 2520 MW instead of 1800 MW at para 13.4.1, 13.4.4 and 13.4.5. in the Minutes of the said EAC meeting.

The EAC after verifying the records and examination of the Minutes of the 13th EAC meeting held on 12.08.2024 agreed to correct the minutes of the aforesaid meeting to the extent that the capacity of the Shahpur Pumped Storage Project shall be read as 1800 MW.

3. Details of proposals considered by the committee

Day 1 -13/09/2024

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Pawana Falyan Pumped Storage Project by **AVAADA HYDROPOWER BATTERY PRIVATE LIMITED** located at **PUNE,MAHARASHTRA**			
Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/MH/RIV/470300/2024	J-12011/12/2024-IA-I(R)	27/08/2024	River Valley/Irrigation projects (1(c))

3.1.2. Project Salient Features

15.1.1: The proposal is for grant of Terms of Reference (ToR) to the project for Pawana Falyan Close Loop Pumped Storage Project (1500 MW) in an area of 204Ha in Village Kurvande and Falyan, Sub District Mawal and Sudhagad, District Pune and Raigad, Maharashtra by M/s Avaada Hydropower Battery Private Limited.

15.1.2: 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. Pawana Falyan Project (Pawana Falyan PSP) is a pumped storage scheme with an installed capacity of 1500 MW. The scheme of operation considered for the project is daily regulation to meet the demand of about 6 hours of peak power daily. Off-peak pumping hours are considered as 6 hrs 50 mins daily. The Pawana Falyan Pumped Storage Project envisages construction of two artificial reservoirs near Kurvande & Falyan villages in Pune and Raigad Districts of Maharashtra.

ii. The proposed upper reservoir is located at Kurvande village, Mawal taluka of Pune district, having geographical latitude 18°42'13.1" N and longitude 73°23'39.2"E. Whereas, the proposed lower reservoir is located at Falyan village, Sudhagad tehsil of Raigad district, having geographical latitude 18°41'37.6"N and longitude 73°21'46.7"E.

iii. The total land required for the project components and related works has been estimated to be about 204 Hectares. Out of which around 63% is forest land and 37% of non-forest land. In addition to the above, for transmission line right of way (RoW) to be taken based on the land use pattern, which will be explored further in the DPR stage. Any impacts on biodiversity due to development of proposed PSP shall be studied as part of EIA studies.

iv. The estimated project cost is Rs 6091 crore including IDC. As a preliminary estimate, a construction period of 36 months from the date of award of civil works package has been estimated for this project.

v. This PSP envisages to utilize the available head between proposed upper and lower dams situated in the Western Ghat mountain ranges and envisages an annual utilization of about 1.41 Mm3 towards recuperation of evaporation losses in Amba river basin.

vi. Demographic details in 10 km radius of project :

The proposed Pawana Falyan Pumped Storage impact area i.e. the project area and immediate surrounding area of its components like proposed upper and lower reservoir, pump house, water conductive system, pumping alignment etc. falling under Mawal tehsil in Pune district and Sudhagad tehsil in Raigad district. The proposed upper reservoir is located at Kurvande village, Mawal tehsil/taluka of Pune district. Whereas, the proposed lower reservoir is located at Falyan

village, Sudhagad tehsil/taluka of Raigad district

The table below presents the list of villages according to their proximity to the project area components.

Proposed Upper Reservoir Surrounding Villages Name		**Proposed Lower Reservoir Surrounding villages Name**	
District: Pune		**District: Raigad**	
Tehsil	**Village Name**	**Tehsil**	**Village Name**
Mawal	Kurvande	Sudhagad	Wave T. Asare
		Sudhagad	Mangaon Bk
		Sudhagad	Falyan
		Sudhagad	Bheliv
		Sudhagad	Mangaon Kh

Demographic Profile of the Project Area Villages

As per Mission Antyodaya 2020, the total population of the project area villages is 5225 of which 2672 (51.13%) are males and 2553 (48.86%) are females. The number of houses is 1142 and on an average 4 to 5 persons live in each house. Sex ratio was found to be 955 females per 1000 males. The table below provides the village wise demographic details.

The total population of Schedule Tribes in the project area is 18.57%, while the total population of Schedule Castes is 13.52%.

Demographic Profile of the Villages

Village Name	**No_ H.H**	**TOT_P**	**TOT_M**	**TOT_F**	**P_SC%**	**P_ST%**
Kurvande	755	3637	1815	1822	25.98	7.04
Wave T. Asare	58	266	132	134	0	40.09
Mangaon Bk	74	275	150	125	0	15.98
Falyan	92	397	210	187	0	47.42
Village Name	**No_ H.H**	**TOT_P**	**TOT_M**	**TOT_F**	**P_SC%**	**P_ST%**
Bheliv	75	320	180	140	0	25.52
Mangaon Kh	88	330	185	145	2.69	21.56
Total	**1142**	**5225**	**2672**	**2553**	**18.57**	**13.52**

(Source Mission Antyodaya 2020 and Census of India 2011)

(*No_HH-Total House Hold, TOP_P-Total Population, TOT_M-Total Male, TOT_F-Total Female, P_SC- Scheduled Caste population, P_ST-Scheduled Tribe Population)*

Occupation Profile of the Project Area Villages

In the villages falling within the project area, 35.87% of the total population is working population and 64.12% is non-working population indicating that the non-working population is relatively high in the project area. Out of the total working population, 93.48% are main workers and 6.51% are marginal workers.

Table: Occupation Profile of the Villages

Village Name	Total Worker (In %)	Main Worker (In %)	Marginal Worker (In %)	Non Worker (In %)
Kurvande	31.45	91.78	8.22	68.55
Wave T. Asare	27.59	98.44	1.56	72.41
Mangaon Bk	29.29	98.99	1.01	70.71
Falyan	63.23	89.80	10.20	36.77
Bheliv	62.94	97.78	2.22	37.06
Mangaon Kh	47.90	100.00	0	52.10
Total	**35.87**	**93.48**	**6.51**	**64.12**

(Source: Census of India 2011)

vii. Water requirement: Pawana Falyan PSP (1500 MW) will require 12.08 MCM for initial reservoir filling and thereafter ~ 1.41 MCM per year will be required on annual basis from Pawana Lake for restoring the storage capacity lost due to evaporation. It is proposed to utilize the water from Pawana Lake for initial filling.

viii. Project Cost: The estimated project cost is Rs 6091.0 crore. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

ix. Project Benefit: Total Employment will be 1200 persons as direct & 200 persons indirect after expansion.

x. Environmental Sensitive area: Sudhagarh WLS is located about 9.4 Km, Wildlife Clearance is application for the proposed project. River/ water body, Uttara River is flowing at the aerial distance of 0 km in east to west direction.

xi. MoU signed with State Government on 12-08-2024.

xii. Alternative Studies: 3 alternative layouts have been prepared and compared for development of PSP.

Different locations of upper and lower reservoirs have been studied around the selected project site area with availability of maximum head and keeping away from Eco-Sensitive Zone.

Various levels of FRL & MDDL have been studied for the selected upper reservoir and lower reservoir sites. The finalised parameters of all the four alternative schemes are shown in Table below.

Table Broad Features of Various Alternatives considered

S. No	Alternative	Reservoir	FRL (m)	MDDL (m)	Gross Head (m)	Minimum Available Head (m)	*L/H Ratio	Installed Capacity (MW)	Type of Power house
1	ALT-1	Upper	EL810.00m	EL 789.00 m	713.0m	686.0m	4.40	1500 MW	Pit-type Surface
		Lower	EL 124.00m	EL 97.00 m					
2	ALT-2	Upper	EL 662.30m	EL 643.30 m	565.0m	545.0m	4	1500MW	Underground
		Lower	EL 117.20m	EL 97.20 m					
3	ALT-3	Upper	EL 655.00m	EL 636.00 m	597.50 m	577.50 m	5.20	1500 MW	Pit-type Surface
		Lower	EL 77.50m	EL 57.50m					

*L = Length of water conductor system up to Powerhouse Start & H = Minimum available Head in m

Alternative Layouts considering Major Planning Aspects

The major aspects for the project planning for the selected three (3) alternate layouts are brought out in Table 1below.

Major Aspects	ALT-1	ALT-2	ALT-3
Availability of Gross Head	713.0m	565.0m	597.50m
Available Net Head	686.0m	545.0m	577.50m
Favourable Geological Condition	Favors	Favors	Favors
Tentative Land Acquisition area for Proposed Project Components only (Upper, Lower & WCS)	151 Ha	170 Ha	168 Ha
Submergence Area in Upper Reservoir (Houses/Agricultural land	0 Ha	0 Ha	0 Ha

s)			
Submergence Area in Lower Reservoir (Houses/Agricultural lands)	0 Ha	0 Ha	0 Ha
R&R Issues	Less	Major	Major
Forest Land % in total area (in Ha)	100%	100%	100%
L/H Ratio	4.40	4.15	5.20
Requirement of U/s Surge	No	No	No
Type of Powerhouse	Pit-type Surface	Pit-type Surface	Underground
Requirement of D/s Surge Cavern	No	No	Yes
Installed Capacity	1500 MW	1500 MW	1500 MW
Accessibility and ease of construction	Less Difficult	Moderately Difficult	Moderately Difficult
Total Length of Dam (Upper Dam & Lower Dam)	~2.65km	~2.5km	~2.5km
Length of WCS	~3.2km	~4.0km	~3.5km
Tentative Construction Period (months excluding pre-construction activities	36 months	42 months	42 months
Total Hard Cost of the Project (in Crore)	5427	5988	6146

From the above major aspects, Alternative-1 project layout is the most techno-economically feasible one for the proposed 1500MW Pawana Falyan Pumped Storage Hydro Project and selected for further studies and development.

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

xiv. The salient features of the project are as follows: -

Name of the Proposal	Pawana Falyan Pumped Storage Project

Location (Including coordinates)	Lower Reservoir : 73°21'46.7"E; 18°41'37.6"N Upper Reservoir : 73°23'29.2”E; 18°42'13.1"N
Inter- state issue involved	No
Seismic zone	Zone-III

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

Powerhouse Installed Capacity	1500 MW
Generation of Electricity Annually	3121 MU
No. of Units	5 nos. (5X3000 MW)
Additional information (if any)	Nil

Cost of project	6091.0 Cr.
Total area of Project	204.0 Ha
Height of Dam from River Bed (EL)	Lower Dam – 39.0 m Upper Dam –20.0 m
Length of Tunnel/Channel	3200.0 m
Details of Submergence area	133.10 Ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	Not Applicable, as this is Off-Stream Closed Loop Pumped Storage Project (PSP)
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then If not the E-Flows maintain criteria for sustaining river ecosystem.	No

No. of proposed disposal area/ (type of land- Forest/Pvt. land)	20.0 Ha Non-Forest Land

Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

Private Land	75.0 Ha
Government land/Forest Land	129.0 Ha
Submergence area/Reservoir area	133.10 Ha
Land required for project components	204.00 Ha
Additional information (if any)	Nil

Forest Land/ Protected Area/ Environmental Sensitivity Zone	**Yes/No**	**Details of Certificate / letter/ Remarks**
Reserve Forest/Protected Forest Land	--	Distance from nearest protected area (Sudhagarh WLS) is 9.4 Km, Wildlife Clearance is applicable.
National Park	--- --	
Wildlife Sanctuary	--- --	

Court Case	Nil
Additional information (if any)	Nil

Affidavit/Undertaking	Enclosed
Additional information (if any)	Nil

Particulars	**Letter no. and date**
Certified EC compliance report (if applicable)	Not Applicable
Status of Stage- I FC	Yet to Apply
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Yet to Apply

Particulars	**Details**
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (NABET Accredited Consultant Organization) Certificate No : NABET/EIA/2225/RA0274 Validity : August 15, 2025 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, Sect or 43, Gurugram, Haryana - 122009 E-mail : ravi@rstechnologies.co.in Land Line : (0124) 4295383 Cellular : (+91) 9810136853
Project Benefits	o Least expensive source of electricity, not requiri ng fossil fuel for generation o An emission-free renewable source o Balancing grid for demand driven variations o Balancing generation driven variations o Voltage support and grid stability Apart from this, proposed PSP will also benefit the lo cal community by creating employment opportunities and will result in upliftment of livelihood and socio-e conomic conditions.
Status of other statutory clearances	Forest Clearance - Online application seeking forest di version for around 129.0 Ha after receipt of ToR Appr oval, alongwith other statutory clearances (as applicab le) from State as well as Central government will be o btained post completion of Detailed Project Report.
R&R details	Details shall be evaluated during EIA/EMP Studies
Additional detail (If any)	Nil

3.1.3. Deliberations by the committee in previous meetings

N/A

3.1.4. Deliberations by the EAC in current meetings

15.1.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, KML file, etc.) and presented during the meeting. It was observed that the proposal seeks the grant of Terms of Reference (ToR) for the Pawana Falyan Close Loop Pumped Storage Project (1500 MW), covering an area of 204 hectares in the villages of Kurvande and Falyan, Sub-Districts Mawal and Sudhagad, Districts Pune and Raigad, Maharashtra, by M/s Avaada Hydropower Battery 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.

During the discussion, it was noted that the project site is located in the Western Ghats. The EAC also emphasized the need for a study focusing on the worst-case scenario, critical mineral assessment, and a comprehensive risk analysis. The EAC also noted that the PFR submitted by the project proponent is for open loop PSP whereas during the presentation it was observed that the project is a closed loop category PSP. Also, water requirement in the PFR is different from what it has been presented during the meeting.

The total land requirement for the project is 204 hectares, out of which 129 hectares are forest land and 75 hectares are non-forest land. It was noted that the application for Stage-I Forest Clearance is yet to be submitted.

Additionally, the Project Proponent has provided a Memorandum of Understanding (MoU) dated 12/08/2024, signed between the Government of Maharashtra and M/s Avaada Hydropower Battery Private Limited, granting in-principle approval for the establishment of the Pumped Storage Project with a capacity of 1500 MW in Village Kurvande, District Pune.

3.1.5. Recommendation of EAC

Recommended

3.1.6. Details of Terms of Reference

3.1.6.1. Specific

Environmental Management and Biodiversity Conservation	
1.	Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 129 Ha of forest land involved in the project shall be submitted.
2.	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.
3.	PP shall submit the detailed plan for filling the reservoir for generating envisaged capacity with excess monsoon water only.
4.	Transportation Plan for transporting construction materials shall be submitted. Separate chapter for risk assessment of such transportation through/within the Wildlife Sanctuary shall be included in the EIA report.
5.	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.
6.	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.
7.	Calculation and values of GHGs (CO2, CH4 etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.
8.	The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report. Presence of any critical mineral zone in the proposed area be clarified from GSI.
9.	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.
10.	Conducting site specific ecological study with respect to riverine ecology focus on 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.
11.	Cumulative Impact of projects on carrying capacity and sustainability of Reservoir/ River /nala of catchment area / due to tapping of water for filling reservoir.

12.	Action plan for survival or diversion of the rivulets/stream leading to join river shall be submitted.
13.	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 three seasons.
14.	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.
15.	Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
16.	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.
17.	The project area should not come up on any critical mineral zone to be verified by GSI/NMDC.
18.	Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI. No mineral zone on the proposed site be certified by Geological Survey of India or any other concerned Government Organization.
19.	The Sub-committee shall conduct site visit before the grant of Environmental Clearance for stipulating specific environmental conditions.
Socio-economic Study	
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. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.
3.	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 7th October, 2014 for the project land to be acquired.
4.	Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
5.	Budget earmarked for R&R, CSR shall not include in the cost of EMP and compliance of issues raised during Public Hearing.
Muck Management/ Disaster Management	
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.
Disaster Management	
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.	PP shall submit the proposal of EAC and seek approval of CEA/CWC for DPR, with a distance of 100 mts from HFL to avoid future damage due to flood. The data and distance of HFL shall be certified by concerned State Government and shall be submitting grant submitting the proposal of grant of EC.
Miscellaneous	
1.	Both capital and recurring expenditure under EMP shall be submitted.
2.	Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved 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 submit.
5.	Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.
6.	Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.
7.	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.
8.	As per Ministry's OM dated 1st 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 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.

9.	Detailed report on cumulative effect of multiple projects already proposed within the region on the same source.

3.1.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Scope of EIA Study	
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.
Details of the Project and Site	
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
Description of Environment and Baseline Data	
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.
Details of the Methology	
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.
Methodology for Collection of Biodiversity Data	
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).
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follow s:	
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 (SO2) and Oxides of Nitrogen (NOX) 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, NO2, PO4, CI, SO4, 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 km2 year-1.
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.
3	Sedimentation data available with CWC may be used to find out the loss in storage over the years.

0.	
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.
36.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).
37.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
38.	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.
39.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
40.	Economically important species like medicinal plants, timber, fuel wood etc.
41.	Details of endemic species found in the project area.
42.	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.
43.	Cropping pattern and Horticultural Practices in the study area.
44.	null
45.	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.
46.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
47.	Information (authenticated) on Avi-fauna and wildlife in the study area.

48.	Status of avifauna their resident/ migratory/ passage migrants etc.
49.	Documentation of butterflies, if any, found in the area.
50.	Details of endemic species found in the project area.
51.	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.
52.	Existence of barriers and corridors, if any, for wild animals.
53.	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.
54.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
55.	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.
56.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.
57.	Fish and fisheries, their migration and breeding grounds.
58.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
59.	Conservation status of aquatic fauna.
60.	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.
61.	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.
62.	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.
63.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
64.	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.
65.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.

66.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
67.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
68.	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.
69.	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.
23.	Impact on fish migration and habitat degradation due to decreased flow of water
24.	Impact on breeding and nesting grounds of animals and fish.
25.	Impact on local community including demographic profile.
26.	Impact on socio-economic status
27.	Impact on economic status.
28.	Impact on human health due to water / vector borne disease
29.	Impact on increase traffic
30.	Impact on Holy Places and Tourism
31.	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.
32.	Positive and negative impacts likely to be accrued due to the project are listed.
Environmental Management Plan	
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. Deatailed 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.
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.
14.	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.
15.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Pancahayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
16.	Labour Management Plan for their Health and Safety.
17.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
18.	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.
19.	Environmental safeguards during construction activities including Road Construction.
20.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
21.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

3.2. Agenda Item No 2:

3.2.1. Details of the proposal

Rangit-II Hydro Electric Project by **SIKKIM HYDRO POWER VENTURES LIMITED** located at **WEST DIST RICT,SIKKIM**			
Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/SK/RIV/493596/2024	J-12011/6/2009-IA.I(R)	27/08/2024	River Valley/Irrigation projects (1(c))

3.2.2. Project Salient Features

15.2.1: The proposal is for grant of Terms of Reference (ToR) for the project Rangit-II Hydro Electric Project (66 MW) in an area of 33.294 in village Bangten, Barnyak, Barphok and Barthang etc. sub district Gyalshing, Soreng and Ravong, district West District, Sikkim by M/s Sikkim Hydro Power Ventures Ltd.

15.2.2: 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. The Sikkim Hydro Power Ventures Limited envisages construction of Rangit-II Hydro Power Project in Gyalshing district of Sikkim.

ii. Sikkim Hydro Power Ventures Limited ('SHPVL') is a Special Purpose Vehicle (SPV) incorporated by AJR Infra and Tolling Ltd. ("AJR Infra") (formerly known as Gammon Infrastructure Projects Limited) entered into an agreement with Government of Sikkim (GOS) on 08/12/2005 for the development of 66 MW Rangit II Hydro Electric Power Project at West Sikkim on Build Own Operate and Transfer (BOOT) basis for the concession period of 35 years post COD.

iii. It is trans-basin Run of the River Project utilizing waters of Rimbi Khola and exploiting the head difference of about 630m between two sub-basins (Rimbi & Kalej Khola) of major

iv. The geographical co-ordinate of the project are:
Dam Site: 88°10'27.77"E "; 27°18'47.44"N
Power house Site: 88°13'30.9"E; 27°16'17.8"N

v. Environment clearance was issued to project on 10.06.2009 and after forest diversion and acquisition of land, project construction work started in 2012, however, when EC lapsed in 2019 about 18% of the work got completed. To re-start the construction work, denovo EC is applicable.

vi. **Land requirement:**
Forest Land : 5.314 ha
Non-forest Land : 27.980 ha
Total Land : 33.294 Ha

vii. Demographic details in 10 km radius of project area:
The proposed Rangit II Hydro Electric Project impact area i.e. the project area and immediate surrounding area of its components like dam area, Head Race Tunnel (HRT), Dumping area, Power house area etc. falling under Gyalshing sub-district in Gyalshing district of Sikkim.
There are 16 villages located in and around the project area. The list of these villages is given in the table below.

Villages within the Project Area

SI. No	District	Sub-District	Village Name
1	Gyalshing	Gyalshing	Darap
2	Gyalshing	Gyalshing	Gyalshing
3	Gyalshing	Gyalshing	Kyonsda
4	Gyalshing	Gyalshing	Yangthang
5	Gyalshing	Gyalshing	Tikjya
6	Gyalshing	Gyalshing	Lingchom
7	Gyalshing	Gyalshing	Sardong
8	Gyalshing	Gyalshing	Lungzik
9	Gyalshing	Gyalshing	Sapong
10	Gyalshing	Gyalshing	Bangten

11	Gyalshing	Gyalshing	Srinagi
12	Gyalshing	Gyalshing	Pecherek
13	Gyalshing	Gyalshing	Martam
14	Gyalshing	Gyalshing	Barnyak
15	Gyalshing	Gyalshing	Barthang
16	Gyalshing	Gyalshing	Barphok

Demographic Profile of the Project Area

As per Mission Antyodaya 2020, the total population in the village is 21179 of which 10620 (50.14%) are males and 10559 (49.85%) are females. The number of households is 4617 and on an average 4 to 5 persons live in each household. Sex ratio was found to be 994 females per 1000 males. The table below provides village-wise demographic details.

The percentage of Scheduled Caste in the total population is 5.73%, while the percentage of ***Scheduled Tribe*** is ***38.12%***. Notably, Village ***Darap*** has a significantly higher ST population percentage with 76.02%, while Village **Tikjya** has a substantial ST population with 67.80%.

Demographic Profile of the Project Area:

VillageName	**No_H.H**	**TOT_P**	**TOT_M**	**TOT_F**	**P_SC%**	**P_ST%**
Darap	398	1758	898	860	2.24	76.02
Gyalshing	76	380	184	196	5.04	7.68
Kyonsda	291	1428	723	705	1.25	20.68
Ya	407	1691	811	880	7.61	39.65

Village Name	No_H.H	TOT_P	TOT_M	TOT_F	P_SC%	P_ST%
ngthang						
Tikjya	282	1188	591	597	1.74	67.80
Lingchom	489	2083	1067	1016	3.43	39.46
Sardong	201	968	484	484	5.36	47.19
Lungzik	201	979	503	476	6.73	33.53
Sapong	160	712	355	357	5.16	37.80
B	14	72	36	36	9.5	24.

Village Name	No_H.H	TOT_P	TOT_M	TOT_F	P_SC%	P_ST%
angtgen	7	5	5	0	1	22
Srinagi	164	674	335	339	0.00	5.47
Pechereek	251	1206	621	585	2.24	38.81
Martam	493	2434	1208	1226	6.47	39.23
Barnyak	314	1590	794	796	10.55	38.14
Barthang	338	1596	757	839	2.64	25.25
Barpho	405	1767	924	843	9.17	22.98

Village Name	No_H.H	TOT_P	TOT_M	TOT_F	P_SC%	P_ST%
k						
Total	**4617**	**21179**	**10620**	**10559**	**5.73**	**38.12**

(Source Mission Antyodaya 2020 and Census of India 2011)
(*No_HH-Total House Hold, TOP_P-Total Population, TOT_M-Total Male, TOT_F-Total Female, P_SC-Scheduled Caste population, P_ST-Scheduled Tribe Population)*

Occupation Profile of the project Area: The villages falling in the project area have 58.71% of the total population as working population and 41.28% as non-working population. Out of the total working population, 68.95% are main workers and 31.04% are marginal workers.

Table: Occupation Profile of the Project Area

Village Name	Total Worker (In %)	Main Worker (In %)	Marginal Worker (In %)	Non-Worker (In %)
Darap	49.23	54.55	45.45	50.77
Gyalshing	39.91	77.47	22.53	60.09
Kyonsda	65.24	52.46	47.54	34.76
Yangthang	42.68	64.83	35.17	57.32
Tikjya	42.48	87.69	12.31	57.52
Lingchom	53.87	71.79	28.21	46.13
Sardong	61.57	62.63	37.37	38.43
Lungzik	48.76	91.28	8.72	51.24
Sapong	85.50	93.47	6.53	14.50
Bangten	87.67	89.83	10.17	12.33
Srinagi	86.84	100.00	0.00	13.16
Pecherek	79.48	48.04	51.96	20.52
Martam	76.11	49.53	50.47	23.89

Barnyak	72.33	68.35	31.65	27.67
Barthang	73.27	71.40	28.60	26.73
Barphok	39.57	69.17	30.83	60.43
Total	**58.71**	**68.95**	**31.04**	**41.28**

(Source: Census of India 2011)

viii. Water requirement:
Live Storage at Dam – 0.223 MCM (4 hours)
Design Discharge – 12.46 m3/s
Annual yield (90%) – 235.77 MCM

ix. **Project Cost:** The estimated project cost is Rs 496.44 crore. The cost is being further reviewed during site investigations. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

ESTIMATED PROJECT COST @ 2012:

Project Components	Rs. (in Crore)
Land	18.08
EPC (Civil, H&M, E&M, Transmission, etc.)	325.75
Pre-liminary& Pre-operative Expenses	84.05
IDC	68.56
Total	**496.44**

x. **Project Benefit**: Total Employment will be 100 persons as direct & 500 persons indirect after expansion.

xi. **Environmental Sensitive area:** Barsey Rhododendron WLS is the nearest protected area at a distance of 2.3 km from the project site. ESZ boundary notified vide MOEF&CC's notification no. S.O.2172(E) dated 27th August 2014. The Eco-sensitive Zone varies from 25 m to 50 m from the boundary of the sanctuary. All project components are outside the protected area as well as ESZ. The dam site of the project is at Rimbi Khola.

xii. MoU signed with State Government on 08-12-2005 and extension of Commercial Operation date (COD) by Govt.of Sikkim Power Department vide letter no. 49/cih/ACE(west)/E&P/2016-17/Part-11/160 dated 11/10/2022.

xiii. **Resettlement and rehabilitation:** No new resettlement and rehabilitation concerns as no private land acquisition is proposed for the remaining work. All compensation payments for the acquisition of private property have been completed. CSR programs to be resumed during the construction period in line with Sikkim Hydro Power Ventures policies as part of the updated EIA/EMP.

xiv. **Scheduled – I species:** As part of earlier EIA study, a Biodiversity Conservation and Wildlife Management Plan has been prepared and submitted to state forest department for implementation. An amount of Rs. 195.59 lakh has been deposited in the CAMPA fund for this purpose. The activity shall be implemented by FEWMD and shall be monitored by SHPVL and MOEF.

xv. Public Hearing for the proposed project has been conducted by the State Pollution Control Board on 21/09/2008.

xvi. DPR was prepared in 2006 by SVS Engineering Services, one of the renowned hydro power consultants. It included detailed studies on drilling, geological studies, seismological analysis, dam type, design, hydrology studies, etc. Further, A. F. Colenco, a leading Swiss engineering company was appointed to review and validate the DPR.

xvii. **Clearances:** SHPVL has obtained all necessary clearances for implementation of the project which

are as under.

CLEARANCES	PRESENTSTATUS
Techno-economic Clearance (TEC) from Government of Sikkim	Valid
Commer	Valid till 03/

cial Operation Date extension	06/2026
Environment Clearance	Environment clearance was issued to M/s Sikkim Hydro Power Ventures Limited (SH

	PVL) vide Letter no J-12011/6/2009-IA-I dated 10th June 2009. Due to certain design changes, EC was revalidated vide M

	OEF letter no. J-12011/6/2009-IA-I dated 16th April 2010. Further, EC was revalidated 0n 13/09/2021 2 for shift od dam by 36

	m.
Forest Clearance and Award	FC stage I for 5.431 ha of forest land was issued on 12/7//2010 FC stage II for 5.431 ha of forest land was issued on 22/10//

	2010 FC stage I for 0.3370 ha of forest land was issued on 25/02/2014 FC stage II for 0.3370 ha of forest land was issued on 03/0

	5/2016 Forest land of 0.454 has was surrendered on 03/05/2016
Private Land Acquisition (Private land was acquired by	Leased ded for 21.612 Ha signed on 12/12/2013 Leased de

Sikkim Power Development Corporation, Government of Sikkim and leased to Sikkim Hydro Power Ventu	ed for 6.368 Hawass signed on 29/09/2022

re Limited	
Connectivity and Long-term Access for evacuation of power through State Transmission Utility.	In-principally agreed by GOS and required to submit necessary technical details/ drawings and other documents

	with Application to STU.
Financial Closure with the consortium of Power Finance Corporation, Bank of India and	Required revalidation

Indian Renewable Energy Development Agency (IREDA) in January 2014. Debt: Equity 75:25	
Consent to	Required ren

establish from State Pollution Control Board	ewal

xviii. **Land Status:**

Permanent land - Govt. Land (through lo	**33.294ha** 27.9800ha 5.3144ha	Inpossession

ngterm land lease) Forest land (through memo)		
Temporary Land For construction p	**4.496 ha**	Inpossession

has through hagreement		

xix. **Construction Work:** SHPVL had awarded EPC contracts for Civil, Hydro Mechanical and Electro-Mechanical works in 2012 and firmed up project price at Rs. 496.44. The Project pre-development, initial infrastructure works have been completed and EPC work of almost 18% of total project work completed till Dec-2017. Status of work is as under.

xx. **Infrastructure Work:** Staff & workers colony at dam site and surge shaft site completed and were operational. Need repair. All other infrastructure works like approach roads, steel bridge, culverts, construction power arrangement, workshop, stores, etc. were completed and operational. Need repair.

xxi. **EPC Work Status**

- River diversion works completed – Required cleaning and repairs.
- 70% of dam excavation completed in 2017 – required removal of riverbed material accumulated during flash floods.
- Adit to Head Race Tunnel completed and were operational
- Works at three faces in Head Race Tunnel - around 625 meters excavation and supporting work completed.
- Total excavation of 66 meters deep surge shaft completed
- Tunneling work in Pressure shaft - around 265 meters excavation and supporting work completed
- Approach road to Powerhouse completed.
- Till Dec-2017, total project work of around 18% completed
- SHPVL has not drawn down any project loan so far and work is being carried out using project equity fund. Till date SHPVL has invested around Rs. 110 Cr.

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

- **EAC Meeting Details:**

EAC meeting/s	15th Meeting
Date of Meeting/s	13.09.2024
Date of earlier EAC meetings	14.05.2009 for Environment Clearance
	22.02.2007 for Scoping Clearance

- **Project details:**

Name of the Proposal	Rangit II Hydro Electric Project
Location (Including coordinates)	Dam Site: 88°10'27.77"E; 27°18'47.44"N Powerhouse Site: 88°13'30.9"E; 27°16'17.8"N

Inter- state issue involved	No
Seismic zone	Zone-IV

- **Category details:**

Category of the project	A
Provisions	
Capacity / Cultural command area (CCA)	66 MW
Attracts the General Conditions (Yes/No)	Yes
Additional information (if any)	Nil

- **Electricity generation capacity:**

Powerhouse Installed Capacity	66 MW
Generation of Electricity Annually	283.87 MU
No. of Units	2 nos. (2X33 MW)
Additional information (if any)	Nil

- **ToR/EC Details:**

Cost of project	496.44 Cr.
Total area of Project	33.294 ha
Height of Dam from River Bed (EL)	40.0 m
Length of Tunnel/Channel	4745.0 m
Details of Submergence area	4.0 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	E-flow will be released as per applicable guidelines.
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 b) EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

- **Muck Management Details:**

No. of proposed disposal area/ (type of land- Forest/Pvt. land)	2.6 ha Non-Forest Land

- **Land**

Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

Area Breakup:

Private Land	27.980 ha
Government land/Forest Land	5.314 ha
Submergence area/Reservoir area	4.0 ha
Land required for project components	29.294 ha
Additional information (if any)	Nil

- **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	--	Distance from nearest protected area (Barsey Rhododendron WLS) is 2.30 Km, however, proposed project is outside the notified ESZ boundary of the sanctuary
National Park	--- --	
Wildlife Sanctuary	--- --	

- **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

- **Affidavit/Undertaking details:**

Affidavit/Undertaking	Enclosed
Additional information (if any)	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	FC stage I for 5.431 ha of forest land was issued on 12/7//2010 FC stage II for 5.431 ha of forest land was issued on 22/10//2010 FC stage I for 0.3370 ha of forest land was issued on 25/02/2014

	FC stage II for 0.3370 ha of forest land was issued on 03/05/2016 Forest land of 0.454 ha was surrendered on 03/05/2016
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	-

- **Miscellaneous**

Particulars	**Details**
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (*NABET* Accredited *Consultant Organization*) Certificate No : NABET/EIA/2225/RA0274 Validity : August 15, 2025 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
Project Benefits	• Project will generate 283.87 MU annually in a 90% dependable year. • 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
Status of other statutory clearances	Present case is a de novo EC application where 18% work has already been completed and Forest clearance is already in place.
R&R details	No R&R, as present case is a de novo EC application and R&R was completed earlier.
Additional detail (If any)	Nil

3.2.3. Deliberations by the committee in previous meetings

N/A

3.2.4. Deliberations by the EAC in current meetings

15.2.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, KML file, etc.), and as presented in the meeting, observed that the proposal is for the grant of Terms of Reference (ToR) for the Rangit-II Hydro Electric Project (66 MW), covering an area of 33.294 hectares in the villages of Bangten, Barnyak, Barphok, and Barthang, located in the sub-districts of Gyalshing, Soreng, and Ravong in West District, Sikkim, by M/s Sikkim Hydro Power Ventures Ltd.

The project falls under Category A of item 1(c) 'River Valley Projects' in the Environmental Impact Assessment (EIA) Notification, 2006, requiring appraisal at the central level by the sectoral EAC in the Ministry.

The EAC noted that **Environmental Clearance (EC)** for the project was issued on **10/06/2009**, and construction commenced in **2012** after securing **forest diversion** and acquiring the required land. However, by the time the EC lapsed in **2019**, only about **18% of the work** had been completed.

Additionally, it was noted that the total land requirement for the project is **33.294 hectares,** consisting of **5.314 hectares of forest land** and **27.980 hectares of non-forest land. Stage-II Forest Clearance** (FC) for **5.431 hectares** of forest land was issued on **22/10/2010**, and FC Stage-II for **0.3370 hectares** of forest land was issued on **03/05/2016**. Furthermore, **0.454 hectares of forest land** was surrendered on **03/05/2016**.

The EAC also noted that the **Memorandum of Understanding (MoU)** was signed with the **State Government on 08/12/2005,** and an extension for the **Commercial Operation Date (COD)** was granted by the **Government of Sikkim Power Department** via letter no. **49/cih/ACE(west)/E&P/2016-17/Part-11/160** dated **11/10/2022.**

3.2.5. Recommendation of EAC

Recommended

3.2.6. Details of Terms of Reference

3.2.6.1. Specific

Environmental Management and Biodiversity Conservation	
1.	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.
2.	The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report.
3.	Environmental matrix during construction and operational phase needs to be submitted. Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report.
4.	Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature required to be cut for barrage creation and other project component.
5.	Three season (Pre-monsoon, Monsoon and winter season) baseline data of all the environmental attributes including biological environment as mentioned in the Standard ToR shall be collected for preparation of EIA/EMP report.
6.	Source of construction material and its distance from the project site along with detailed transportation plan for construction material.
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.
8.	A detailed wildlife conservation plan for Schedule –I species be prepared duly approved by the Chief

	Wild Life Warden be submitted.
9.	Explore the possibilities to reduce forest area for the construction of proposed project. Reduction of forest land with changing installed capacity.
10.	Conduct geological survey and find out availability of mineral in study area. Take Geological opinion from GSI regarding mineral zone in the project study area.
11.	Density of forest and its types including tentative nos of tree felled during construction of the project and details of plants species to be planted under compensatory plantation be mentioned in Compensatory Afforestation Plan under EIA/EMP.
12.	Identify the sand mining/ quarrying sites in submergence area and downstream of reservoir.Source of construction material and its distance from the project site along with detailed transportation plan for construction material.
13.	A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.
14.	Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is located outside the Eco Sensitive Zone (ESZ) and Wildlife Sanctuary.
15.	In case any Wildlife corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals.
16.	Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
17.	Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.
18.	Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.
19.	Project impact on avi-fauna shall be studied and incorporated in EIA/ EMP report.
20.	The project proponent must also include information if any, on the critical mineral zone mining or potential in the projected area from Geological Survey of India /Mineral Exploration Corporation Ltd or similar such Government organizations.
Socio-economic Study	
1.	Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policyissue 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. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.
3.	Statement on the commitments (activity-wise) made during public hearing to facilitate thediscussion on the CER in compliance of the Ministry's OM F.No.22- 65/2017- IA.III dated 30th September, 2020 shall be submitted.

4.	Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared. Details of settlement in 10 km area shall be submitted.
5.	Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
Muck Management/ Disaster Management	
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 sitealong with types of road etc.
3.	Details of water sprinkling arrangements for arresting the fugitive / dust, emission from transportation and other project activities in project construction area.
4.	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.
5.	Restoration plan for construction area including dumping site of excavated materials by levelling, filling up of burrow pits, landscaping etc.
Disaster Management	
1.	CAT plan, Dam break analysis, Disaster Management Plan and Fisheries Management Plan be prepared along with other EMPs and incorporated in the EIA/EMP report.
2.	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.
3.	Pre-DPR Chapters viz., Hydrology, Layout Map and Power Potential Studies duly approvedby CWC /CEA shall be submitted.
Miscellaneous	
1.	Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.
2.	Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.
3.	Both capital and recurring expenditure under EMP shall be submitted.
4.	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 analyse the samples.

5.	Aerial view video of project site shall be recorded and to be submitted.
6.	Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.

3.2.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Scope of EIA Study	
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.
Details of the Project and Site	
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
Description of Environment and Baseline Data	
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.
Details of the Methology	
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.
Methodology for Collection of Biodiversity Data	
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).
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follow s:	
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 (SO2) and Oxides of Nitrogen (NOX) 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, NO2, PO4, CI, SO4, 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 km2 year-1.
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.
36.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).
37.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
38.	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.
39.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
40.	Economically important species like medicinal plants, timber, fuel wood etc.
41.	Details of endemic species found in the project area.
42.	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.
43.	Cropping pattern and Horticultural Practices in the study area.
44.	null
45.	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.
46.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.

47.	Information (authenticated) on Avi-fauna and wildlife in the study area.
48.	Status of avifauna their resident/ migratory/ passage migrants etc.
49.	Documentation of butterflies, if any, found in the area.
50.	Details of endemic species found in the project area.
51.	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.
52.	Existence of barriers and corridors, if any, for wild animals.
53.	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.
54.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
55.	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.
56.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.
57.	Fish and fisheries, their migration and breeding grounds.
58.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
59.	Conservation status of aquatic fauna.
60.	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.
61.	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.
62.	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.
63.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
64.	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.

65.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
66.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
67.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
68.	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.
69.	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.
23.	Impact on fish migration and habitat degradation due to decreased flow of water
24.	Impact on breeding and nesting grounds of animals and fish.
25.	Impact on local community including demographic profile.
26.	Impact on socio-economic status
27.	Impact on economic status.
28.	Impact on human health due to water / vector borne disease
29.	Impact on increase traffic
30.	Impact on Holy Places and Tourism
31.	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.
32.	Positive and negative impacts likely to be accrued due to the project are listed.
Environmental Management Plan	
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. Deatailed 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.

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.
14.	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.
15.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Pancahayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
16.	Labour Management Plan for their Health and Safety.
17.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
18.	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.
19.	Environmental safeguards during construction activities including Road Construction.
20.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
21.	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

Tiruvannamalai Pumped Storage Project (2000 MW) by **ECO LEAP TECHNOLOGIES INDIA PRIVATE LIM ITED** located at **TIRUVANNAMALAI,TAMIL NADU**			
Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/TN/RIV/456813/2023	J-12011/02/2024-IA.I(R)	27/12/2023	River Valley/Irrigation projects (1(c))

3.3.2. Project Salient Features

15.3.1: The proposal is for grant of Terms of References (TOR) to Tiruvannamalai Pumped Storage Project (2000 MW) in an area of 295ha in village Karnatiogarh Reserved Forest, Kidampalayam and Mel Cheppili etc., Sub District Jamunamarathoor and Kalasapakkam, District Tiruvannamalai, Tamil Nadu by M/s Eco Leap Technologies India Private Limited

15.3.2: 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. Tiruvannamalai PSP has been planned as a closed loop pumped storage project and envisages the creation of two off-stream reservoirs near Kidampalayam Village. Both the upper and lower reservoirs of this project are located away from the natural river stream. The requirement of water for the project is planned to be met by initially pumping water into the lower reservoir from the Cheyyar River and this will be used cyclically for power generation.

ii. The water from the upper reservoir will be utilized for generating power during peaking hours and the off-peak periods, water from the lower reservoir shall be pumped back to the upper reservoir. The project has a total generating capacity of 2000 MW and envisages the installation of 8 nos. of reversible units of 250 MW each with a 549.75 m rated head and design discharge of 416.9 m3/s. All the units are housed in an underground powerhouse.

iii. The geographical co-ordinate of the project are Lower Reservoir: 79°1'3.47"E; 12°32'51.43"N; Upper Reservoir : 78°58'59.40"E; 12°32'57.25"N.

iv. The Tiruvannamalai Pumped Storage Project envisages construction of two artificial reservoirs near Kidampalayam village in Tiruvannamalai District of Tamil Nadu

v. The Tiruvannamalai off-stream closed loop Pumped Storage Project envisages construction of

- Ø A Geomembrane Faced Rock-Fill Dam (GFRD) having varying height from 5.0 m to 51.0 m from the natural surface level for the upper and lower reservoir.
- Ø Two intake/outlet structures have been proposed within the upper reservoir by locally excavating to provide sufficient submergence below the MDDL.
- Ø Two numbers of horseshoe and circular shaped high-pressure tunnels of the total length of about 1570 m each, which connects the two number of circular pressure shaft of length of about 300 m each.
- Ø Each pressure shaft divided into four-unit pressure shafts to feed eight pump-turbine housed in the Powerhouse.
- Ø An underground powerhouse of size 215.5 m (L) x 22.0 m (W) x 50.0 m (H) having an installation of eight nos. of reversible Francis pump-turbine of 250 MW each.
- Ø A transformer cavern of size 215.5 m (L) x 17.2 m (W) x 26.0 m (H) has been proposed downstream of the powerhouse cavern.
- Ø One 7.5 m diameter D-shaped main access tunnel (MAT) has been proposed to provide the access to underground powerhouses and transformer caverns.
- Ø A pothead yard of size 50.0 m (L) x 20.0 m (W)
- Ø Eight branches of low-pressure tunnels emerge from each draft tube and combine into two horseshoe shaped low pressure tunnels of length 715 m each.
- Ø Two intake/outlet structures have been proposed to be located within the lower reservoir which discharge the water from the low-pressure tunnel to the reservoir.

vi. The total land required for the construction of various components and related works for Tiruvannamalai PSP is estimated to be around 295.0 ha, out of which is 92.50 ha is private land and 202.50 ha is forest/govt. land. Therefore, Forest Clearance is required to be obtained under Forest Conservation Act. Koundinya is about 48.0 Km from site, is the nearest protected area from the proposed project. Any impacts due to development of proposed PSP shall be studied as part of EIA studies.

vii. The estimated project cost is Rs. 12758.0 Crore including IDC. As a preliminary estimate, a construction period of 54 months from the date of award of civil works package has been estimated for this project.

viii. Demographic details in 10 km radius of project area :The proposed Tiruvannamalai Pumped Storage impact area i.e. the project area and immediate surrounding area of its components like proposed upper and lower reservoir, pump house, water conductive system, pumping alignment etc. falling under Polur tehsil in Tiruvannamalai district of Tamil Nadu.

The table below presents the list of villages according to their proximity to the project area components.

Proposed Upper Reservoir Surrounding Villages Name		**Proposed Lower Reservoir, WCS, MD & Pumping Alignment Surrounding villages Name**	
District: Tiruvannamalai			
Tehsil/Taluk	**Village Name**	**Tehsil/Taluk**	**Village Name**
Polur	Melchippili	Polur	Thumbakkadu
Polur	Kuttakarai	Polur	Kidampalayam
Polur	Pattarikadu	Polur	Kaliyam
Polur	Seengadu	Polur	Athimoor
		Polur	Siruvallur
		Polur	Kettavarampalayam
		Polur	Melarani
		Polur	Vilvarayanallur (Mel)

Demographic Profile of the Project Area Villages: As per Mission Antyodaya 2020, the villages has a total population of 30925 of which 14748 (47.68%) are males and 16177 (52.32.5%) are females. The number of houses is 10049 and on an average 3 to 4 persons live in each house. Sex ratio was found to be 1096 females per 1000 males which shows the female population is higher than male population. Village wise demographic details are given in the table below.

The data shows that tribal communities have significant presence in some of the villages in the project area, with Scheduled Tribes accounting for 14.33% of the total population while Scheduled Castes account for 25.95%.

Demographic Profile of the Villages

Village Name	**No_ H.H**	**TOT_P**	**TOT_M**	**TOT_F**	**P_SC%**	**P_ST%**
Seengadu	162	312	172	140	0	99.77
Kuttakarai	315	1222	631	591	0	99.57
Pattarikadu	147	529	265	264	0	98.48
Thumbakkadu	352	1335	657	678	0	77.35

Athimoor	1862	3274	1174	2100	5.06	0.40
Kaliyam	2270	3274	1070	2204	70.4	0
Kidampalayam	674	2845	1423	1422	3.83	0.59
Melchippili	129	526	269	257	0.38	99.04
Kettavarampalayam	1482	5934	2976	2958	47.36	0.54
Melarani	652	2811	1448	1363	24.79	0
Vilvarayanallur (Mel)	679	2700	1500	1200	36.85	0
Siruvallur	1325	6163	3163	3000	18.59	0.13
Total	**10049**	**30925**	**14748**	**16177**	**25.95**	**14.33**

(Source Mission Antyodaya 2020 and Census of India 2011)

(*No_HH-Total House Hold, TOP_P-Total Population, TOT_M-Total Male, TOT_F-Total Female, P_SC-Scheduled Caste population, P_ST-Scheduled Tribe Population)*

Occupation Profile of the Project Area Villages: In the villages falling within the project area, 57.72% of the total population is working population and 42.27% is non-working population. Out of the total working population, 72.25% are main workers and 27.74% are marginal workers.

Table: Occupation Profile of the Villages

Village Name	Total Worker (In %)	Main Worker (In %)	Marginal worker (In %)	Non Worker (In %)
Seengadu	50.11	62.22	37.78	49.89
Kuttakarai	69.24	93.76	6.24	30.76
Pattarikadu	55.95	88.85	11.15	44.05
Thumbakkadu	62.11	99.15	0.85	37.89
Athimoor	62.03	51.1	48.9	37.97
Kaliyam	59.41	38.65	61.35	40.59
Kidampalayam	62.46	64.38	35.62	37.54
Melchippili	50	100	0	50
Kettavarampalayam	54.2	94.42	5.58	45.8
Melarani	55.78	97.9	2.1	44.22

Vilvarayanallur (Mel)	47.77	70.6	29.4	52.23
Siruvallur	60.55	57.31	42.69	39.45
Total	**57.72**	**72.25**	**27.74**	**42.27**

(Source: Census of India 2011)

ix. **Water requirement**: Tiruvannamalai PSP (2000 MW) will require 13.36 MCM for initial reservoir filling and thereafter ~ 2.0 MCM per year will be required on annual basis from Cheyyar River for restoring the storage capacity lost due to evaporation.

x. **Project Cost:** The estimated project cost is Rs 12758.0 crore. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

xi. **Project Benefit**: Total Employment will be 100 persons as direct & 250 persons indirect after expansion.

xii. **Environmental Sensitive area:** Koundinya WLS is located about 48.0 Km**.** River/ water body, Mirukanda N is flowing at the aerial distance of 500 m in east to north-west direction.

xiii. MoU signed with State Government on 08-01-2024.

xiv. Alternative Studies: 3 alternative layouts have been prepared and compared for development of PSP. To work out the best alternative layout, 3 alternative layouts have been prepared and compared for development of PSP.

These layouts have been studied in detail with respect to the following criteria:

- *Ø Environment and social impacts*
- *Ø Topography of the area and other factors like location, length of water conductor System*
- *Ø Utilization of available head at project site to the maximum extent feasible*
- *Ø Development of economical and optimized layout*
- *Ø Ease of construction and access to shafts, powerhouse, and related structures*
- *Ø Minimal area of land acquisition to accommodate various project components*
- *Ø Away from habitation*

xv. The upper reservoir location has been kept the same for all the alternatives due to its topographical constraints and the lower reservoir is studied at three different locations based on the availability of flat terrain and type of land.

xvi. The layout of all three alternatives has been planned in such a way that it would eliminate the requirement of upstream surge shaft and the same has been studied for tailrace in all alternatives. Underground powerhouse has been proposed in all the alternatives as the natural ground level in the project region makes it difficult to have surface or pit type powerhouse.

Comparison of salient features of Alternatives

Description	**Alternative 1**	**Alternative 2**	**Alternative 3**
Upper reservoir (proposed)			
Type of dam	GFRD		
Max dam height (m) from NSL	51.0		
Reservoir periphery (km)	3.78		

Length of embankment dam (km)	2.37		
FRL (m)	847.50		
MDDL(m)	811.50		
Live storage capacity (MCM)	12.33		
Lower reservoir (proposed)			
Type of dam	GFRD	GFRD	GFRD
Max dam height (m)	41.0	21.0	40.0
Reservoir periphery (km)	3.27	3.26	2.50
Length of embankment dam (km)	2.46	3.26	2.21
FRL (m)	284.00	248.00	259.00
MDDL (m)	255.50	225.50	220.50

Description	**Alternative 1**	**Alternative 2**	**Alternative 3**
Live Storage Capacity (MCM)	12.38	13.73	11.44
Total Discharge (m3/s)	416.90	416.90	397.37
Max Head (m)	582.00	608.00	612.50
Min Head (m)	517.50	549.50	538.00
IC (MW)	2000	2160	1920
No.of Units	8	9	8
Unit Capacity (MW)	250	240	240
Unit Discharge (m3/s)	52.11	46.32	49.67
No. of WCS	2	2	2
Annual Energy, MU @ 95% m/c ava ilability	5548	5992	5326
Water Conductor System			
Head race - length (m)	2000	2000	2000

Tail race - length (m)	860	2080	2255
Total Length of WCS (m)	2860	4080	4255
Upstream L/H Ratio	3.6	3.4	3.4
Upstream Surge Tank/shaft	Nil	Nil	Nil
Downstream Surge Gallery	Nil	Required	Required
Type of Powerhouse	Underground	Underground	Underground
Length of MAT (m)	938	1250	1500

Comparison of Land Requirement

	Alternative 1 (2000 MW)	Alternative 2 (2160 MW)	Alternative 3 (1920 MW)
Total land requirement (ha)	295.00	296.00	299.00
Private land (ha)	92.50	32.00	50.00
Forest land (ha)	202.50	264.00	249.00

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

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

- **EAC Meeting Details:**

EAC meeting/s	15th Meeting
Date of Meeting/s	13.09.2024
Date of earlier EAC meetings	6th Meeting dated 23.01.2024

- **Project details:**

Name of the Proposal	Tiruvannamalai Pumped Storage Project
Location (Including coordinates)	Lower Reservoir : 79° 1'3.47" E; 12°32'51.43" N Upper Reservoir : 78°58'59.40" E; 12°32'57.25" N
Inter- state issue involved	No
Seismic zone	Zone-III

- **Category details:**

Category of the project	A
Provisions	

Capacity / Cultural command area (CCA)	2000 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

- **Electricity generation capacity:**

Powerhouse Installed Capacity	2000 MW
Generation of Electricity Annually	5548.0 MU
No. of Units	8 nos. (8X250 MW)
Additional information (if any)	Nil

- **ToR/EC Details:**

Cost of project	12758.0 Cr.
Total area of Project	295.0 ha
Height of Dam from River Bed (EL)	Lower Dam – 41.0 m Upper Dam – 51.0 m
Length of Tunnel/Channel	2860 m
Details of Submergence area	165.0 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	Not Applicable, as this is Off-Stream Closed L oop Pumped Storage Project (PSP)
Is Projects earlier studies in Cumulative Impa ct assessment & Carrying Capacity studies (C IA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by b) EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustain ing river ecosystem.	No

- **Muck Management Details:**

No. of proposed disposal area/ (type of land- Forest/Pvt. land)	65 ha Non-Forest Land
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

- **Land**

Area Breakup:

Private Land	92.5 ha
Government land/Forest Land	202.5 ha
Submergence area/Reservoir area	165.0 ha
Land required for project components	130.0 ha
Additional information (if any)	Nil

- **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	--	There is no Protected Area in t he vicinity of the proposed pr oject. Koundinya WLS is abo ut 48 Km from site is the near est protected area from the pro posed project.
National Park	--- --	
Wildlife Sanctuary	--- --	

- **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

- **Miscellaneous**

Particulars	**Details**
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (*NABET* Accredited *Consultant Organization*) Certificate No : NABET/EIA/2225/RA0274 Validity : August 15, 2025 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
Project Benefits	• Pumped storage hydropower is a modified use of co nventional hydropower technology to store and manage energy or electricity by moving water bet ween an upper and lower reservoir. Currently, pu mped storage round-trip or cycle energy efficienc ies exceed 80%, comparing favorably to other en

	ergy storage technologies and thermal technologi es. This effectively shifts, stores, and reuses ener gy generated until there is corresponding demand for system reserves and variable energy integrati on. This shifting can also occur to avoid transmis sion congestion periods, to help more efficiently manage transmission grid, and to avoid potential interruptions to energy supply. This is important because many of the renewable energy resources being developed (e.g., wind and solar) are genera ted at times of low demand and off-peak energy d emand periods are still being met with fossil fuel resources, often at inefficient performance levels that increase the release of greenhouse gas emissi ons. • Further, pumped storage projects are critical to the n ational economy and overall energy reliability be cause it's: o Least expensive source of electricity, not re quiring fossil fuel for generation o An emission-free renewable source o Balancing grid for demand driven variations o Balancing generation driven variations o Voltage support and grid stability Apart from this, proposed PSP will also benefit the l ocal community by creating employment opportuniti es and will result in upliftment of livelihood and soci o-economic conditions.
Status of other statutory clearances	Forest Clearance - Online application seeking forest diversion for around 202.5 Ha after receipt of ToR A pproval. Alongside, other statutory clearances (as ap plicable) from State as well as Central government w ill be obtained post completion of Detailed Project R eport.
R&R details	Details shall be evaluated during EIA/EMP Studies
Additional detail (If any)	Nil

15.3.3 The Proposal was earlier considered by the EAC in its 6th meeting held on 23.01.2024 wherein the EAC deferred the proposal and sought additional information. Accordingly, the PP vide its reply dated 29.08.2024 re-submitted the proposal along with following information sought by the EAC:

Query 1: PP shall submit MoU signed with State department for setting up the proposed project and availability of water for the project along with different users.

Reply: An MoU has been signed between Government of Tamil Nadu and M/s Leap Green Energy Private Limited on 8th January 2024 for setting up of a Green Ammonia Manufacturing Facility with a capacity of 660 Kilo Tonnes per Annum combined with Solar capacity of 3400MW and Pumped Storage Project with a capacity of2000MW/16000MWh by Leap Green or SPVs set up by Leap Green and/ or the PSG Group of Leap Green

Query 2: PP shall explore any alternate source of water and other alternatives site as Kettavarampalayam lake is not having enough/sufficient water.

Reply:

As advised by EAC, a study has been initiated to explore alternate source of water for meeting the water requirement of Tiruvannamalai PSP. Cheyyar river has been identified as a potential source of water as it flows at a distance of about 12 Km from the project location. It is a tributary of Palar River, originates in Jawadhu Hills and flows through Thiruvannamalai district before entering into the Bay of Bengal. Therefore, a study was initiated on the assessment of dependable yield from Cheyyar river.

Water availability study has been carried out by experts (Er R Selvam (ME), Consultant - Water Resources Chennai & Dr P K Suresh (PhD), Modelling specialist, Chennai) to establish water availability in Cheyyar river for initial filling and recuperation of losses.

The study concluded that the drawl of water is proposed during Monsoon period when the system receives considerable amount of rainfall. Accordingly, it is concluded that 13.36 MCM of water for initial filling and 2.0 MCM of water for Annual Top-up can be drawn from the Cheyyar river without affecting the existing irrigation systems in the river.

Query 3: PP shall submit revised land area to minimize the requirement of forest area and muck disposal site shall be proposed in non-forest area.

Reply: As advised by EAC, land requirement has been revised and muck disposal site has been proposed in non-forest area. Tn addition, contractor facilities, store and permanent colony, which were earlier proposed on forest land has been changed to non-forest land. With the change in location of these components. forest land requirement has been reduced to 202.50 ha as compared to earlier proposed forest land requirement of 264.50 ha i.e. a reduction of 62 ha (23.4%). Revised land requirement table is as below:

S. No.	Description	Land Requirement (Earlier Proposal)				Land requirement (Revised Proposal)		
		Forest (ha)	Non-forest (ha)	Total (ha)		Forest (ha)	Non-forest (ha)	Total (ha)
1	Upper reservoir & upper intake	74	6	80		80	-	80
2	Lower reservoir & lower intake	83.5	1.5	85		83.5	1.5	85
3	High pressure tunnel	5	-	5		5	-	5
4	Low pressure tunnel	3	-	3		3	-	3
5	Powerhouse	5	-	5		5	-	5
6	Emergency, cable and ventilation tunnel	3	-	3		3	-	3
7	Portals and pothead yard	4	-	4		4	-	4
8	Proposed road	11	-	11		11	-	11
9	Laying of Water filling line	8	2	10		8	2	10
10	Proposed contractor facilities & store	20	-	20			20	20

11	Muck disposal	44	21	65			65	65
12	Permanent colony	4	-	4			4	4
	Total	**264.5**	**30.5**	**295**		**202.5**	**92.5**	**295**

Query 4: A letter certified from DFO shall be submit stating that no wildlife corridor is passing through out the project boundary.

Reply: As required, a letter has been issued by DFO, Tiruvannamalai division on 28/06/2024 stating that there is no recognized wildlife corridor passing through the project boundary. Copy of the letter has been submitted.

Query 5: A drone video shall be submitted and presented during the meeting.

Reply: Drone video has been presented during the EAC meeting

Query 6: PP shall submit details and status of other projects proposed in the 10 km range of the Tiruvannamalai Close Loop Pumped Storage Project.

Reply: We have thoroughly reviewed all the available data; there are no other pump storage schemes proposed within 10 Km range of Tiruvannarnalai PSP

Query 7: An undertaking shall be submitted that no construction has been started till date.

Reply: The undertaking has been sumitted.

3.3.3. Deliberations by the committee in previous meetings

Date of EAC 1 :23/01/2024

Deliberations of EAC 1 :

The EAC, after detailed deliberation on the information submitted and as presented during the meeting observed that proposed lake, as a source of water is not sufficient, since it has a shallow depth. It was suggested to explore for other nearest source of water. Further, the alternatives sites proposed by Project Proponent has only explored different sites of lower reservoirs instead PP shall explore alternatives sites for both reservoirs. Also, the proposal of using forest land of 44 ha for disposal of muck is not convincing and required to be relooked for non-forest land.

It was further opined that run off water of the catchment is approximately equal to the requirement of the water for proposed project and therefore PP was asked to explore different avenues. Accordingly, following observations were raised for further appraisal :

1. PP shall submit MoU signed with State department for setting up the proposed project and availability of water for the project along with different users.
2. PP shall explore any alternate source of water and other alternatives site as Kettavarampalayam lake is not having enough/sufficient water.
3. PP shall submit revised land area to minimize the requirement of forest area and muck disposal site shall be proposed in non-forest area.
4. A letter certified from DFO shall be submit stating that no wildlife corridor is passing through out the project boundary.
5. A drone video shall be submitted and presented during the meeting.
6. PP shall submit details and status of other projects proposed in the 10 km range of the Tiruvannamalai Close Loop Pumped Storage Project.
7. An undertaking shall be submitted that no construction has been started till date.

The proposal is therefore ***deferred*** on above lines.

3.3.4. Deliberations by the EAC in current meetings

The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, KML file, etc.), as presented in the meeting, and observed that the proposal is for the grant of Terms of Reference (ToR) for the

Tiruvannamalai Pumped Storage Project (2000 MW), covering an area of 295 hectares located in the Karnatiogarh Reserved Forest, Kidampalayam, and Mel Cheppili villages within the sub-districts of Jamunamarathoor and Kalasapakkam, in Tiruvannamalai District, Tamil Nadu, by M/s Eco Leap Technologies India Private Limited.
The project falls under Category A of item 1(c) 'River Valley Projects' as per the Environmental Impact Assessment (EIA) Notification, 2006, and thus requires appraisal at the Central level by the sectoral EAC in the Ministry.

The total land requirement for the project is **295.0 hectares,** out of which **92.50 hectares** is private land and **202.50 hectares** is forest/government land. The application for **Stage-I forest clearance** is yet to be submitted.

The EAC observed that the project site is located on a predominantly high-density, rich forest area that hosts a variety of plant and animal species, including those classified as Schedule I and endangered species. While the EAC has reviewed and considered alternative sites and determined that the selected site is appropriate for the project, they have recommended that the PP shall explore ways to minimize the use of forest land by optimizing the project's capacity as well as appropriate action plan for minimizing the impacts of project on the biota. Additionally, the EAC has advised conducting a cost-benefit analysis that will take into account the potential loss of forest area and the impact on biodiversity.
It was also noted that the Project Proponent has submitted an **MoU dated 08.01.2024**, signed between **Guidance, Government of Tamil Nadu,** and **M/s Leap Green Energy Private Limited**. The EAC observed that while the MoU was signed with **M/s Leap Green Energy Private Limited**, the proposal was submitted by **M/s Eco Leap Technologies India Private Limited**.

3.3.5. Recommendation of EAC

Recommended

3.3.6. Details of Terms of Reference

3.3.6.1. Specific

Miscellaneous	
1.	Both capital and recurring expenditure under EMP shall be submitted.
2.	Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.
3.	The PP shall submit the Memorandum of Understanding (MoU) with Government of Tamil Nadu in the name of "Eco Leap Technologies India Private Limited" for development of the proposed PSP.
4.	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.
5.	Drone video of project site shall be recorded and to be submit.
6.	Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.
7.	Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.
8.	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.
9.	As per Ministry's OM dated 1st 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 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.
10.	Detailed report on cumulative effect of multiple projects already proposed within the region on the same source.
Disaster Management	
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.	PP shall submit the proposal of EAC and seek approval of CEA/CWC for DPR, with a distance of 100 mts from HFL to avoid future damage due to flood. The data and distance of HFL shall be certified by concerned State Government and shall be submitting grant submitting the proposal of grant of EC.
Muck Management/ Disaster Management	
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.
Socio-economic Study	
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. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.
3.	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 7th October, 2014 for the project land to be acquired.
4.	Land acquired for the project shall be suitably compensated in accordance with the law of the land

	with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
5.	Budget earmarked for R&R, CSR shall not include in the cost of EMP and compliance of issues raised during Public Hearing.
Environmental Management and Biodiversity Conservation	
1.	Cumulative Impact Assessment be conducted in Terms of flow required for overall well-being of the ecosystem covering aspects like survival of river, water sheds and local populations needs.
2.	Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 202.50 Ha of forest land involved in the project shall be submitted.
3.	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.
4.	PP shall submit the detailed plan for filling the reservoir for generating envisaged capacity with excess monsoon water only.
5.	Transportation Plan for transporting construction materials shall be submitted. Separate chapter for risk assessment of such transportation through/within the Wildlife Sanctuary shall be included in the EIA report.
6.	Environmental Cost Benefit Analysis shall be done strictly 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.
7.	Calculation and values of GHGs (CO_2, CH_4 etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.
8.	The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report. Presence of any critical mineral zone in the proposed area be clarified from GSI.
9.	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.
10.	Conducting site specific ecological study with respect to riverine ecology focus on 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.
11.	Action plan for survival or diversion of the rivulets/stream leading to join river shall be submitted.
12.	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 three seasons.
13.	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.
14.	Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
15.	Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.
16.	The project area should not come up on any critical mineral zone to be verified by GSI/NMDC.
17.	Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI. No mineral zone on the proposed site be certified by Geological Survey of India or any other concerned Government Organization.

3.3.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Scope of EIA Study	
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.
Details of the Project and Site	
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
Description of Environment and Baseline Data	
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.
Details of the Methology	
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.
Methodology for Collection of Biodiversity Data	
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).
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follow s:	
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 (SO2) and Oxides of Nitrogen (NOX) 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, NO2, PO4, CI, SO4, 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 km2 year-1.
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.
36.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).
37.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
38.	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.
39.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
40.	Economically important species like medicinal plants, timber, fuel wood etc.
41.	Details of endemic species found in the project area.
42.	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.
43.	Cropping pattern and Horticultural Practices in the study area.

44.	null
45.	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.
46.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
47.	Information (authenticated) on Avi-fauna and wildlife in the study area.
48.	Status of avifauna their resident/ migratory/ passage migrants etc.
49.	Documentation of butterflies, if any, found in the area.
50.	Details of endemic species found in the project area.
51.	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.
52.	Existence of barriers and corridors, if any, for wild animals.
53.	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.
54.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
55.	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.
56.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.
57.	Fish and fisheries, their migration and breeding grounds.
58.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
59.	Conservation status of aquatic fauna.
60.	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.
61.	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.

62.	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.
63.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
64.	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.
65.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
66.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
67.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
68.	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.
69.	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.
23.	Impact on fish migration and habitat degradation due to decreased flow of water
24.	Impact on breeding and nesting grounds of animals and fish.
25.	Impact on local community including demographic profile.
26.	Impact on socio-economic status
27.	Impact on economic status.
28.	Impact on human health due to water / vector borne disease
29.	Impact on increase traffic
30.	Impact on Holy Places and Tourism

31.	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.
32.	Positive and negative impacts likely to be accrued due to the project are listed.
Environmental Management Plan	
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. Deatailed 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.
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.
14.	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.
15.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Pancahayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
16.	Labour Management Plan for their Health and Safety.
17.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
18.	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.
19.	Environmental safeguards during construction activities including Road Construction.
20.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
21.	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

Greenko TN-11 Off-Stream Closed Loop Pumped Storage Project by **GREENKO ENERGIES PRIVATE LIMIT**

ED located at **SALEM,TAMIL NADU**			
Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/TN/RIV/494515/2024	J-12011/26/2024-IA-I(R)	29/08/2024	River Valley/Irrigation projects (1(c))

3.4.2. Project Salient Features

15.4.1: The proposal is for grant of Terms of References (TOR) to the project for Greenko TN-11 Off-Stream Closed Loop Pumped Storage Project [1000 MW (6090 MWH)] in an area of 274.94Ha in village Navappatti, Sub District Mettur, District Salem, Tamil Nadu by M/s Greenko Energies Private Limited.

15.4.2: 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:

ii. The total capacity of proposed PSP is 1000 MW (6090 MWH) and it is proposed that One-time requirement of 0.278 TMC of water will be lifted from existing nearby Stanley Reservoir (also known as Mettur Dam, (which is located about 7 Km away from the proposed Lower reservoir) and will be stored in the lower reservoir to be constructed and used cyclically for energy storage and discharge, out of which 0.225 TMC of water will be used for power generation by re-circulation with 6.09 hours storage capacity. Evaporation losses if any will be recouped periodically from Stanley Reservoir (also known as Mettur Dam.

iii. The proposed project involves creation of upper reservoir (11°45'33.44" N & 77°45'1.29" E) and lower reservoir (11°45'30.07" N & 77°46'42.43" E).

iv. The proposed scheme involves creation of new upper reservoir & lower reservoir. It is proposed to construct rockfill embankment of upper reservoir with average height of around 24 m (with maximum height of 45 m) for the length of 733 m with gross storage of 0.252 TMC capacity and Lower reservoir of rockfill embankment for the average height of 29 m (with maximum height of 48m) for the length of 1275 m with gross storage of 0.251 TMC capacity, 25m wide approach Channel of 436 m long joining with the intake structure. 45.15 m high Power Intake Structure, 2 nos. of 2111.05m long 5.5m dia. of Circular Steel lined Penstock / Pressure Shaft consisting of 98.55 m long Intake Tunnel, 175.44 m long Vertical Pressure Shaft-1 (VPS-1), 631.94 m long Horizontal Pressure Shaft-1 (HPS-1), 175.12 m long Vertical Pressure Shaft-2 (VPS-2), 637.91 m long Horizontal Pressure Shaft-2 (HPS-2), 167.82 m long Vertical Pressure Shaft-3 (VPS-3) and 224.28 m long Horizontal Pressure Shaft-3 (HPS-3) up to bifurcation point. Out of 2nos. of Penstock / Pressure Shaft, 1 no. of 5.5m dia. Penstock / Pressure Shaft will get bifurcated near powerhouse in to two nos. of 3.75m dia. of about 100m long to feed 2 units of 250 MW each. Another Penstock / Pressure Shaft of 5.5m dia. will initially get bifurcated into two nos. near powerhouse of 3.75m dia. in which one no. of 3.75m dia. of about 100m long will feed 1 unit of 250 MW. Another branch of 3.75m dia. will further get bifurcated in to two nos. near powerhouse of 2.65m dia. of about 100m long will feed 2 units each of 125 MW. An Underground Powerhouse having an installation of three reversible Francis turbine of 250 MW capacity (Fixed speed turbine) and two reversible Francis turbine each of 125MW (both are Fixed speed turbines) operating under a rated head of 394.00 m in generating mode and 415.00 m in pumping mode. As such, The Project will generate 1000 MW by utilizing a design discharge of 290.70 Cumec and rated head of 394.00 m.

v. The cycle efficiency of the project is expected to be around 80%. One 400 KV Double Circuit Transmission Line with Quad Moose Conductor of length 50 km (appx.) from PSP will be connected to 400 kV PGCIL Substation Dharmapuri - Hogenakkal Road, Somenahalli, Tamil Nadu for evacuation of power during turbine mode and pumping of power from grid during pumping mode. However, final connectivity will be determined in the Detailed Project Report (DPR).

vi. Total land required for construction of various components, including infrastructure facilities and muck disposal area is estimated to be around 274.94 Ha, involving 179.46 Ha of forest land and 95.49 Ha of non-forest land.

Sl. No.	Components	Forest	Non-Forest	Total
1	Upper Reservoir	68.40	4.36	72.76
2	Lower Reservoir	64.92	0.00	64.92
3	WCS, PH	22.42	0.00	22.42
4	Adit	8.63	0.38	9.01
5	Approach Roads to Project Boundary			
I	Road to Lower Reservoir & Magazine	10.25	1.76	12.01
II	Road to Adit	1.81	1.33	3.14
III	Road to MDA	0.00	1.07	1.07
IV	Road to Civil/ E&M Store Yard	0.00	0.88	0.88
6	Muck Disposal Area	0.00	40.00	40.00
7	Job Facility Area	0.00	15.00	15.00
8	Civil/E&M Store Yard	0.00	20.00	20.00
9	Magazine	0.00	0.10	0.10
10	Pumping Alignment	3.02	10.61	13.63
Total		**179.45**	**95.49**	**274.94**

vii. Demographic details in 10 km radius of project area:

Information about Demographic & Working Population of the Project Area

The proposed Greenko TN-11 Pumped Storage Project impact area i.e. the project area and immediate surrounding area of its components like proposed upper and lower reservoir, pump house, water conductive system, pumping alignment etc. falling under Mettur tehsil/taluk in Salem district of Tamil Nadu. The proposed upper reservoir is located in Palamalai village, Mettur tehsil/taluk, Salem district, while the lower reservoir is situated in Navappatti village, also within Mettur tehsil/taluk, Salem district. Moreover, **Mettur** town is located near the proposed lower reservoir.

There are 6 villages and one town located in and around the project area. The table below presents the list of villages & town according to their proximity to the project area components.

Table: Villages in the Project Area

Upper Reservoir Surrounding Village &To	Lower Reservoir and Pumping Ali gnment Surrounding village &To

wn Name		wn Name	
District: Salem			
Tehsil/Taluk	**Village & TownName**	**Tehsil/Taluk**	**Village & Town Name**
Mettur	Palamalai	Mettur	Navappatti
Mettur	Sampalli	Mettur	Kolnaikenpatti
Mettur	Kannamoochi	Mettur	**Mettur (Town)**
Mettur	Moolakkadu		

Demographic Profile of the Project Area

As per Mission Antyodaya 2020, the total population in the project area villages is 80318 of which 40507 (50.43%) are males and 39811 (49.56%) are females. The number of households is 23442 and on an average 3 to 4 persons live in each household. Sex ratio was found to be 982 females per 1000 males. The table below provides village-wise demographic details.

The percentage of Scheduled Caste in the total population is 17.71%, while the percentage of Scheduled Tribe is 5.97%. Notably, Village **Palamalai** has a significantly higher ST population percentage with 98.65%, while Village **Kannamoochi** has a substantial ST population with 67.80%.

Table: Demographic Profile of Project Area Villages

Village & Town Name	No_ H.H	TOT_P	TOT_M	TOT_F	P_SC%	P_ST%
Kannamoochi	1840	5091	2546	2545	10.14	24.95
Moolakkadu	1317	3716	1916	1800	27.07	2.72
Sampalli	851	2134	1000	1134	13.92	9.79
Palamalai	615	1977	1056	921	0.24	98.65
Navappatti	2358	8693	4665	4028	22.36	1.74
Kolnaikenpatti	2179	5894	3122	2772	6.09	0.73
Mettur (M)	14282	52813	26202	26611	19.43	0.42
Total	**23442**	**80318**	**40507**	**39811**	**17.71**	**5.97**

(Source Mission Antyodaya 2020 and Census of India 2011)

(*No_HH-Total House Hold, TOP_P-Total Population, TOT_M-Total Male, TOT_F-Total Female, P_SC- Scheduled Caste population, P_ST-Scheduled Tribe Population)*

Working Population of the Project Area

The villages falling in the project area have 43.41% of the total population as working

population and 56.58% as non-working population. Out of the total working population, 87.51% are main workers and 12.48% are marginal workers.

Table: Working Population of Project Area Villages

Village & TownName	Total Worker (In %)	Main Worker (In %)	Marginal Worker (In %)	Non-Worker(In %)
Kannamoochi	55.90	99.05	0.95	44.10
Moolakkadu	59.42	92.16	7.84	40.58
Sampalli	51.64	86.84	13.16	48.36
Palamalai	71.71	98.36	1.64	28.29
Navappatti	47.05	85.26	14.74	52.95
Kolnaikenpatti	61.79	72.35	27.65	38.21
Mettur (M)	36.55	87.50	12.50	63.45
Total	**43.41**	**87.51**	**12.48**	**56.58**

(Source: Census of India 2011)

viii. Water requirement: Greenko TN-11 Off-Stream Closed Loop Pumped Storage Project PSP (1000 MW) will require 7.87 MCM (0.278 TMC) for initial reservoir filling and thereafter ~ 1.13 MCM (0.225TMC) power generation by re-circulation. Evaporation losses if any will be recouped periodically from Stanley Reservoir for restoring the storage capacity lost due to evaporation.

ix. Project Cost: The estimated project cost is Rs 5947.45 crore. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

x. Project Benefit: Total Employment will be 2000 persons as direct & 150 persons indirect after expansion.

xi. Environmental Sensitive area: Thanthai Periyar WLS is located about 4.0 Km, Wildlife Clearance is application for the proposed project. River/ water body, Kaveri River is flowing at the aerial distance of 500 m in north to south direction.

xii. MoU signed with State Government on 21-08-2024.

xiii. Alternative Studies: 2 alternative layouts have been prepared and compared for development of PSP. The GREENKO TN-11 Off-Stream Closed Loop Pumped Storage Project is planned between two reservoirs and are proposed to be constructed as GREENKO TN-11 OCPSP Upper & Lower Reservoir and one-time water requirement to be pumped from nearby Stanley Reservoir (also known as Mettur Dam) to fill up the Lower Reservoir. The scheme will operate between Upper reservoir EL 677.00m (FRL) and lower reservoir EL 246.00m (MDDL).

The layout of the project has been finalized, after exploring two alternative layouts from techno- economic assessment. The proposed GREENKO TN-11 OCPSP envisages construction of

- Upper and Lower Dams (for formation of upper & lower reservoir)
- Intake Structure
- Penstock Tunnel / Pressure Shaft (Vertical & Horizontal)
- Underground Powerhouse

- Transformer Cavern
- Downstream surge chamber
- Tail Race Tunnel
- Tailrace Outlet Structure

Site Selection Criteria:

Based on the google contour downloaded for GREENKO TN-11 OCPSP, two alternative layouts have been studied in detail with respect to the following criteria:

- Topographical Condition
- Geological Condition
- Land availability Condition
- Optimization of layout and
- Social and Environmental Condition

Alternative Layout Studies for Project Layout

Two alternative layouts with the optimization of project components have been studied with the finalized parameters of upper and lower reservoir. Both alternative layouts have been studied and discussed with the same location of upper reservoir and two different location of lower reservoirs to develop a best suitable layout considering the topographical and geological/geotechnical constraints. The length of water conductor system and tail race tunnels / channels have been altered accordingly to suit for both the alternative layouts. The layout comprising the project components for both the alternative layouts are shown in the following drawings which are tabulated below.

Sl. No.	Drawing Title	Drawing No.
1.	General Layout Plan – Alternative-1	GKOTN-11 – PSP - 006
2.	General Layout Plan – Alternative-2	GKOTN-11 – PSP - 007

Selection of Reservoir Locations:

In all three locations of reservoir which were identified for the project, one location for upper reservoir and two locations for lower reservoir were found technically acceptable.

Upper Reservoir:

The Topography of the proposed area of upper reservoir represents depression profile around the top of hill area showing possibility of creation of reservoir. Therefore, considering the technical requirements and proximity requirements only one feasible location was identified for upper reservoir and the identified site was studied.

Site for Upper Reservoir:

The proposed Site for upper reservoir location appears that the maximum portion of land is coming under forest land and very less portion is coming under private land. The vegetation density in this location appears to be more. The proposed Site for upper reservoir is found suitable for creating the desired live storage capacity. Also, no adverse geological features were observed in this area. During detailed assessment of site and this location appears to be geologically suitable for water retention in the reservoir. Similarly, no major social and environmental issues are foreseen in this location. The area of land required for creating this reservoir is estimated to about 72.76 Ha in which forest and private land area are 68.40 Ha & 4.36 Ha respectively. Considering this in view, this location has been selected for upper reservoir for further development of the project.

Lower Reservoir:

With respect to the location of upper reservoir and basic technical parameters required for the pumped storage project two locations were found suitable for lower reservoir which are located on natural depression and flat / gradually sloping land area respectively where the desired live storage capacity can be created by constructing a minimum height of embankment.

Site – 1 Lower Reservoir:

The proposed Site – 1 lower reservoir appears to be completely in forest land. The boundary of

the proposed lower reservoir area has been fixed keeping in view the safe distance far away from the habituated area. In this location, no adverse geological features were observed and appears to be geologically suitable for water retention in the reservoir. Similarly, no Social and Environmental issues are envisaged. The area of land required for creating this reservoir is estimated to about 64.92 Ha which is completely in forest land.

Site – 2 Lower Reservoir:

Apart from this proposed Site – 1 location of lower reservoir, another alternative location i.e., Site-2 location of lower reservoir is also identified on West side of the Site-1 location which is also found suitable for creation of reservoir for the desired capacity. In this location, the area of land is partly in forest land and partly in private land. In this location also, no adverse geological features were observed and appears to be geologically suitable for water retention in the reservoir. On detailed assessment for Social and environmental aspects it was observed that few houses are coming under the proposed lower reservoir area. Keeping the reservoir in this location may cause disturbance, dislocation of population and create social and environmental issues. The area of land required for creating this reservoir is estimated to about 77.19 Ha in which forest land area is 45.11 Ha and private land area is 32.08 Ha.

Alternate Layouts:

Two alternative layouts for this scheme were studied.

Alternative – 1: Layout with Underground Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock Tunnel / Pressure Shaft, Downstream Surge Chamber, Tail Race Tunnel, Tail Race Outlet, and Site-1 Lower reservoir.

Alternative – 2: Layout with Underground Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock Tunnel / Pressure Shaft, Tail Race Tunnel, Tail Race Outlet, and Site – 2 Lower reservoir.

Alternative -1 Layout

The Alternative – 1 layout has been proposed with underground powerhouse between Upper reservoir and Site – 1 lower reservoir.The proposed upper reservoir site which is to be constructed newly is located on natural depression which is suitable for creating the desired storage capacity keeping FRL & MDDL at EL 677.00m & EL 652.00m respectively. Similarly, the lower reservoir which is to be constructed newly is proposed to be located in the natural depression which is suitable for creating the desired gross storage capacity keeping FRL and MDDL at EL 275.00m & EL 246.00m respectively. The rated head available in this alternative is about 394.00m and the rating of pumped storage project is estimated to 1000 MW for which the live storage requirement is 0.225 TMC. An underground powerhouse has been proposed considering the topography of the projectarea and requirement of depth of excavation of more than 130m in case of surface powerhouse. Moreover, all project components are located far away from the populated area and there will not be any social and environmental issues are envisaged. The length of embankment for upper and lower reservoirs are 733 m and 1275 m respectively. Similarly, the total length of Penstock / Pressure Shaft and Tail Race Tunnel are 2211.05m and 1089.27m respectively. The total area of land required for this Alternative is estimated to 274.94 Ha in which forest and non-forest land area are 179.46 Ha and 95.49 Ha respectively. Component wise land requirement details are given below:

LAND REQUIREMENT DETAILS OF GREENKO TN-11 OCPSP (Ha) ALTERNATIVE - 1

Sl. No.	Component	Forest	Non-Forest	Total
1	Upper Reservoir	68.40	4.36	72.76
2	Lower Reservoir	64.92	0.00	64.92

3	WCS, PH	22.42	0.00	22.42
4	Adit	8.63	0.38	9.01
5	Approach Roads to Project Boundary			
I	Road to Lower Reservoir & Magazine	10.25	1.76	12.00
II	Road to Adit	1.81	1.33	3.14
III	Road to MDA	0.00	1.07	1.07
IV	Road to Civil/ E&M Store Yard	0.00	0.88	0.88
6	Muck Disposal Area	0.00	40.00	40.00
7	Job Facility Area	0.00	15.00	15.00
8	Civil/E&M Store Yard	0.00	20.00	20.00
9	Magazine	0.00	0.10	0.10
10	Pumping Alignment	3.02	10.61	13.63
Total		**179.46**	**95.49**	**274.94**

The land requirement detailed drawing for this alternative is shown in Drg. No. GKOTN-11 – PSP – 005.

Except Upper and Lower reservoir, all other components including Adits are in underground. Therefore, for this alternative, the investigation time and preparation of DPR required will be about 2 years and construction time for completion of this Alternative is estimated to around 42 months excluding pre-construction works.

Alternative – 2 Layout

The Alternative – 2 layout has been proposed with underground powerhouse between upper reservoir and Site – 2 lower reservoir. The proposed upper reservoir location is same as considered in Alternative – 1 layout which is to be constructed newly and is located on natural depression which is suitable for creating the desired storage capacity keeping FRL & MDDL at EL 677.00m & EL 652.00m respectively. Similarly, the lower reservoir which is to be constructed newly is proposed to be located in the flat / gradually sloping land which is suitable for creating the desired gross storage capacity keeping FRL and MDDL at EL 380.00m & EL 349.00m respectively. The rated head available in this alternative is about 292.00 m which is about 102 m less than Alternative – 1 layout. Because of this reason, the live storage requirement of reservoir is made for about 0.303 TMC due to lesser rated head and also to get the same capacity of 1000 MW.

An underground powerhouse has been proposed considering the topography of the project area and requirement of depth of excavation more than 130m in case of surface power house. The length of the embankment for upper and lower reservoirs are 733 m and 1670 m respectively. Similarly, the length of Penstock / Pressure Shaft is about 1610 m and is almost 601 m less than Alternative – 1 layout. With respect to 2 nos. of Penstock, the reduction in total length of penstock is around 1202 m which will decrease cost of the project to some extent. Also, the length of Tail Race Tunnel is about 310m which is 779m less than Alternative – 1 layout. With respect to 5 nos. of tunnel, the reduction in total length of tunnel is around 3895m which will

decrease cost of the project as well as construction time considerably. However, the length of embankment of lower reservoir is almost 395 m more than Alternative – 1 and this will increase the project cost to some extent. Overall, the cost of the project and construction time will be less in case of Alternative – 2 layout than Alternative – 1 layout. But, since the lower reservoir location is coming under habituated area, fertile agricultural land, temples, roads etc., this will lead to create Social and Environmental issues. The total area of land required for this alternative is estimated to 258.90 Ha in which forest and non-forest land area are 144.53 Ha and 114.37 Ha respectively. Component wise land requirement details are given below:

LAND REQUIREMENT DETAILS OF GREENKO TN-11 OCPSP (Ha) ALTERNATIVE – 2

Sl. No.	Component	Forest	Non-Forest	Total
1	Upper Reservoir	68.72	4.36	73.09
2	Lower Reservoir	45.11	32.08	77.19
3	WCS, PH	12.05	0.00	12.05
4	Adit	5.00	0.60	5.60
5	Approach Roads to Project Boundary			
I	Road to Lower Reservoir	6.79	0.54	7.33
II	Road to Adit	1.52	0.00	1.52
III	Road to Civil, MDA	0.00	2.22	2.22
IV	Road to Civil/ E&M Store Yard	0.00	0.41	0.41
V	Road to JFA	0.00	0.42	0.42
VI	Road to Magazine	0.00	0.22	0.22
6	Muck Disposal Area	0.00	25.00	25.00
7	Job Facility Area	0.00	15.00	15.00
8	Civil/E&M Store Yard	0.00	20.00	20.00
9	Magazine	0.00	0.10	0.10
10	Pumping Alignment	5.34	13.42	18.76
Total		**144.53**	**114.37**	**258.90**

The land requirement detailed drawing for this alternative is shown in Drg. No. GKOTN-11 – PSP – 008.

Except Upper and Lower reservoir, all other components including Adits are in underground. Therefore, for this alternative, the investigation time and preparation of DPR required will be

about 2 years and construction time for completion of this Alternative is estimated to around 42 months excluding pre-construction works.

Selection of Final Layout

As discussed above, Alternative – 1 layout has been preferred considering the following reasons:

- The length of embankment of lower reservoir for Alternative -1 (i.e., 1275 m) is less than Alternative – 2 (i.e., 1670 m). Hence, considerable cost and time can be reduced in Alternative – 1 Layout.
- The total area of land required for Alternative – 1 layout (i.e., 274.94 Ha) is more than Alternative – 2 layout (i.e., 258.74 Ha). But in Alternative -1 layout, no Social and Environmental issues are foreseen. Whereas in case of Alternative – 2, the lower reservoir is located in habituated area and fertile agriculture land, temples and roads etc. are coming under lower reservoir area which will create Social and Environmental issues.

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

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

- **Project details:**

Name of the Proposal	Greenko Energies Private Limited Greenko TN011 Off-Stream Closed Loop Pumped Storage Project – Tamil Nadu
Location (Including coordinates)	The proposed project involves creation Upper Reservoir 11°45'33.44" N & 77°45'1.29"E Lower Reservoir 11°45'30.07"N & 77°46'42.43"E
Inter- state issue involved	No
Seismic zone	Zone -II (least active)

- **Category details:**

Category of the project	1(c) River Valley Projects
Provisions	
Capacity / Cultural command area (CCA)	1000 MW
Attracts the General Conditions (Yes/No)	Yes
Additional information (if any)	Nil

- **Electricity generation capacity:**

Powerhouse Installed Capacity	1000 MW (6090 MWH)
Generation of Electricity Annually	2111 MU
No. of Units	5 Nos. (3 X 250 MW) + (2 X 125 MW)
Additional information (if any)	Nil

- **ToR/EC Details:**

Cost of project	5957.45 Cr.

Total area of Project	274.94 Ha
Height of Dam from River Bed (EL)	Height of Embankment max- 45 m & Avg-24 m
Length of Tunnel/Channel	98.55 m
Details of Submergence area	137.68 Ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	Not Applicable, as this is Off-Stream Closed Loop Pumped Storage Project (OCPSP)
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 b) EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

- **Muck Management Details:**

No. of proposed disposal area/ (type of land- Forest/Pvt. land)	One Location of 40 Ha in Non-Forest Area
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

- **Land**

Area Breakup:

Private land	95.49 ha
Government land/Forest Land	Forest Land- 179.45 Ha
Submergence area/Reservoir area	137.68 Ha-Upper & Lower reservoirs
Land required for project components	274.94 Ha- Total Land requirement
Additional information (if any)	Nil

- **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 L and	--	Distance from nearest p rotected area (Thanthai Periyar WLS) is about 4.0 Km.
National Park	--- --	
Wildlife Sanctuary	--- --	

- **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

- **Affidavit/Undertaking details:**

Affidavit/Undertaking	Enclosed
Additional information (if any)	Nil

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

Particulars	**Letter no. and date**
Certified EC compliance report (if ap plicable)	Not Applicable
Status of Stage- I FC	Yet to Apply
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Yet to Apply

- **Miscellaneous**

Particulars	**Details**
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (*NABET* Accredited *Cons ultant Organization*) Certificate No : NABET/EIA/2225/RA 0274 Validity : August 15, 2025 Contact Person : Mr. Ravinder Bhatia Name of Sector : River Valley and Hyd roelectric Projects Category : A MoEF Schedule : I(C) Address : 402, Radisson Suites Comme rcial Plaza, B Block, Sushant Lok Phas e I, Gurugram, Haryana - 122009. E-mail : ravi@rstechnologies.co.in Land Line : (0124) 4295383 Cellular : (+91) 9810136853

Project Benefits	• Pumped storage hydropower is a modified use of conventional hydropower technology to store and manage energy or electricity by moving water between an upper and lower reservoir. Currently, pumped storage round-trip or cycle energy efficiencies exceed 80%, comparing favorably to other energy storage technologies and thermal technologies. This effectively shifts, stores, and reuses energy generated until there is corresponding demand for system reserves and variable energy integration. This shifting can also occur to avoid transmission congestion periods, to help more efficiently manage transmission grid, and to avoid potential interruptions to energy supply. This is important because many of the renewable energy resources being developed (e.g., wind and solar) are generated at times of low demand and off-peak energy demand periods are still being met with fossil fuel resources, often at inefficient performance levels that increase the release of greenhouse gas emissions. • Further, pumped storage projects are critical to the national economy and overall energy reliability because it's: o Least expensive source of electricity, not requiring fossil fuel for generation o An emission-free renewable source o Balancing grid for demand driven variations o Balancing generation driven variations o Voltage support and grid stability Apart from this, proposed PSP will also benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic conditions.
Status of other statutory clearances	**Forest Clearance:** Online application seeking forest diversion for around 179.45 Ha after receipt of ToR Approval. Along

	side, other statutory clearances (as applic able) from State as well as Central gover nment will be obtained post completion of Detailed Project Report.
R&R details	Details shall be evaluated during EIA/E MP Studies
Additional detail (If any)	Nil

3.4.3. Deliberations by the committee in previous meetings

N/A

3.4.4. Deliberations by the EAC in current meetings

The EAC during deliberations noted the following:

The **EAC** deliberated on the information submitted and presented during the meeting, observing that the proposal seeks the grant of **Terms of Reference (ToR)** for the **Greenko TN-11 Off-Stream Closed Loop Pumped Storage Project [1000 MW (6090 MWH)],** covering an area **of 274.94 hectares** in **Navappatti village**, Sub District **Mettur**, District **Salem**, Tamil Nadu by **M/s Greenko Energies Private Limited.**

The project falls under **Category A of item 1(c) 'River Valley projects'** as per the **Environmental Impact Assessment Notification, 2006**, requiring appraisal at the Central level by the sectoral **EAC** in the Ministry.

The total land requirement for the project is **274.94 hectares**, which includes **179.46 hectares** of forest land and **95.49 hectares** of non-forest land. The application for **Stage-I Forest Clearance** is yet to be submitted.

It was also noted that the Project Proponent has submitted an **MoU dated 21.08.2024** signed between **Government of Tamil Nadu,** and **M/s Greenko Energies Private Limited** for setting up the Pumped Storage Project in District **Salem**, near **Mettur, Palamalai** (upper reservoir) and **Navappatti** (near the powerhouse and lower reservoir).

The EAC observed that the project site is located on a predominantly high-density, rich forest area that hosts a variety of plant and animal species, including those classified as Schedule I and endangered species. While the EAC has reviewed and considered alternative sites and determined that the selected site is appropriate for the project, they have recommended that the PP shall explore ways to minimize the use of forest land by optimizing the project's capacity as well as appropriate action plan for minimizing the impacts of project on the biota. Additionally, the EAC has advised conducting a cost-benefit analysis that will take into account the potential loss of forest area and the impact on biodiversity.

3.4.5. Recommendation of EAC

Recommended

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. Layout Map and Power Potential Studies duly approved 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 submit.
5.	Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.
6.	Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.
7.	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.
8.	As per Ministry's OM dated 1st 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 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.
9.	Detailed report on cumulative effect of multiple projects already proposed within the region on the same water source.
Disaster Management	
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.	PP shall submit the proposal of EAC and seek approval of CEA/CWC for DPR, with a distance of 100 mts from HFL to avoid future damage due to flood. The data and distance of HFL shall be certified by concerned State Government and shall be submitting grant submitting the proposal of grant of EC.
Muck Management/ Disaster Management	
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.

Socio-economic Study	
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. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.
3.	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 7th October, 2014 for the project land to be acquired.
4.	Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
5.	Budget earmarked for R&R, CSR shall not include in the cost of EMP and compliance of issues raised during Public Hearing.
Environmental Management and Biodiversity Conservation	
1.	Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 179.46 Ha of forest land involved in the project shall be submitted.
2.	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.
3.	PP shall submit the detailed plan for filling the reservoir for generating envisaged capacity with excess monsoon water only.
4.	Transportation Plan for transporting construction materials shall be submitted. Separate chapter for risk assessment of such transportation through/within the Wildlife Sanctuary shall be included in the EIA report.
5.	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.
6.	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.
7.	Calculation and values of GHGs (CO2, CH4 etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.
8.	The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report. Presence of any critical mineral zone in the proposed area be clarified from GSI.
9.	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.
10.	Conducting site-specific ecological study with respect to riverine ecology focus on 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.
11.	Cumulative Impact of project on carrying capacity and sustainability of Reservoir/ River /nala of catchment area / due to tapping of water for filling reservoir.
12.	Action plan for survival or diversion of the rivulets/stream leading to join river shall be submitted.
13.	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 three seasons.
14.	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.
15.	Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
16.	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.
17.	The project area should not come up on any critical mineral zone to be verified by GSI/NMDC.
18.	Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI. No mineral zone on the proposed site be certified by Geological Survey of India or any other concerned Government Organization.

3.4.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Scope of EIA Study	
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.
Details of the Project and Site	
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
Description of Environment and Baseline Data	
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.
Details of the Methology	

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.
Methodology for Collection of Biodiversity Data	
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).
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follow s:	
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 (SO2) and Oxides of Nitrogen (NOX) 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, NO2, PO4, CI, SO4, 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 km2 year-1.
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.
36.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).
37.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.

38.	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.
39.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
40.	Economically important species like medicinal plants, timber, fuel wood etc.
41.	Details of endemic species found in the project area.
42.	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.
43.	Cropping pattern and Horticultural Practices in the study area.
44.	null
45.	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.
46.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
47.	Information (authenticated) on Avi-fauna and wildlife in the study area.
48.	Status of avifauna their resident/ migratory/ passage migrants etc.
49.	Documentation of butterflies, if any, found in the area.
50.	Details of endemic species found in the project area.
51.	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.
52.	Existence of barriers and corridors, if any, for wild animals.
53.	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.
54.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
55.	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.

56.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.
57.	Fish and fisheries, their migration and breeding grounds.
58.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
59.	Conservation status of aquatic fauna.
60.	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.
61.	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.
62.	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.
63.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
64.	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.
65.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
66.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
67.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
68.	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.
69.	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.
23.	Impact on fish migration and habitat degradation due to decreased flow of water
2	Impact on breeding and nesting grounds of animals and fish.

4.	
25.	Impact on local community including demographic profile.
26.	Impact on socio-economic status
27.	Impact on economic status.
28.	Impact on human health due to water / vector borne disease
29.	Impact on increase traffic
30.	Impact on Holy Places and Tourism
31.	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.
32.	Positive and negative impacts likely to be accrued due to the project are listed.
Environmental Management Plan	
1.	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.
2.	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.
3.	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.
4.	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.
5.	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.
6.	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.
7.	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.
8.	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.
9.	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.
10.	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. Deatailed 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.
11.	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.
12.	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.
13.	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.
14.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Pancahayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
15.	Labour Management Plan for their Health and Safety.
16.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.

17.	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.
18.	Environmental safeguards during construction activities including Road Construction.
19.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
20.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

4. Any Other Item(s)

N/A

5. List of Attendees

Sr. No.	Name	Designation	Email ID	Remarks
1	Prof G J Chakrapani	Chairman, EAC	cha**********@gmail.com	
2	Dr Uday Kumar R Y	Member (EAC)	uda********@yahoo.com	
3	Dr Mukesh Sharma	Member (EAC)	muk***@iitk.ac.in	
4	Dr J V Tyagi	Member (EAC)	jvt******@gmail.com	
5	Shri Kartik Sapre	Member (EAC)	kar********@gmail.com	
6	Shri Ajay Kumar Lal	Member (EAC)	akl****@gmail.com	
7	Shri Rajeev Varshney	Member	rva**********@gov.in	
8	Shri Piyush Ranjan	Member	emo***@nic.in	Absent
9	Dr J A Johnson	Member (EAC)	jaj@wii.gov.in	
10	Dr A K Sahoo	Member (EAC)	ami***@gmail.com	
11	Yogendra Pal Singh	Scientist E	yog*******@nic.in	

MINUTES OF THE 15TH MEETING OF THE EXPERT APPRAISAL COMMITTEE FOR RIVER VALLEY AND HYDROELECTRIC PROJECTS HELD ON 13TH SEPTEMBER, 2024 THROUGH VIDEO CONFERENCE (ONLINE)

The 15th 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 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 14th EAC meeting:

The Minutes of the Meeting held on 14th EAC meeting on 30th August, 2024 – 31st August, 2024 were confirmed with following corrections:

Correction in the Minutes of the 13th EAC meeting:

The Member Secretary informed the EAC that an agenda item (no 13.4) was deliberated in the 13th EAC meeting held on 12.08.2024 related to the proposal [vide Proposal No. IA/RJ/RIV/416873/2023] for grant of Environmental Clearance (EC) for construction of Shahpur Pumped Storage Project (2520 MW) in an area of 624.1702 Ha located at Kaloni, Baint and Mungawali villages, Shahabad Tehsil, District Baran, (Rajasthan) by M/s Greenko Energies Private Limited. The EAC recommended the proposal for grant of Environmental Clearance with suitable environmental safeguards. The PP has represented thereafter that capacity of the project got mentioned as 2520 MW instead of 1800 MW at para 13.4.1, 13.4.4 and 13.4.5. in the Minutes of the said EAC meeting.

The EAC after verifying the records and examination of the Minutes of the 13th EAC meeting held on 12.08.2024 agreed to correct the minutes of the aforesaid meeting to the extent that the capacity of the Shahpur Pumped Storage Project shall be read as 1800 MW.

Agenda Item No. 15.1

Pawana Falyan Close Loop Pumped Storage Project (1500 MW) in an area of 204 Ha in Village Kurvande and Falyan, Sub District Mawal and Sudhagad, District Pune and Raigad, Maharashtra by M/s Avaada Hydropower Battery Private Limited – Terms of References (TOR) – reg.

[Proposal No. IA/MH/RIV/470300/2024; F. No. J-12011/12/2024-IA-I(R)]

15.1.1: The proposal is for grant of Terms of Reference (ToR) to the project for Pawana Falyan Close Loop Pumped Storage Project (1500 MW) in an area of 204Ha in Village Kurvande and Falyan, Sub District Mawal and Sudhagad, District Pune and Raigad, Maharashtra by M/s Avaada Hydropower Battery Private Limited.

15.1.2: 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. Pawana Falyan Project (Pawana Falyan PSP) is a pumped storage scheme with an installed capacity of 1500 MW. The scheme of operation considered for the project is daily regulation to meet the demand of about 6 hours of peak power daily. Off-peak pumping hours are considered as 6 hrs 50 mins daily. The Pawana Falyan Pumped Storage Project envisages construction of two artificial reservoirs near Kurvande & Falyan villages in Pune and Raigad Districts of Maharashtra.

ii. The proposed upper reservoir is located at Kurvande village, Mawal taluka of Pune district, having geographical latitude 18°42'13.1" N and longitude 73°23'39.2"E. Whereas, the proposed lower reservoir is located at Falyan village, Sudhagad tehsil of Raigad district, having geographical latitude 18°41'37.6"N and longitude 73°21'46.7"E.

iii. The total land required for the project components and related works has been estimated to be about 204 Hectares. Out of which around 63% is forest land and 37% of non-forest land. In addition to the above, for transmission line right of way (RoW) to be taken based on the land use pattern, which will be explored further in the DPR stage. Any impacts on biodiversity due to development of proposed PSP shall be studied as part of EIA studies.

iv. The estimated project cost is Rs 6091 crore including IDC. As a preliminary estimate, a construction period of 36 months from the date of award of civil works package has been estimated for this project.

v. This PSP envisages to utilize the available head between proposed upper and lower dams situated in the Western Ghat mountain ranges and envisages an annual utilization of about 1.41 Mm3 towards recuperation of evaporation losses in Amba river basin.

vi. Demographic details in 10 km radius of project :

The proposed Pawana Falyan Pumped Storage impact area i.e. the project area and immediate surrounding area of its components like proposed upper and lower reservoir, pump house, water conductive system, pumping alignment etc. falling under Mawal tehsil in Pune district and Sudhagad tehsil in Raigad district. The proposed upper reservoir is located at Kurvande village, Mawal tehsil/taluka of Pune district. Whereas, the proposed lower reservoir is located at Falyan village, Sudhagad tehsil/taluka of Raigad district

The table below presents the list of villages according to their proximity to the project area components.

Proposed Upper Reservoir Surrounding Villages Name		Proposed Lower Reservoir Surrounding villages Name	
District: Pune		**District: Raigad**	
Tehsil	**Village Name**	**Tehsil**	**Village Name**
Mawal	Kurvande	Sudhagad	Wave T. Asare
		Sudhagad	Mangaon Bk
		Sudhagad	Falyan
		Sudhagad	Bheliv
		Sudhagad	Mangaon Kh

Demographic Profile of the Project Area Villages

As per Mission Antyodaya 2020, the total population of the project area villages is 5225 of which 2672 (51.13%) are males and 2553 (48.86%) are females. The number of houses is 1142 and on an average 4 to 5 persons live in each house. Sex ratio was found to be 955 females per 1000 males. The table below provides the village wise demographic details.

The total population of Schedule Tribes in the project area is 18.57%, while the total population of Schedule Castes is 13.52%.

Demographic Profile of the Villages

Village Name	No_ H.H	TOT_P	TOT_M	TOT_F	P_SC%	P_ST%
Kurvande	755	3637	1815	1822	25.98	7.04
Wave T. Asare	58	266	132	134	0	40.09
Mangaon Bk	74	275	150	125	0	15.98
Falyan	92	397	210	187	0	47.42
Bheliv	75	320	180	140	0	25.52
Mangaon Kh	88	330	185	145	2.69	21.56
Total	**1142**	**5225**	**2672**	**2553**	**18.57**	**13.52**

(Source Mission Antyodaya 2020 and Census of India 2011)

(*No_HH-Total House Hold, TOP_P-Total Population, TOT_M-Total Male, TOT_F-Total Female, P_SC- Scheduled Caste population, P_ST-Scheduled Tribe Population)*

Occupation Profile of the Project Area Villages

In the villages falling within the project area, 35.87% of the total population is working population and 64.12% is non-working population indicating that the non-working

population is relatively high in the project area. Out of the total working population, 93.48% are main workers and 6.51% are marginal workers.

Table: Occupation Profile of the Villages

Village Name	Total Worker (In %)	Main Worker (In %)	Marginal Worker (In %)	Non Worker (In %)
Kurvande	31.45	91.78	8.22	68.55
Wave T. Asare	27.59	98.44	1.56	72.41
Mangaon Bk	29.29	98.99	1.01	70.71
Falyan	63.23	89.80	10.20	36.77
Bheliv	62.94	97.78	2.22	37.06
Mangaon Kh	47.90	100.00	0	52.10
Total	**35.87**	**93.48**	**6.51**	**64.12**

(Source: Census of India 2011)

vii. Water requirement: Pawana Falyan PSP (1500 MW) will require 12.08 MCM for initial reservoir filling and thereafter ~ 1.41 MCM per year will be required on annual basis from Pawana Lake for restoring the storage capacity lost due to evaporation. It is proposed to utilize the water from Pawana Lake for initial filling.

viii. Project Cost: The estimated project cost is Rs 6091.0 crore. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

ix. Project Benefit: Total Employment will be 1200 persons as direct & 200 persons indirect after expansion.

x. Environmental Sensitive area: Sudhagarh WLS is located about 9.4 Km, Wildlife Clearance is application for the proposed project. River/ water body, Uttara River is flowing at the aerial distance of 0 km in east to west direction.

xi. MoU signed with State Government on 12-08-2024.

xii. Alternative Studies: 3 alternative layouts have been prepared and compared for development of PSP.

Different locations of upper and lower reservoirs have been studied around the selected project site area with availability of maximum head and keeping away from Eco-Sensitive Zone.

Various levels of FRL & MDDL have been studied for the selected upper reservoir and lower reservoir sites. The finalised parameters of all the four alternative schemes are shown in Table below.

Table Broad Features of Various Alternatives considered

S. No	Alternative	Reservoir	FRL (m)	MDDL (m)	Gross Head (m)	Minimum Available Head (m)	*L/H Ratio	Installed Capacity (MW)	Type of Power house
1	ALT-1	Upper	EL810.00m	EL 789.00m	713.0m	686.0m	4.40	1500 MW	Pit-type Surface
		Lower	EL 124.00m	EL 97.00m					
2	ALT-2	Upper	EL 662.30m	EL 643.30m	565.0m	545.0m	4	1500MW	Underground
		Lower	EL 117.20m	EL 97.20m					
3	ALT-3	Upper	EL 655.00m	EL 636.00m	597.50 m	577.50m	5.20	1500 MW	Pit-type Surface
		Lower	EL 77.50m	EL 57.50m					

*L = Length of water conductor system up to Powerhouse Start & H = Minimum available Head in m

Alternative Layouts considering Major Planning Aspects

The major aspects for the project planning for the selected three (3) alternate layouts are brought out in Table 1below.

Major Aspects	ALT-1	ALT-2	ALT-3
Availability of Gross Head	713.0m	565.0m	597.50m
Available Net Head	686.0m	545.0m	577.50m
Favourable Geological Condition	Favors	Favors	Favors
Tentative Land Acquisition area for Proposed Project			

Components only (Upper, Lower & WCS)	151 Ha	170 Ha	168 Ha
Submergence Area in Upper Reservoir (Houses/Agricultural lands)	0 Ha	0 Ha	0 Ha
Submergence Area in Lower Reservoir (Houses/Agricultural lands)	0 Ha	0 Ha	0 Ha
R&R Issues	Less	Major	Major
Forest Land % in total area (in Ha)	100%	100%	100%
L/H Ratio	4.40	4.15	5.20
Requirement of U/s Surge	No	No	No
Type of Powerhouse	Pit-type Surface	Pit-type Surface	Underground
Requirement of D/s Surge Cavern	No	No	Yes
Installed Capacity	1500 MW	1500 MW	1500 MW
Accessibility and ease of construction	Less Difficult	Moderately Difficult	Moderately Difficult
Total Length of Dam (Upper Dam & Lower Dam)	~2.65km	~2.5km	~2.5km
Length of WCS	~3.2km	~4.0km	~3.5km
Tentative Construction Period (months excluding pre-construction activities	36 months	42 months	42 months
Total Hard Cost of the Project (in Crore)	5427	5988	6146

From the above major aspects, Alternative-1 project layout is the most techno-economically feasible one for the proposed 1500MW Pawana Falyan Pumped Storage Hydro Project and selected for further studies and development.

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

xiv. The salient features of the project are as follows: -

- **Project details:**

Name of the Proposal	Pawana Falyan Pumped Storage Project
Location (Including coordinates)	Lower Reservoir : 73°21'46.7"E; 18°41'37.6"N Upper Reservoir : 73°23'29.2”E; 18°42'13.1"N
Inter- state issue involved	No
Seismic zone	Zone-III

- **Category details:**

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

- **Electricity generation capacity:**

Powerhouse Installed Capacity	1500 MW
Generation of Electricity Annually	3121 MU
No. of Units	5 nos. (5X3000 MW)
Additional information (if any)	Nil

- **ToR/EC Details:**

Cost of project	6091.0 Cr.
Total area of Project	204.0 Ha
Height of Dam from River Bed (EL)	Lower Dam – 39.0 m Upper Dam –20.0 m
Length of Tunnel/Channel	3200.0 m
Details of Submergence area	133.10 Ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste

E-Flows for the Project	Not Applicable, as this is Off-Stream Closed Loop Pumped Storage Project (PSP)
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 b) EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

- **Muck Management Details:**

No. of proposed disposal area/ (type of land- Forest/Pvt. land)	20.0 Ha Non-Forest Land
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

- **Land Area Breakup:**

Private Land	75.0 Ha
Government land/Forest Land	129.0 Ha
Submergence area/Reservoir area	133.10 Ha
Land required for project components	204.00 Ha
Additional information (if any)	Nil

- **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	--	Distance from nearest protected area (Sudhagarh WLS) is 9.4 Km, Wildlife Clearance is applicable.
National Park	--	
Wildlife Sanctuary	--	

- **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

- **Affidavit/Undertaking details:**

Affidavit/Undertaking	Enclosed
Additional information (if any)	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	Yet to Apply
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Yet to Apply

- **Miscellaneous**

Particulars	**Details**
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (NABET Accredited Consultant Organization) Certificate No : NABET/EIA/2225/RA0274 Validity : August 15, 2025 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
Project Benefits	• Pumped storage hydropower is a modified use of conventional hydropower technology to store and manage energy or electricity by moving water between an upper and lower reservoir. Currently, pumped storage round-trip or cycle energy efficiencies exceed 80%, comparing favorably to other energy storage technologies

	and thermal technologies. This effectively shifts, stores, and reuses energy generated until there is corresponding demand for system reserves and variable energy integration. This shifting can also occur to avoid transmission congestion periods, to help more efficiently manage transmission grid, and to avoid potential interruptions to energy supply. This is important because many of the renewable energy resources being developed (e.g., wind and solar) are generated at times of low demand and off-peak energy demand periods are still being met with fossil fuel resources, often at inefficient performance levels that increase the release of greenhouse gas emissions. • Further, pumped storage projects are critical to the national economy and overall energy reliability because it's: o Least expensive source of electricity, not requiring fossil fuel for generation o An emission-free renewable source o Balancing grid for demand driven variations o Balancing generation driven variations o Voltage support and grid stability Apart from this, proposed PSP will also benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic conditions.
Status of other statutory clearances	Forest Clearance - Online application seeking forest diversion for around 129.0 Ha after receipt of ToR Approval, alongwith other statutory clearances (as applicable) from State as well as Central government will be obtained post completion of Detailed Project Report.
R&R details	Details shall be evaluated during EIA/EMP Studies
Additional detail (If any)	Nil

15.1.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, KML file, etc.) and presented during the meeting. It was observed that the proposal seeks the grant of Terms of Reference (ToR) for the Pawana Falyan Close Loop Pumped Storage Project (1500 MW), covering an area of 204

hectares in the villages of Kurvande and Falyan, Sub-Districts Mawal and Sudhagad, Districts Pune and Raigad, Maharashtra, by M/s Avaada Hydropower Battery 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.

During the discussion, it was noted that the project site is located in the Western Ghats. The EAC also emphasized the need for a study focusing on the worst-case scenario, critical mineral assessment, and a comprehensive risk analysis. The EAC also noted that the PFR submitted by the project proponent is for open loop PSP whereas during the presentation it was observed that the project is a closed loop category PSP. Also, water requirement in the PFR is different from what it has been presented during the meeting.

The total land requirement for the project is 204 hectares, out of which 129 hectares are forest land and 75 hectares are non-forest land. It was noted that the application for Stage-I Forest Clearance is yet to be submitted.

Additionally, the Project Proponent has provided a Memorandum of Understanding (MoU) dated 12/08/2024, signed between the Government of Maharashtra and M/s Avaada Hydropower Battery Private Limited, granting in-principle approval for the establishment of the Pumped Storage Project with a capacity of 1500 MW in Village Kurvande, District Pune.

15.1.4 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 Pawana Falyan Close Loop Pumped Storage Project (1500 MW) in an area of 204 Ha in Village Kurvande and Falyan, Sub District Mawal and Sudhagad, District Pune and Raigad, Maharashtra by M/s Avaada Hydropower Battery 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. Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 129 Ha of forest land involved in the project shall be submitted.

ii. 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.

iii. PP shall submit the detailed plan for filling the reservoir for generating envisaged capacity with excess monsoon water only.

iv. Transportation Plan for transporting construction materials shall be submitted. Separate

chapter for risk assessment of such transportation through/within the Wildlife Sanctuary shall be included in the EIA report.

v. 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.

vi. 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.

vii. Calculation and values of GHGs (CO_2, CH_4 etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.

viii. The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report. Presence of any critical mineral zone in the proposed area be clarified from GSI.

ix. 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.

x. Conducting site specific ecological study with respect to riverine ecology focus on 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.

xi. Cumulative Impact of projects on carrying capacity and sustainability of Reservoir/ River /nala of catchment area / due to tapping of water for filling reservoir.

xii. Action plan for survival or diversion of the rivulets/stream leading to join river shall be submitted.

xiii. 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 three seasons.

xiv. 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.

xv. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.

xvi. 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.

xvii. The project area should not come up on any critical mineral zone to be verified by GSI/NMDC.

xviii. Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI. No mineral zone on the proposed site be certified by Geological Survey of India or any other concerned Government Organization.

xix. The Sub-committee shall conduct site visit before the grant of Environmental Clearance for stipulating specific environmental conditions.

[B] Socio-economic Study

xx. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.

xxi. 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. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.

xxii. 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 7th October, 2014 for the project land to be acquired.

xxiii. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.

xxiv. Budget earmarked for R&R, CSR shall not include in the cost of EMP and compliance of issues raised during Public Hearing.

[C] Muck Management/ Disaster Management

xxv. 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.

xxvi. 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.

xxvii. 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.

xxviii. Restoration plan for construction area including dumping site of excavated materials by levelling, filling up of burrow pits, landscaping etc.

[D] Disaster Management

xxix. 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.

xxx. PP shall submit the proposal of EAC and seek approval of CEA/CWC for DPR, with a distance of 100 mts from HFL to avoid future damage due to flood. The data and distance of HFL shall be certified by concerned State Government and shall be submitting grant submitting the proposal of grant of EC.

[E] Miscellaneous

xxxi. Both capital and recurring expenditure under EMP shall be submitted.

xxxii. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.

xxxiii. 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.

xxxiv. Drone video of project site shall be recorded and to be submit.

xxxv. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.

xxxvi. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.

xxxvii. 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.

xxxviii. As per Ministry's OM dated 1st 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 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.

xxxix. Detailed report on cumulative effect of multiple projects already proposed within the region on the same source.

Agenda Item No. 15.2

Rangit-II Hydro Electric Project (66 MW (2x33 MW)) in an area of 33.294 Ha in village Bangten, Barnyak, Barphok and Barthang etc., Sub District Gyalshing, Soreng and Ravong, District West District, Sikkim by M/s Sikkim Hydro Power Ventures Limited - Terms of References (TOR) - reg.

[Proposal No. IA/SK/RIV/493596/2024; F. No. J-12011/6/2009-IA.I(R)]

15.2.1: The proposal is for grant of Terms of Reference (ToR) for the project Rangit-II Hydro Electric Project (66 MW) in an area of 33.294 in village Bangten, Barnyak, Barphok and Barthang etc. sub district Gyalshing, Soreng and Ravong, district West District, Sikkim by M/s Sikkim Hydro Power Ventures Ltd.

15.2.2: 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. The Sikkim Hydro Power Ventures Limited envisages construction of Rangit-II Hydro Power Project in Gyalshing district of Sikkim.

ii. Sikkim Hydro Power Ventures Limited ('SHPVL') is a Special Purpose Vehicle (SPV) incorporated by AJR Infra and Tolling Ltd. ("AJR Infra") (formerly known as Gammon Infrastructure Projects Limited) entered into an agreement with Government of Sikkim (GOS) on 08/12/2005 for the development of 66 MW Rangit II Hydro Electric Power Project at West Sikkim on Build Own Operate and Transfer (BOOT) basis for the concession period of 35 years post COD.

iii. It is trans-basin Run of the River Project utilizing waters of Rimbi Khola and exploiting the head difference of about 630m between two sub-basins (Rimbi & Kalej Khola) of major

iv. The geographical co-ordinate of the project are:
Dam Site: 88°10'27.77"E "; 27°18'47.44"N
Power house Site: 88°13'30.9"E; 27°16'17.8"N

v. Environment clearance was issued to project on 10.06.2009 and after forest diversion and acquisition of land, project construction work started in 2012, however, when EC lapsed in 2019 about 18% of the work got completed. To re-start the construction work, denovo EC is applicable.

vi. **Land requirement:**

Forest Land	: 5.314 ha
Non-forest Land	: 27.980 ha
Total Land	: 33.294 Ha

vii. Demographic details in 10 km radius of project area:

The proposed Rangit II Hydro Electric Project impact area i.e. the project area and immediate surrounding area of its components like dam area, Head Race Tunnel (HRT), Dumping area, Power house area etc. falling under Gyalshing sub-district in Gyalshing district of Sikkim.

There are 16 villages located in and around the project area. The list of these villages is given in the table below.

Villages within the Project Area

SI. No	District	Sub-District	Village Name
1	Gyalshing	Gyalshing	Darap
2	Gyalshing	Gyalshing	Gyalshing
3	Gyalshing	Gyalshing	Kyonsda
4	Gyalshing	Gyalshing	Yangthang
5	Gyalshing	Gyalshing	Tikjya
6	Gyalshing	Gyalshing	Lingchom
7	Gyalshing	Gyalshing	Sardong
8	Gyalshing	Gyalshing	Lungzik
9	Gyalshing	Gyalshing	Sapong
10	Gyalshing	Gyalshing	Bangten
11	Gyalshing	Gyalshing	Srinagi
12	Gyalshing	Gyalshing	Pecherek
13	Gyalshing	Gyalshing	Martam
14	Gyalshing	Gyalshing	Barnyak
15	Gyalshing	Gyalshing	Barthang
16	Gyalshing	Gyalshing	Barphok

Demographic Profile of the Project Area
As per Mission Antyodaya 2020, the total population in the village is 21179 of which 10620 (50.14%) are males and 10559 (49.85%) are females. The number of households is 4617 and on an average 4 to 5 persons live in each household. Sex ratio was found to be 994 females per 1000 males. The table below provides village-wise demographic details.

The percentage of Scheduled Caste in the total population is 5.73%, while the percentage of ***Scheduled Tribe*** is ***38.12%***. Notably, Village ***Darap*** has a significantly higher ST population percentage with 76.02%, while Village **Tikjya** has a substantial ST population with 67.80%.

Demographic Profile of the Project Area:

Village Name	No_ H.H	TOT_P	TOT_M	TOT_F	P_SC%	P_ST%
Darap	398	1758	898	860	2.24	76.02
Gyalshing	76	380	184	196	5.04	7.68
Kyonsda	291	1428	723	705	1.25	20.68
Yangthang	407	1691	811	880	7.61	39.65
Tikjya	282	1188	591	597	1.74	67.80
Lingchom	489	2083	1067	1016	3.43	39.46
Sardong	201	968	484	484	5.36	47.19
Lungzik	201	979	503	476	6.73	33.53
Sapong	160	712	355	357	5.16	37.80
Bangten	147	725	365	360	9.51	24.22
Srinagi	164	674	335	339	0.00	5.47
Pecherek	251	1206	621	585	2.24	38.81
Martam	493	2434	1208	1226	6.47	39.23
Barnyak	314	1590	794	796	10.55	38.14
Barthang	338	1596	757	839	2.64	25.25
Barphok	405	1767	924	843	9.17	22.98
Total	**4617**	**21179**	**10620**	**10559**	**5.73**	**38.12**

(Source Mission Antyodaya 2020 and Census of India 2011)
(*No_HH-Total House Hold, TOP_P-Total Population, TOT_M-Total Male, TOT_F-Total Female, P_SC-Scheduled Caste population, P_ST-Scheduled Tribe Population)*

Occupation Profile of the project Area: The villages falling in the project area have 58.71% of the total population as working population and 41.28% as non-working population. Out of the total working population, 68.95% are main workers and 31.04% are marginal workers.

Table: Occupation Profile of the Project Area

Village Name	Total Worker (In %)	Main Worker (In %)	Marginal Worker (In %)	Non-Worker (In %)
Darap	49.23	54.55	45.45	50.77
Gyalshing	39.91	77.47	22.53	60.09
Kyonsda	65.24	52.46	47.54	34.76
Yangthang	42.68	64.83	35.17	57.32
Tikjya	42.48	87.69	12.31	57.52
Lingchom	53.87	71.79	28.21	46.13
Sardong	61.57	62.63	37.37	38.43
Lungzik	48.76	91.28	8.72	51.24
Sapong	85.50	93.47	6.53	14.50
Bangten	87.67	89.83	10.17	12.33
Srinagi	86.84	100.00	0.00	13.16

Pecherek	79.48	48.04	51.96	20.52
Martam	76.11	49.53	50.47	23.89
Barnyak	72.33	68.35	31.65	27.67
Barthang	73.27	71.40	28.60	26.73
Barphok	39.57	69.17	30.83	60.43
Total	**58.71**	**68.95**	**31.04**	**41.28**

(Source: Census of India 2011)

viii. Water requirement:

Live Storage at Dam – 0.223 MCM (4 hours)
Design Discharge – 12.46 m3/s
Annual yield (90%) – 235.77 MCM

ix. **Project Cost:** The estimated project cost is Rs 496.44 crore. The cost is being further reviewed during site investigations. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

ESTIMATED PROJECT COST @ 2012:

Project Components	Rs. (in Crore)
Land	18.08
EPC (Civil, H&M, E&M, Transmission, etc.)	325.75
Pre-liminary& Pre-operative Expenses	84.05
IDC	68.56
Total	**496.44**

x. **Project Benefit**: Total Employment will be 100 persons as direct & 500 persons indirect after expansion.

xi. **Environmental Sensitive area:** Barsey Rhododendron WLS is the nearest protected area at a distance of 2.3 km from the project site. ESZ boundary notified vide MOEF&CC's notification no. S.O.2172(E) dated 27th August 2014. The Eco-sensitive Zone varies from 25 m to 50 m from the boundary of the sanctuary. All project components are outside the protected area as well as ESZ. The dam site of the project is at Rimbi Khola.

xii. MoU signed with State Government on 08-12-2005 and extension of Commercial Operation date (COD) by Govt.of Sikkim Power Department vide letter no. 49/cih/ACE(west)/E&P/2016-17/Part-11/160 dated 11/10/2022.

xiii. **Resettlement and rehabilitation:** No new resettlement and rehabilitation concerns as no private land acquisition is proposed for the remaining work. All compensation payments for the acquisition of private property have been completed. CSR programs to be resumed during the construction period in line with Sikkim Hydro Power Ventures policies as part of the updated EIA/EMP.

xiv. **Scheduled – I species:** As part of earlier EIA study, a Biodiversity Conservation and Wildlife Management Plan has been prepared and submitted to state forest department for implementation. An amount of Rs. 195.59 lakh has been deposited in the CAMPA fund for this purpose. The activity shall be implemented by FEWMD and shall be monitored by SHPVL and MOEF.

xv. Public Hearing for the proposed project has been conducted by the State Pollution Control Board on 21/09/2008.

xvi. DPR was prepared in 2006 by SVS Engineering Services, one of the renowned hydro power consultants. It included detailed studies on drilling, geological studies, seismological analysis, dam type, design, hydrology studies, etc. Further, A. F. Colenco, a leading Swiss engineering company was appointed to review and validate the DPR.

xvii. **Clearances:** SHPVL has obtained all necessary clearances for implementation of the project which are as under.

CLEARANCES	**PRESENT STATUS**
Techno-economic Clearance (TEC) from Government of Sikkim	Valid
Commercial Operation Date extension	Valid till 03/06/2026
Environment Clearance	Environment clearance was issued to M/s Sikkim Hydro Power Ventures Limited (SHPVL) vide Letter no J-12011/6/2009-IA-I dated 10th June 2009. Due to certain design changes, EC was revalidated vide MOEF letter no. J-12011/6/2009-IA-I dated 16th April 2010. Further, EC was revalidated 0n 13/09/20212 for shift od dam by 36 m.
Forest Clearance and Award	FC stage I for 5.431 ha of forest land was issued on 12/7//2010 FC stage II for 5.431 ha of forest land was issued on 22/10//2010 FC stage I for 0.3370 ha of forest land was issued on 25/02/2014

	FC stage II for 0.3370 ha of forest land was issued on 03/05/2016 Forest land of 0.454 ha was surrendered on 03/05/2016
Private Land Acquisition (Private land was acquired by Sikkim Power Development Corporation, Government of Sikkim and leased to Sikkim Hydro Power Venture Limited	Lease deed for 21.612 Ha signed on 12/12/2013 Lease deed for 6.368 Ha was signed on 29/09/2022
Connectivity and Long-term Access for evacuation of power through State Transmission Utility.	In-principally agreed by GOS and required to submit necessary technical details / drawings and other documents with Application to STU.
Financial Closure with the consortium of Power Finance Corporation, Bank of India and Indian Renewable Energy Development Agency (IREDA) in January 2014. Debt: Equity 75: 25	Required revalidation
Consent to establish from State Pollution Control Board	Required renewal

xviii. **Land Status:**

Permanent land - Govt. Land (through long term land lease) Forest land (through memo)	**33.294 ha** 27.980 ha 5.314 ha	In possession
Temporary Land For construction phase through agreement	**4.496 ha**	In possession

xix. **Construction Work:** SHPVL had awarded EPC contracts for Civil, Hydro Mechanical and Electro-Mechanical works in 2012 and firmed up project price at Rs. 496.44. The Project pre-development, initial infrastructure works have been completed and EPC work of almost 18% of total project work completed till Dec-2017. Status of work is as under.

xx. **Infrastructure Work:** Staff & workers colony at dam site and surge shaft site completed and were operational. Need repair. All other infrastructure works like approach roads, steel bridge, culverts, construction power arrangement, workshop, stores, etc. were completed and operational. Need repair.

xxi. **EPC Work Status**

- ✓ River diversion works completed – Required cleaning and repairs.

- ✓ 70% of dam excavation completed in 2017 – required removal of riverbed material accumulated during flash floods.
- ✓ Adit to Head Race Tunnel completed and were operational
- ✓ Works at three faces in Head Race Tunnel - around 625 meters excavation and supporting work completed.
- ✓ Total excavation of 66 meters deep surge shaft completed
- ✓ Tunneling work in Pressure shaft - around 265 meters excavation and supporting work completed
- ✓ Approach road to Powerhouse completed.
- ✓ Till Dec-2017, total project work of around 18% completed
- ✓ SHPVL has not drawn down any project loan so far and work is being carried out using project equity fund. Till date SHPVL has invested around Rs. 110 Cr.

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

- **EAC Meeting Details:**

EAC meeting/s	15th Meeting
Date of Meeting/s	13.09.2024
Date of earlier EAC meetings	14.05.2009 for Environment Clearance
	22.02.2007 for Scoping Clearance

- **Project details:**

Name of the Proposal	Rangit II Hydro Electric Project
Location (Including coordinates)	Dam Site: 88°10'27.77"E; 27°18'47.44"N Powerhouse Site: 88°13'30.9"E; 27°16'17.8"N
Inter- state issue involved	No
Seismic zone	Zone-IV

- **Category details:**

Category of the project	A
Provisions	
Capacity / Cultural command area (CCA)	66 MW
Attracts the General Conditions (Yes/No)	Yes
Additional information (if any)	Nil

- **Electricity generation capacity:**

Powerhouse Installed Capacity	66 MW
Generation of Electricity Annually	283.87 MU
No. of Units	2 nos. (2X33 MW)
Additional information (if any)	Nil

- **ToR/EC Details:**

Cost of project	496.44 Cr.
Total area of Project	33.294 ha
Height of Dam from River Bed (EL)	40.0 m
Length of Tunnel/Channel	4745.0 m
Details of Submergence area	4.0 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	E-flow will be released as per applicable guidelines.
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

- **Muck Management Details:**

No. of proposed disposal area/ (type of land-Forest/Pvt. land)	2.6 ha Non-Forest Land
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

- **Land Area Breakup:**

Private Land	27.980 ha
Government land/Forest Land	5.314 ha
Submergence area/Reservoir area	4.0 ha
Land required for project components	29.294 ha
Additional information (if any)	Nil

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

Forest Land/ Protected Area/ Environmental Sensitivity Zone	**Yes/No**	**Detailsof Certificate / letter/ Remarks**
Reserve Forest/Protected Forest Land	--	Distance from nearest protected area (Barsey Rhododendron WLS) is 2.30 Km, however, proposed project is outside the notified ESZ boundary of the sanctuary
National Park	--- --	
Wildlife Sanctuary	--- --	

- **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

- **Affidavit/Undertaking details:**

Affidavit/Undertaking	Enclosed
Additional information (if any)	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	FC stage I for 5.431 ha of forest land was issued on 12/7//2010 FC stage II for 5.431 ha of forest land was issued on 22/10//2010

	FC stage I for 0.3370 ha of forest land was issued on 25/02/2014 FC stage II for 0.3370 ha of forest land was issued on 03/05/2016 Forest land of 0.454 ha was surrendered on 03/05/2016
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	-

- **Miscellaneous**

Particulars	**Details**
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (*NABET* Accredited *Consultant Organization*) Certificate No : NABET/EIA/2225/RA0274 Validity : August 15, 2025 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
Project Benefits	Project will generate 283.87 MU annually in a 90% dependable year. 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

Status of other statutory clearances	Present case is a de novo EC application where 18% work has already been completed and Forest clearance is already in place.
R&R details	No R&R, as present case is a de novo EC application and R&R was completed earlier.
Additional detail (If any)	Nil

15.2.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, KML file, etc.), and as presented in the meeting, observed that the proposal is for the grant of Terms of Reference (ToR) for the Rangit-II Hydro Electric Project (66 MW), covering an area of 33.294 hectares in the villages of Bangten, Barnyak, Barphok, and Barthang, located in the sub-districts of Gyalshing, Soreng, and Ravong in West District, Sikkim, by M/s Sikkim Hydro Power Ventures Ltd.

The project falls under Category A of item 1(c) 'River Valley Projects' in the Environmental Impact Assessment (EIA) Notification, 2006, requiring appraisal at the central level by the sectoral EAC in the Ministry.

The EAC noted that Environmental Clearance (EC) for the project was issued on 10/06/2009, and construction commenced in 2012 after securing forest diversion and acquiring the required land. However, by the time the EC lapsed in 2019, only about 18% of the work had been completed.

Additionally, it was noted that the total land requirement for the project is 33.294 hectares**,** consisting of 5.314 hectares of forest land and 27.980 hectares of non-forest land**.** Stage-II Forest Clearance (FC) for 5.431 hectares of forest land was issued on 22/10/2010, and FC Stage-II for 0.3370 hectares of forest land was issued on 03/05/2016. Furthermore, 0.454 hectares of forest land was surrendered on 03/05/2016.

The EAC also noted that the Memorandum of Understanding (MoU) was signed with the State Government on 08/12/2005**,** and an extension for the Commercial Operation Date (COD) was granted by the Government of Sikkim Power Department via letter no. 49/cih/ACE(west)/E&P/2016-17/Part-11/160 dated 11/10/2022**.**

15.2.4 The EAC based on the information submitted and as presented during the meeting, **recommended** the proposal for grant of Standard ToR issued by the Ministry for conducting EIA study to the project for Rangit-II Hydro Electric Project (66 MW) in an area of 33.294 in village Bangten, Barnyak, Barphok and Barthang etc. sub district Gyalshing, Soreng and Ravong, district West District, Sikkim by M/s Sikkim Hydro Power Ventures Ltd, under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR.

[A] Environmental Management and Biodiversity Conservation:

i. 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.

ii. The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report.

iii. Environmental matrix during construction and operational phase needs to be submitted. Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report.

iv. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature required to be cut for barrage creation and other project component.

v. Three season (Pre-monsoon, Monsoon and winter season) baseline data of all the environmental attributes including biological environment as mentioned in the Standard ToR shall be collected for preparation of EIA/EMP report.

vi. Source of construction material and its distance from the project site along with detailed transportation plan for construction material.

vii. 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.

viii. A detailed wildlife conservation plan for Schedule –I species be prepared duly approved by the Chief Wild Life Warden be submitted.

ix. Explore the possibilities to reduce forest area for the construction of proposed project. Reduction of forest land with changing installed capacity.

x. Conduct geological survey and find out availability of mineral in study area. Take Geological opinion from GSI regarding mineral zone in the project study area.

xi. Density of forest and its types including tentative nos of tree felled during construction of the project and details of plants species to be planted under compensatory plantation be mentioned in Compensatory Afforestation Plan under EIA/EMP.

xii. Identify the sand mining/ quarrying sites in submergence area and downstream of reservoir. Source of construction material and its distance from the project site along with detailed transportation plan for construction material.

xiii. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.

xiv. Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is located outside the Eco Sensitive Zone (ESZ) and Wildlife Sanctuary.

xv. In case any Wildlife corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals.

xvi. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.

xvii. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.

xviii. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.

xix. Project impact on avi-fauna shall be studied and incorporated in EIA/ EMP report.

xx. The project proponent must also include information if any, on the critical mineral zone mining or potential in the projected area from Geological Survey of India /Mineral Exploration Corporation Ltd or similar such Government organizations.

[B] Socio-economic Study

xxii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policyissue is involved with any State in the project.

xxiii. All the tasks including conducting public hearing shall be done as per the provisions of EIANotification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.

xxiv. Statement on the commitments (activity-wise) made during public hearing to facilitate thediscussion on the CER in compliance of the Ministry's OM F.No.22- 65/2017- IA.III dated30th September, 2020 shall be submitted.

xxv. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared. Details of settlement in 10 km area shall be submitted.

xxvi. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.

[C] Muck Management/ Disaster Management

xxvii. 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.

xxviii. 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

sitealong with types of road etc.

xxix. Details of water sprinkling arrangements for arresting the fugitive / dust, emission from transportation and other project activities in project construction area.

xxx. Safety measures for avoiding spill over muck into the riverbed/streams and its flow into theriver 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 notroll down the slopes and shall be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area.

xxxi. Restoration plan for construction area including dumping site of excavated materials bylevelling, filling up of burrow pits, landscaping etc.

[D] Disaster Management

xxxii. CAT plan, Dam break analysis, Disaster Management Plan and Fisheries Management Planbe prepared along with other EMPs and incorporated in the EIA/EMP report.

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

xxxiv. Pre-DPR Chapters viz., Hydrology, Layout Map and Power Potential Studies duly approvedby CWC /CEA shall be submitted.

[E] Miscellaneous

xxxv. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.

xxxvi. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.

xxxvii. Both capital and recurring expenditure under EMP shall be submitted.

xxxviii. 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 analyse the samples.

xxxix. Aerial view video of project site shall be recorded and to be submitted.

xl. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.

Agenda Item No. 15.3:

Tiruvannamalai Pumped Storage Project (2000 MW) in an area of 295ha in village Karnatiogarh Reserved Forest, Kidampalayam and Mel Cheppili etc., Sub District Jamunamarathoor and Kalasapakkam, District Tiruvannamalai, Tamil Nadu by M/s Eco Leap Technologies India Private Limited – Reconsideration for Terms of References (TOR) - reg.

[Proposal No. IA/TN/RIV/456813/2023; F. No. J-12011/02/2024-IA.I(R)]

15.3.1: The proposal is for grant of Terms of References (TOR) to Tiruvannamalai Pumped Storage Project (2000 MW) in an area of 295ha in village Karnatiogarh Reserved Forest, Kidampalayam and Mel Cheppili etc., Sub District Jamunamarathoor and Kalasapakkam, District Tiruvannamalai, Tamil Nadu by M/s Eco Leap Technologies India Private Limited

15.3.2: 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. Tiruvannamalai PSP has been planned as a closed loop pumped storage project and envisages the creation of two off-stream reservoirs near Kidampalayam Village. Both the upper and lower reservoirs of this project are located away from the natural river stream. The requirement of water for the project is planned to be met by initially pumping water into the lower reservoir from the Cheyyar River and this will be used cyclically for power generation.

ii. The water from the upper reservoir will be utilized for generating power during peaking hours and the off-peak periods, water from the lower reservoir shall be pumped back to the upper reservoir. The project has a total generating capacity of 2000 MW and envisages the installation of 8 nos. of reversible units of 250 MW each with a 549.75 m rated head and design discharge of 416.9 m3/s. All the units are housed in an underground powerhouse.

iii. The geographical co-ordinate of the project are Lower Reservoir: 79°1'3.47"E; 12°32'51.43"N; Upper Reservoir : 78°58'59.40"E; 12°32'57.25"N.

iv. The Tiruvannamalai Pumped Storage Project envisages construction of two artificial reservoirs near Kidampalayam village in Tiruvannamalai District of Tamil Nadu

v. The Tiruvannamalai off-stream closed loop Pumped Storage Project envisages construction of

- A Geomembrane Faced Rock-Fill Dam (GFRD) having varying height from 5.0 m to 51.0 m from the natural surface level for the upper and lower reservoir.
- Two intake/outlet structures have been proposed within the upper reservoir by locally excavating to provide sufficient submergence below the MDDL.

- Two numbers of horseshoe and circular shaped high-pressure tunnels of the total length of about 1570 m each, which connects the two number of circular pressure shaft of length of about 300 m each.
- Each pressure shaft divided into four-unit pressure shafts to feed eight pump-turbine housed in the Powerhouse.
- An underground powerhouse of size 215.5 m (L) x 22.0 m (W) x 50.0 m (H) having an installation of eight nos. of reversible Francis pump-turbine of 250 MW each.
- A transformer cavern of size 215.5 m (L) x 17.2 m (W) x 26.0 m (H) has been proposed downstream of the powerhouse cavern.
- One 7.5 m diameter D-shaped main access tunnel (MAT) has been proposed to provide the access to underground powerhouses and transformer caverns.
- A pothead yard of size 50.0 m (L) x 20.0 m (W)
- Eight branches of low-pressure tunnels emerge from each draft tube and combine into two horseshoe shaped low pressure tunnels of length 715 m each.
- Two intake/outlet structures have been proposed to be located within the lower reservoir which discharge the water from the low-pressure tunnel to the reservoir.

vi. The total land required for the construction of various components and related works for Tiruvannamalai PSP is estimated to be around 295.0 ha, out of which is 92.50 ha is private land and 202.50 ha is forest/govt. land. Therefore, Forest Clearance is required to be obtained under Forest Conservation Act. Koundinya is about 48.0 Km from site, is the nearest protected area from the proposed project. Any impacts due to development of proposed PSP shall be studied as part of EIA studies.

vii. The estimated project cost is Rs. 12758.0 Crore including IDC. As a preliminary estimate, a construction period of 54 months from the date of award of civil works package has been estimated for this project.

viii. Demographic details in 10 km radius of project area :The proposed Tiruvannamalai Pumped Storage impact area i.e. the project area and immediate surrounding area of its components like proposed upper and lower reservoir, pump house, water conductive system, pumping alignment etc. falling under Polur tehsil in Tiruvannamalai district of Tamil Nadu.

The table below presents the list of villages according to their proximity to the project area components.

Proposed Upper Reservoir Surrounding Villages Name		**Proposed Lower Reservoir, WCS, MD & Pumping Alignment Surrounding villages Name**	
District: Tiruvannamalai			
Tehsil/Taluk	**Village Name**	**Tehsil/Taluk**	**Village Name**
Polur	Melchippili	Polur	Thumbakkadu
Polur	Kuttakarai	Polur	Kidampalayam
Polur	Pattarikadu	Polur	Kaliyam

Polur	Seengadu	Polur	Athimoor
		Polur	Siruvallur
		Polur	Kettavarampalayam
		Polur	Melarani
		Polur	Vilvarayanallur (Mel)

Demographic Profile of the Project Area Villages: As per Mission Antyodaya 2020, the villages has a total population of 30925 of which 14748 (47.68%) are males and 16177 (52.32.5%) are females. The number of houses is 10049 and on an average 3 to 4 persons live in each house. Sex ratio was found to be 1096 females per 1000 males which shows the female population is higher than male population. Village wise demographic details are given in the table below.

The data shows that tribal communities have significant presence in some of the villages in the project area, with Scheduled Tribes accounting for 14.33% of the total population while Scheduled Castes account for 25.95%.

Demographic Profile of the Villages

Village Name	No_ H.H	TOT_ P	TOT_ M	TOT_ F	P_SC %	P_ST %
Seengadu	162	312	172	140	0	99.77
Kuttakarai	315	1222	631	591	0	99.57
Pattarikadu	147	529	265	264	0	98.48
Thumbakkadu	352	1335	657	678	0	77.35
Athimoor	1862	3274	1174	2100	5.06	0.40
Kaliyam	2270	3274	1070	2204	70.4	0
Kidampalayam	674	2845	1423	1422	3.83	0.59
Melchippili	129	526	269	257	0.38	99.04
Kettavarampalayam	1482	5934	2976	2958	47.36	0.54
Melarani	652	2811	1448	1363	24.79	0
Vilvarayanallur (Mel)	679	2700	1500	1200	36.85	0
Siruvallur	1325	6163	3163	3000	18.59	0.13
Total	**10049**	**30925**	**14748**	**16177**	**25.95**	**14.33**

(Source Mission Antyodaya 2020 and Census of India 2011)

(*No_HH-Total House Hold, TOP_P-Total Population, TOT_M-Total Male, TOT_F-Total Female, P_SC-Scheduled Caste population, P_ST-Scheduled Tribe Population)*

Occupation Profile of the Project Area Villages: In the villages falling within the project area, 57.72% of the total population is working population and 42.27% is non-working population. Out of the total working population, 72.25% are main workers and 27.74% are marginal workers.

Table: Occupation Profile of the Villages

Village Name	Total Worker (In %)	Main Worker (In %)	Marginal worker (In %)	Non Worker (In %)
Seengadu	50.11	62.22	37.78	49.89
Kuttakarai	69.24	93.76	6.24	30.76
Pattarikadu	55.95	88.85	11.15	44.05
Thumbakkadu	62.11	99.15	0.85	37.89
Athimoor	62.03	51.1	48.9	37.97
Kaliyam	59.41	38.65	61.35	40.59
Kidampalayam	62.46	64.38	35.62	37.54
Melchippili	50	100	0	50
Kettavarampalayam	54.2	94.42	5.58	45.8
Melarani	55.78	97.9	2.1	44.22
Vilvarayanallur (Mel)	47.77	70.6	29.4	52.23
Siruvallur	60.55	57.31	42.69	39.45
Total	**57.72**	**72.25**	**27.74**	**42.27**

(Source: Census of India 2011)

ix. **Water requirement**: Tiruvannamalai PSP (2000 MW) will require 13.36 MCM for initial reservoir filling and thereafter ~ 2.0 MCM per year will be required on annual basis from Cheyyar River for restoring the storage capacity lost due to evaporation.

x. **Project Cost:** The estimated project cost is Rs 12758.0 crore. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

xi. **Project Benefit**: Total Employment will be 100 persons as direct & 250 persons indirect after expansion.

xii. **Environmental Sensitive area:** Koundinya WLS is located about 48.0 Km**.** River/ water body, Mirukanda N is flowing at the aerial distance of 500 m in east to north-west direction.

xiii. MoU signed with State Government on 08-01-2024.

xiv. Alternative Studies: 3 alternative layouts have been prepared and compared for development of PSP. To work out the best alternative layout, 3 alternative layouts have been prepared and compared for development of PSP.

These layouts have been studied in detail with respect to the following criteria:

- *Environment and social impacts*
- *Topography of the area and other factors like location, length of water conductor System*
- *Utilization of available head at project site to the maximum extent feasible*
- *Development of economical and optimized layout*
- *Ease of construction and access to shafts, powerhouse, and related structures*
- *Minimal area of land acquisition to accommodate various project components*
- *Away from habitation*

xv. The upper reservoir location has been kept the same for all the alternatives due to its topographical constraints and the lower reservoir is studied at three different locations based on the availability of flat terrain and type of land.

xvi. The layout of all three alternatives has been planned in such a way that it would eliminate the requirement of upstream surge shaft and the same has been studied for tailrace in all alternatives. Underground powerhouse has been proposed in all the alternatives as the natural ground level in the project region makes it difficult to have surface or pit type powerhouse.

Comparison of salient features of Alternatives

Description	**Alternative 1**	**Alternative 2**	**Alternative 3**
Upper reservoir (proposed)			
Type of dam	GFRD		

Max dam height (m) from NSL	51.0		
Reservoir periphery (km)	3.78		
Length of embankment dam (km)	2.37		
FRL (m)	847.50		
MDDL(m)	811.50		
Live storage capacity (MCM)	12.33		
Lower reservoir (proposed)			
Type of dam	GFRD	GFRD	GFRD
Max dam height (m)	41.0	21.0	40.0
Reservoir periphery (km)	3.27	3.26	2.50
Length of embankment dam (km)	2.46	3.26	2.21
FRL (m)	284.00	248.00	259.00
MDDL (m)	255.50	225.50	220.50

Description	**Alternative 1**	**Alternative 2**	**Alternative 3**
Live Storage Capacity (MCM)	12.38	13.73	11.44
Total Discharge (m3/s)	416.90	416.90	397.37
Max Head (m)	582.00	608.00	612.50
Min Head (m)	517.50	549.50	538.00
IC (MW)	2000	2160	1920
No.of Units	8	9	8
Unit Capacity (MW)	250	240	240
Unit Discharge (m3/s)	52.11	46.32	49.67
No. of WCS	2	2	2
Annual Energy, MU @ 95% m/c availability	5548	5992	5326
Water Conductor System			
Head race - length (m)	2000	2000	2000

Tail race - length (m)	860	2080	2255
Total Length of WCS (m)	2860	4080	4255
Upstream L/H Ratio	3.6	3.4	3.4
Upstream Surge Tank/shaft	Nil	Nil	Nil
Downstream Surge Gallery	Nil	Required	Required
Type of Powerhouse	Underground	Underground	Underground
Length of MAT (m)	938	1250	1500

Comparison of Land Requirement

	Alternative 1 (2000 MW)	Alternative 2 (2160 MW)	Alternative 3 (1920 MW)
Total land requirement (ha)	295.00	296.00	299.00
Private land (ha)	92.50	32.00	50.00
Forest land (ha)	202.50	264.00	249.00

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

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

- **EAC Meeting Details:**

EAC meeting/s	15th Meeting
Date of Meeting/s	13.09.2024
Date of earlier EAC meetings	6th Meeting dated 23.01.2024

- **Project details:**

Name of the Proposal	Tiruvannamalai Pumped Storage Project

Location (Including coordinates)	Lower Reservoir : 79° 1'3.47" E; 12°32'51.43" N Upper Reservoir : 78°58'59.40" E; 12°32'57.25" N
Inter- state issue involved	No
Seismic zone	Zone-III

- **Category details:**

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

- **Electricity generation capacity:**

Powerhouse Installed Capacity	2000 MW
Generation of Electricity Annually	5548.0 MU
No. of Units	8 nos. (8X250 MW)
Additional information (if any)	Nil

- **ToR/EC Details:**

Cost of project	12758.0 Cr.
Total area of Project	295.0 ha
Height of Dam from River Bed (EL)	Lower Dam – 41.0 m Upper Dam – 51.0 m
Length of Tunnel/Channel	2860 m
Details of Submergence area	165.0 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	Not Applicable, as this is Off-Stream Closed Loop Pumped Storage Project (PSP)
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then	No

E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	

- **Muck Management Details:**

No. of proposed disposal area/ (type of land- Forest/Pvt. land)	65 ha Non-Forest Land
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

- **Land Area Breakup:**

Private Land	92.5 ha
Government land/Forest Land	202.5 ha
Submergence area/Reservoir area	165.0 ha
Land required for project components	130.0 ha
Additional information (if any)	Nil

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

Forest Land/ Protected Area/ Environmental Sensitivity Zone	**Yes/No**	**Detailsof Certificate / letter/ Remarks**
Reserve Forest/Protected Forest Land	--	There is no Protected Area in the vicinity of the proposed project. Koundinya WLS is about 48 Km from site is the nearest protected area from the proposed project.
National Park	--- --	
Wildlife Sanctuary	--- --	

- **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

- **Miscellaneous**

Particulars	Details
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (*NABET* Accredited *Consultant Organization*) Certificate No : NABET/EIA/2225/RA0274 Validity : August 15, 2025 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
Project Benefits	• Pumped storage hydropower is a modified use of conventional hydropower technology to store and manage energy or electricity by moving water between an upper and lower reservoir. Currently, pumped storage round-trip or cycle energy efficiencies exceed 80%, comparing favorably to other energy storage technologies and thermal technologies. This effectively shifts, stores, and reuses energy generated until there is corresponding demand for system reserves and variable energy integration. This shifting can also occur to avoid transmission congestion periods, to help more efficiently manage transmission grid, and to avoid potential interruptions to energy supply. This is important because many of the renewable energy resources being developed (e.g., wind and solar) are generated at times of low demand and off-peak energy demand periods are still being met with fossil fuel resources, often at inefficient performance levels that increase the release of greenhouse gas emissions.

	• Further, pumped storage projects are critical to the national economy and overall energy reliability because it's: o Least expensive source of electricity, not requiring fossil fuel for generation o An emission-free renewable source o Balancing grid for demand driven variations o Balancing generation driven variations o Voltage support and grid stability Apart from this, proposed PSP will also benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic conditions.
Status of other statutory clearances	Forest Clearance - Online application seeking forest diversion for around 202.5 Ha after receipt of ToR Approval. Alongside, other statutory clearances (as applicable) from State as well as Central government will be obtained post completion of Detailed Project Report.
R&R details	Details shall be evaluated during EIA/EMP Studies
Additional detail (If any)	Nil

15.3.3 The Proposal was earlier considered by the EAC in its 6th meeting held on 23.01.2024 wherein the EAC deferred the proposal and sought additional information. Accordingly, the PP vide its reply dated 29.08.2024 re-submitted the proposal along with following information sought by the EAC:

Query 1: PP shall submit MoU signed with State department for setting up the proposed project and availability of water for the project along with different users.

Reply: An MoU has been signed between Government of Tamil Nadu and M/s Leap Green Energy Private Limited on 8th January 2024 for setting up of a Green Ammonia Manufacturing Facility with a capacity of 660 Kilo Tonnes per Annum combined with Solar capacity of 3400MW and Pumped Storage Project with a capacity of2000MW/16000MWh by Leap Green or SPVs set up by Leap Green and/ or the PSG Group of Leap Green

Query 2: PP shall explore any alternate source of water and other alternatives site as Kettavarampalayam lake is not having enough/sufficient water.

Reply:

As advised by EAC, a study has been initiated to explore alternate source of water for meeting the water requirement of Tiruvannamalai PSP. Cheyyar river has been identified as a potential source of water as it flows at a distance of about 12 Km from the project location. It is a tributary of Palar River, originates in Jawadhu Hills and flows through Thiruvannamalai district before entering into the Bay of Bengal. Therefore, a study was initiated on the assessment of dependable yield from Cheyyar river.

Water availability study has been carried out by experts (Er R Selvam (ME), Consultant - Water Resources Chennai & Dr P K Suresh (PhD), Modelling specialist, Chennai) to establish water availability in Cheyyar river for initial filling and recuperation of losses.

The study concluded that the drawl of water is proposed during Monsoon period when the system receives considerable amount of rainfall. Accordingly, it is concluded that 13.36 MCM of water for initial filling and 2.0 MCM of water for Annual Top-up can be drawn from the Cheyyar river without affecting the existing irrigation systems in the river.

Query 3: PP shall submit revised land area to minimize the requirement of forest area and muck disposal site shall be proposed in non-forest area.

Reply: As advised by EAC, land requirement has been revised and muck disposal site has been proposed in non-forest area. Tn addition, contractor facilities, store and permanent colony, which were earlier proposed on forest land has been changed to non-forest land. With the change in location of these components. forest land requirement has been reduced to 202.50 ha as compared to earlier proposed forest land requirement of 264.50 ha i.e. a reduction of 62 ha (23.4%). Revised land requirement table is as below:

S. No.	Description	Land Requirement (Earlier Proposal)			Land requirement (Revised Proposal)		
		Forest (ha)	Non-forest (ha)	Total (ha)	Forest (ha)	Non-forest (ha)	Total (ha)
1	Upper reservoir & upper intake	74	6	80	80	-	80
2	Lower reservoir & lower intake	83.5	1.5	85	83.5	1.5	85
3	High pressure tunnel	5	-	5	5	-	5
4	Low pressure tunnel	3	-	3	3	-	3
5	Powerhouse	5	-	5	5	-	5
6	Emergency, cable and ventilation tunnel	3	-	3	3	-	3
7	Portals and pothead yard	4	-	4	4	-	4
8	Proposed road	11	-	11	11	-	11
9	Laying of Water filling line	8	2	10	8	2	10

10	Proposed contractor facilities & store	20	-	20		20	20
11	Muck disposal	44	21	65		65	65
12	Permanent colony	4	-	4		4	4
	Total	**264.5**	**30.5**	**295**	**202.5**	**92.5**	**295**

Query 4: A letter certified from DFO shall be submit stating that no wildlife corridor is passing through out the project boundary.

Reply: As required, a letter has been issued by DFO, Tiruvannamalai division on 28/06/2024 stating that there is no recognized wildlife corridor passing through the project boundary. Copy of the letter has been submitted.

Query 5: A drone video shall be submitted and presented during the meeting.

Reply: Drone video has been presented during the EAC meeting

Query 6: PP shall submit details and status of other projects proposed in the 10 km range of the Tiruvannamalai Close Loop Pumped Storage Project.

Reply: We have thoroughly reviewed all the available data; there are no other pump storage schemes proposed within 10 Km range of Tiruvannarnalai PSP

Query 7: An undertaking shall be submitted that no construction has been started till date.

Reply: The undertaking has been sumitted.

15.3.4 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, KML file, etc.), as presented in the meeting, and observed that the proposal is for the grant of Terms of Reference (ToR) for the Tiruvannamalai Pumped Storage Project (2000 MW), covering an area of 295 hectares located in the Karnatiogarh Reserved Forest, Kidampalayam, and Mel Cheppili villages within the sub-districts of Jamunamarathoor and Kalasapakkam, in Tiruvannamalai District, Tamil Nadu, by M/s Eco Leap Technologies India Private Limited.

The project falls under Category A of item 1(c) 'River Valley Projects' as per the Environmental Impact Assessment (EIA) Notification, 2006, and thus requires appraisal at the Central level by the sectoral EAC in the Ministry.

The total land requirement for the project is 295.0 hectares**,** out of which 92.50 hectares is private land and 202.50 hectares is forest/government land. The application for Stage-I forest clearance is yet to be submitted.

The EAC observed that the project site is located on a predominantly high-density, rich forest area that hosts a variety of plant and animal species, including those classified as Schedule I and endangered species. While the EAC has reviewed and considered alternative sites and determined that the selected site is appropriate for the project, they have recommended that the PP shall explore ways to minimize the use of forest land by optimizing the project's capacity as well as appropriate action plan for minimizing the impacts of project on the biota. Additionally, the EAC has advised conducting a cost-benefit analysis that will take into account the potential loss of forest area and the impact on biodiversity.

It was also noted that the Project Proponent has submitted an MoU dated 08.01.2024, signed between Guidance, Government of Tamil Nadu**,** and M/s Leap Green Energy Private Limited. The EAC observed that while the MoU was signed with M/s Leap Green Energy Private Limited, the proposal was submitted by M/s Eco Leap Technologies India Private Limited.

15.3.5 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 Closed Loop Pumped Storage Projects vide OM dated 14.08.2023 for conducting EIA study to the project for Tiruvannamalai Pumped Storage Project (2000 MW) in an area of 295ha in village Karnatiogarh Reserved Forest, Kidampalayam and Mel Cheppili etc., Sub District Jamunamarathoor and Kalasapakkam, District Tiruvannamalai, Tamil Nadu by M/s Eco Leap Technologies India 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. Cumulative Impact Assessment be conducted in Terms of flow required for overall well-being of the ecosystem covering aspects like survival of river, water sheds and local populations needs.

ii. Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 202.50 Ha of forest land involved in the project shall be submitted.

iii. 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.

iv. PP shall submit the detailed plan for filling the reservoir for generating envisaged capacity with excess monsoon water only.

v. Transportation Plan for transporting construction materials shall be submitted. Separate chapter for risk assessment of such transportation through/within the Wildlife Sanctuary shall be included in the EIA report.

vi. Environmental Cost Benefit Analysis shall be done strictly 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.

vii. Calculation and values of GHGs (CO_2, CH_4 etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.

viii. The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report. Presence of any critical mineral zone in the proposed area be clarified from GSI.

ix. 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.

x. Conducting site specific ecological study with respect to riverine ecology focus on 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.

xi. Action plan for survival or diversion of the rivulets/stream leading to join river shall be submitted.

xii. 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 three seasons.

xiii. 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.

xiv. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.

xv. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.

xvi. The project area should not come up on any critical mineral zone to be verified by GSI/NMDC.

xvii. Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI. No mineral zone on the proposed site be certified by Geological Survey of India or any other concerned Government Organization.

[B] Socio-economic Study

xviii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.

xix. 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. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.

xx. 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 7th October, 2014 for the project land to be acquired.

xxi. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.

xxii. Budget earmarked for R&R, CSR shall not include in the cost of EMP and compliance of issues raised during Public Hearing.

[C] Muck Management/ Disaster Management

xxiii. 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.

xxiv. 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.

xxv. 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.

xxvi. Restoration plan for construction area including dumping site of excavated materials by levelling, filling up of burrow pits, landscaping etc.

[D] Disaster Management

xxvii. 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.

xxviii. PP shall submit the proposal of EAC and seek approval of CEA/CWC for DPR, with a distance of 100 mts from HFL to avoid future damage due to flood. The data and distance of HFL shall be certified by concerned State Government and shall be submitting grant submitting the proposal of grant of EC.

[E] Miscellaneous

xxix. Both capital and recurring expenditure under EMP shall be submitted.

xxx. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.

xxxi. The PP shall submit the Memorandum of Understanding (MoU) with Government of Tamil Nadu in the name of "Eco Leap Technologies India Private Limited" for development of the proposed PSP.

xxxii. 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.

xxxiii. Drone video of project site shall be recorded and to be submit.

xxxiv. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.

xxxv. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.

xxxvi. 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.

xxxvii. As per Ministry's OM dated 1st 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 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.

xxxviii. Detailed report on cumulative effect of multiple projects already proposed within the region on the same source.

Agenda Item No. 15.4

Greenko TN-11 Off-Stream Closed Loop Pumped Storage Project [1000 MW (6090 MWH)] in an area of 274.94 Ha in village Navappatti, Sub District Mettur, District Salem, Tamil Nadu by M/s Greenko Energies Private Limited – Terms of References (TOR) - reg.

[Proposal No. IA/TN/RIV/494515/2024; F. No. J-12011/26/2024-IA-I(R)]

15.4.1: The proposal is for grant of Terms of References (TOR) to the project for Greenko TN-11 Off-Stream Closed Loop Pumped Storage Project [1000 MW (6090 MWH)] in an area of 274.94Ha in village Navappatti, Sub District Mettur, District Salem, Tamil Nadu by M/s Greenko Energies Private Limited.

15.4.2: 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. Greenko Energies Pvt. Ltd., hereinafter referred as GEPL, proposes to develop Pumped Storage Project (PSP) near located at Palamalai & Navappatti villages of Mettur (T), Salem (D) in the state of Tamil Nadu. The Greenko TN-11 Off-Stream Closed Loop Pumped Storage Project envisages construction of two artificial reservoirs near Palamalai & Navappatti village in Salem district of Tamil Nadu.

ii. The total capacity of proposed PSP is 1000 MW (6090 MWH) and it is proposed that One-time requirement of 0.278 TMC of water will be lifted from existing nearby Stanley Reservoir (also known as Mettur Dam, (which is located about 7 Km away from the proposed Lower reservoir) and will be stored in the lower reservoir to be constructed and used cyclically for energy storage and discharge, out of which 0.225 TMC of water will be used for power generation by re-circulation with 6.09 hours storage capacity. Evaporation losses if any will be recouped periodically from Stanley Reservoir (also known as Mettur Dam.

iii. The proposed project involves creation of upper reservoir (11°45'33.44" N & 77°45'1.29" E) and lower reservoir (11°45'30.07" N & 77°46'42.43" E).

iv. The proposed scheme involves creation of new upper reservoir & lower reservoir. It is proposed to construct rockfill embankment of upper reservoir with average height of around 24 m (with maximum height of 45 m) for the length of 733 m with gross storage of 0.252 TMC capacity and Lower reservoir of rockfill embankment for the average height of 29 m (with maximum height of 48m) for the length of 1275 m with gross storage of 0.251 TMC capacity, 25m wide approach Channel of 436 m long joining with the intake structure. 45.15 m high Power Intake Structure, 2 nos. of 2111.05m long 5.5m dia. of Circular Steel lined Penstock / Pressure Shaft consisting of 98.55 m long Intake Tunnel, 175.44 m long Vertical Pressure Shaft-1 (VPS-1), 631.94 m long Horizontal Pressure Shaft-1 (HPS-1), 175.12 m long Vertical Pressure Shaft-2 (VPS-2), 637.91 m long Horizontal Pressure Shaft-2 (HPS-2), 167.82 m long Vertical Pressure Shaft-3 (VPS-3) and 224.28 m long Horizontal Pressure Shaft-3 (HPS-3) up to bifurcation point. Out of 2nos. of Penstock / Pressure Shaft, 1 no. of 5.5m dia. Penstock / Pressure Shaft will get bifurcated near powerhouse in to two nos. of 3.75m dia. of about 100m long to feed 2 units of 250 MW each. Another Penstock / Pressure Shaft of 5.5m dia. will initially get bifurcated into two nos. near powerhouse of 3.75m dia. in which one no. of 3.75m dia. of about 100m long will feed 1 unit of 250 MW. Another branch of 3.75m dia. will further get bifurcated in to two nos. near powerhouse of 2.65m dia. of about 100m long will feed 2 units each of 125 MW. An Underground Powerhouse having an installation of three reversible Francis turbine of 250 MW capacity (Fixed speed turbine) and two reversible Francis turbine each of 125MW (both are Fixed speed turbines) operating under a rated head of 394.00 m in generating mode and 415.00 m in pumping mode. As such, The Project will generate 1000 MW by utilizing a design discharge of 290.70 Cumec and rated head of 394.00 m.

v. The cycle efficiency of the project is expected to be around 80%. One 400 KV Double Circuit Transmission Line with Quad Moose Conductor of length 50 km (appx.) from PSP will be connected to 400 kV PGCIL Substation Dharmapuri - Hogenakkal Road, Somenahalli, Tamil Nadu for evacuation of power during turbine mode and pumping of power from grid during

pumping mode. However, final connectivity will be determined in the Detailed Project Report (DPR).

vi. Total land required for construction of various components, including infrastructure facilities and muck disposal area is estimated to be around 274.94 Ha, involving 179.46 Ha of forest land and 95.49 Ha of non-forest land.

Sl. No.	Components	Forest	Non-Forest	Total
1	Upper Reservoir	68.40	4.36	72.76
2	Lower Reservoir	64.92	0.00	64.92
3	WCS, PH	22.42	0.00	22.42
4	Adit	8.63	0.38	9.01
5	Approach Roads to Project Boundary			
I	Road to Lower Reservoir & Magazine	10.25	1.76	12.01
II	Road to Adit	1.81	1.33	3.14
III	Road to MDA	0.00	1.07	1.07
IV	Road to Civil/ E&M Store Yard	0.00	0.88	0.88
6	Muck Disposal Area	0.00	40.00	40.00
7	Job Facility Area	0.00	15.00	15.00
8	Civil/E&M Store Yard	0.00	20.00	20.00
9	Magazine	0.00	0.10	0.10
10	Pumping Alignment	3.02	10.61	13.63
Total		**179.45**	**95.49**	**274.94**

vii. Demographic details in 10 km radius of project area:

Information about Demographic & Working Population of the Project Area

The proposed Greenko TN-11 Pumped Storage Project impact area i.e. the project area and immediate surrounding area of its components like proposed upper and lower reservoir, pump house, water conductive system, pumping alignment etc. falling under Mettur tehsil/taluk in Salem district of Tamil Nadu. The proposed upper reservoir is located in Palamalai village, Mettur tehsil/taluk, Salem district, while the lower reservoir is situated in Navappatti village, also within Mettur tehsil/taluk, Salem district. Moreover, **Mettur** town is located near the proposed lower reservoir.

There are 6 villages and one town located in and around the project area. The table below presents the list of villages & town according to their proximity to the project area components.

Table: Villages in the Project Area

Upper Reservoir Surrounding Village &Town Name		Lower Reservoir and Pumping Alignment Surrounding village & Town Name	
District: Salem			
Tehsil/Taluk	**Village & Town Name**	**Tehsil/Taluk**	**Village & Town Name**
Mettur	Palamalai	Mettur	Navappatti
Mettur	Sampalli	Mettur	Kolnaikenpatti
Mettur	Kannamoochi	Mettur	**Mettur (Town)**
Mettur	Moolakkadu		

Demographic Profile of the Project Area

As per Mission Antyodaya 2020, the total population in the project area villages is 80318 of which 40507 (50.43%) are males and 39811 (49.56%) are females. The number of householdsis 23442 and on an average 3 to 4 persons live in each household. Sex ratio was found to be 982 females per 1000 males. The table below provides village-wise demographic details.

The percentage of Scheduled Caste in the total population is 17.71%, while the percentage of Scheduled Tribe is 5.97%. Notably, Village **Palamalai** has a significantly higher ST population percentage with 98.65%, while Village **Kannamoochi** has a substantial ST population with 67.80%.

Table: Demographic Profile of Project Area Villages

Village & Town Name	No_ H.H	TOT_P	TOT_M	TOT_F	P_SC%	P_ST%
Kannamoochi	1840	5091	2546	2545	10.14	24.95
Moolakkadu	1317	3716	1916	1800	27.07	2.72
Sampalli	851	2134	1000	1134	13.92	9.79
Palamalai	615	1977	1056	921	0.24	98.65
Navappatti	2358	8693	4665	4028	22.36	1.74
Kolnaikenpatti	2179	5894	3122	2772	6.09	0.73
Mettur (M)	14282	52813	26202	26611	19.43	0.42
Total	**23442**	**80318**	**40507**	**39811**	**17.71**	**5.97**

(Source Mission Antyodaya 2020 and Census of India 2011)

(*No_HH-Total House Hold, TOP_P-Total Population, TOT_M-Total Male, TOT_F-Total Female, P_SC-Scheduled Caste population, P_ST-Scheduled Tribe Population)*

Working Population of the Project Area

The villages falling in the project area have 43.41% of the total population as working population and 56.58% as non-working population. Out of the total working population, 87.51% are main workers and 12.48% are marginal workers.

Table: Working Population of Project Area Villages

Village & Town Name	Total Worker (In %)	Main Worker (In %)	Marginal Worker (In %)	Non-Worker (In %)
Kannamoochi	55.90	99.05	0.95	44.10
Moolakkadu	59.42	92.16	7.84	40.58
Sampalli	51.64	86.84	13.16	48.36
Palamalai	71.71	98.36	1.64	28.29
Navappatti	47.05	85.26	14.74	52.95
Kolnaikenpatti	61.79	72.35	27.65	38.21
Mettur (M)	36.55	87.50	12.50	63.45
Total	**43.41**	**87.51**	**12.48**	**56.58**

(Source: Census of India 2011)

viii. Water requirement: Greenko TN-11 Off-Stream Closed Loop Pumped Storage Project PSP (1000 MW) will require 7.87 MCM (0.278 TMC) for initial reservoir filling and thereafter ~ 1.13 MCM (0.225TMC) power generation by re-circulation. Evaporation losses if any will be recouped periodically from Stanley Reservoir for restoring the storage capacity lost due to evaporation.

ix. Project Cost: The estimated project cost is Rs 5947.45 crore. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

x. Project Benefit: Total Employment will be 2000 persons as direct & 150 persons indirect after expansion.

xi. Environmental Sensitive area: Thanthai Periyar WLS is located about 4.0 Km, Wildlife Clearance is application for the proposed project. River/ water body, Kaveri River is flowing at the aerial distance of 500 m in north to south direction.

xii. MoU signed with State Government on 21-08-2024.

xiii. Alternative Studies: 2 alternative layouts have been prepared and compared for development of PSP.

The GREENKO TN-11 Off-Stream Closed Loop Pumped Storage Project is planned between two reservoirs and are proposed to be constructed as GREENKO TN-11 OCPSP Upper & Lower Reservoirand one-time water requirement to be pumped from nearby Stanley Reservoir (also known as Mettur Dam) to fill up the Lower Reservoir. The scheme will operate between Upper reservoir EL 677.00m (FRL) and lower reservoir EL 246.00m (MDDL).

The layout of the project has been finalized, after exploring two alternative layouts from techno- economic assessment. The proposed GREENKO TN-11 OCPSP envisages construction of

- Upper and Lower Dams (for formation of upper & lower reservoir)
- Intake Structure
- Penstock Tunnel / Pressure Shaft (Vertical & Horizontal)
- Underground Powerhouse
- Transformer Cavern
- Downstream surge chamber
- Tail Race Tunnel
- Tailrace Outlet Structure

Site Selection Criteria:

Based on the google contour downloaded for GREENKO TN-11 OCPSP, two alternative layouts have been studied in detail with respect to the following criteria:

- Topographical Condition
- Geological Condition
- Land availability Condition
- Optimization of layout and
- Social and Environmental Condition

Alternative Layout Studies for Project Layout

Two alternative layouts with the optimization of project components have been studied with the finalized parameters of upper and lower reservoir. Both alternative layouts have been studied and discussed with the same location of upper reservoir and two different location of lower reservoirs to develop a best suitable layout considering the topographical and geological/geotechnical constraints. The length of water conductor system and tail race tunnels / channels have been altered accordinglyto suit for both the alternative layouts. The layout comprising the project components for both the alternative layouts are shown in the following drawings which are tabulated below.

Sl. No.	Drawing Title	Drawing No.
1.	General Layout Plan – Alternative-1	GKOTN-11 – PSP -

		006
2.	General Layout Plan – Alternative-2	GKOTN-11 – PSP - 007

Selection of Reservoir Locations:

In all three locations of reservoir which were identified for the project, one location for upper reservoir and two locations for lower reservoir were found technically acceptable.

Upper Reservoir:

The Topography of the proposed area of upper reservoir represents depression profile around the top of hill area showing possibility of creation of reservoir. Therefore, considering the technical requirements and proximity requirements only one feasible location was identified for upper reservoir and the identified site was studied.

Site for Upper Reservoir:

The proposed Site for upper reservoir location appears that the maximum portion of land is coming under forest land and very less portion is coming under private land. The vegetation density in this location appears to be more. The proposed Site for upper reservoir is found suitable for creating the desired live storage capacity. Also, no adverse geological features were observed in this area. During detailed assessment of site and this location appears to be geologically suitable for water retention in the reservoir. Similarly, no major social and environmental issues are foreseen in this location. The area of land required for creating this reservoir is estimated to about 72.76 Ha in which forest and private land area are 68.40 Ha & 4.36 Ha respectively. Considering this in view, this location has been selected for upper reservoir for further development of the project.

Lower Reservoir:

With respect to the location of upper reservoir and basic technical parameters required for the pumped storage project two locations were found suitable for lower reservoir which are located on natural depression and flat / gradually sloping land area respectively where the desired live storage capacity can be created by constructing a minimum height of embankment.

Site – 1 Lower Reservoir:

The proposed Site – 1 lower reservoir appears to be completely in forest land. The boundary of the proposed lower reservoir area has been fixed keeping in view the safe distance far away from the habituated area. In this location, no adverse geological features were observed and appears to be geologically suitable for water retention in the reservoir. Similarly, no Social and Environmental issues are envisaged. The area of land required for creating this reservoir is estimated to about 64.92 Ha which is completely in forest land.

Site – 2 Lower Reservoir:

Apart from this proposed Site – 1 location of lower reservoir, another alternative location i.e., Site-2 location of lower reservoir is also identified on West side of the Site-1 location which is also found suitable for creation of reservoir for the desired capacity. In this location, the area of land is partly in forest land and partly in private land. In this location also, no adverse geological features wereobserved and appears to be geologically suitable for water retention in the reservoir. On detailed assessment for Social and environmental aspects it was observed that few houses are coming under the proposed lower reservoir area. Keeping the reservoir in this location may cause disturbance, dislocation of population and create social and environmental issues. The area of land required for creating this reservoir is estimated to about 77.19 Ha in which forest land area is 45.11 Ha and private land area is 32.08 Ha.

Alternate Layouts:

Two alternative layouts for this scheme were studied.

Alternative – 1: Layout with Underground Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock Tunnel / Pressure Shaft, Downstream Surge Chamber, Tail Race Tunnel, Tail Race Outlet, and Site-1 Lower reservoir.

Alternative – 2: Layout with Underground Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock Tunnel / Pressure Shaft, Tail Race Tunnel, Tail Race Outlet, and Site – 2 Lower reservoir.

Alternative -1 Layout

The Alternative – 1 layout has been proposed with underground powerhouse between Upper reservoir and Site – 1 lower reservoir.The proposed upper reservoir site which is to be constructed newly is located on natural depression which is suitable for creating the desired storage capacity keeping FRL & MDDL at EL 677.00m & EL 652.00m respectively. Similarly, the lower reservoir which is to be constructed newly is proposed to be located in the natural depression which is suitable for creating the desired gross storage capacity keeping FRL and MDDL at EL 275.00m & EL 246.00m respectively. The rated head available in this alternative is about 394.00m and the rating of pumped storage project is estimated to 1000 MW for which the live storage requirement is 0.225 TMC. An underground powerhouse has been proposed considering the topography of the projectarea and requirement of depth of excavation of more than 130m in case of surface powerhouse. Moreover, all project components are located far away from the populated area and there will notbe any social and environmental issues are envisaged. The length of embankment for upper and lower reservoirs are 733 m and 1275 m respectively. Similarly, the total length of Penstock / Pressure Shaft and Tail Race Tunnel are 2211.05m and 1089.27m respectively. The total area of land required for this Alternative is estimated to 274.94 Ha in which forest and non-forest land area are 179.46 Ha and 95.49 Ha respectively. Component wise land requirement details are given below:

LAND REQUIREMENT DETAILS OF GREENKO TN-11 OCPSP (Ha) ALTERNATIVE - 1				
Sl. No.	**Component**	**Forest**	**Non-Forest**	**Total**
1	Upper Reservoir	68.40	4.36	72.76
2	Lower Reservoir	64.92	0.00	64.92
3	WCS, PH	22.42	0.00	22.42
4	Adit	8.63	0.38	9.01
5	Approach Roads to Project Boundary			
I	Road to Lower Reservoir & Magazine	10.25	1.76	12.00
II	Road to Adit	1.81	1.33	3.14
III	Road to MDA	0.00	1.07	1.07
IV	Road to Civil/ E&M Store Yard	0.00	0.88	0.88
6	Muck Disposal Area	0.00	40.00	40.00
7	Job Facility Area	0.00	15.00	15.00
8	Civil/E&M Store Yard	0.00	20.00	20.00
9	Magazine	0.00	0.10	0.10
10	Pumping Alignment	3.02	10.61	13.63
Total		**179.46**	**95.49**	**274.94**

The land requirement detailed drawing for this alternative is shown in Drg. No. GKOTN-11 – PSP – 005.

Except Upper and Lower reservoir, all other components including Adits are in underground. Therefore, for this alternative, the investigation time and preparation of DPR required will be about 2 years and construction time for completion of this Alternative is estimated to around 42 months excluding pre-construction works.

Alternative – 2 Layout

The Alternative – 2 layout has been proposed with underground powerhouse between upper reservoir and Site – 2 lower reservoir. The proposed upper reservoir location is same as considered in Alternative – 1 layout which is to be constructed newly and is located on natural depression which is suitable for creating the desired storage capacity keeping FRL & MDDL at EL 677.00m & EL 652.00m respectively. Similarly, the lower reservoir which is to be constructed newly is proposed to be located in the flat / gradually sloping land which is suitable for creating the desired gross storage capacity keeping FRL and MDDL at EL 380.00m & EL 349.00m respectively. The rated head available in this alternative is about 292.00 m which is about 102 m less than Alternative – 1 layout.

Because of this reason, the live storage requirement of reservoir is made for about 0.303 TMC due to lesser rated head and also to get the same capacity of 1000 MW.

An underground powerhouse has been proposed considering the topography of the project area and requirement of depth of excavation more than 130m in case of surface power house. The length of the embankment for upper and lower reservoirs are 733 m and 1670 m respectively. Similarly, the length of Penstock / Pressure Shaft is about 1610 m and is almost 601 m less than Alternative – 1 layout. With respect to 2 nos. of Penstock, the reduction in total length of penstock is around 1202 m which will decrease cost of the project to some extent. Also, the length of Tail Race Tunnel is about 310m which is 779m less than Alternative – 1 layout. With respect to 5 nos. of tunnel, the reductionin total length of tunnel is around 3895m which will decrease cost of the project as well as construction time considerably. However, the length of embankment of lower reservoir is almost 395 m more than Alternative – 1 and this will increase the project cost to some extent. Overall, the costof the project and construction time will be less in case of Alternative – 2 layout than Alternative – 1 layout. But, since the lower reservoir location is coming under habituated area, fertile agricultural land, temples, roads etc., this will lead to create Social and Environmental issues. The total area of land required for this alternative is estimated to 258.90 Ha in which forest and non-forest land area are 144.53 Ha and 114.37 Ha respectively. Component wise land requirement details are given below:

LAND REQUIREMENT DETAILS OF GREENKO TN-11 OCPSP (Ha) ALTERNATIVE – 2				
Sl. No.	**Component**	**Forest**	**Non-Forest**	**Total**
1	Upper Reservoir	68.72	4.36	73.09
2	Lower Reservoir	45.11	32.08	77.19
3	WCS, PH	12.05	0.00	12.05
4	Adit	5.00	0.60	5.60
5	Approach Roads to Project Boundary			
I	Road to Lower Reservoir	6.79	0.54	7.33
II	Road to Adit	1.52	0.00	1.52
III	Road to Civil, MDA	0.00	2.22	2.22
IV	Road to Civil/ E&M Store Yard	0.00	0.41	0.41
V	Road to JFA	0.00	0.42	0.42
VI	Road to Magazine	0.00	0.22	0.22
6	Muck Disposal Area	0.00	25.00	25.00
7	Job Facility Area	0.00	15.00	15.00
8	Civil/E&M Store Yard	0.00	20.00	20.00
9	Magazine	0.00	0.10	0.10
10	Pumping Alignment	5.34	13.42	18.76
Total		**144.53**	**114.37**	**258.90**

The land requirement detailed drawing for this alternative is shown in Drg. No. GKOTN-11 – PSP – 008.

Except Upper and Lower reservoir, all other components including Adits are in underground. Therefore, for this alternative, the investigation time and preparation of DPR required will be about2 years and construction time for completion of this Alternative is estimated to around 42 months excluding pre-construction works.

Selection of Final Layout

As discussed above, Alternative – 1 layout has been preferred considering the following reasons:

- The length of embankment of lower reservoir for Alternative -1 (i.e., 1275 m) is less than Alternative – 2 (i.e., 1670 m). Hence, considerable cost and time can be reduced in Alternative – 1 Layout.
- The total area of land required for Alternative – 1 layout (i.e., 274.94 Ha) is more than Alternative – 2 layout (i.e., 258.74 Ha). But in Alternative -1 layout, no Social and Environmental issues are foreseen. Whereas in case of Alternative – 2, the lower reservoir is located in habituated area and fertile agriculture land, temples and roads etc. are coming under lower reservoir area which will create Social and Environmental issues.

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

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

- **Project details:**

Name of the Proposal	Greenko Energies Private Limited Greenko TN011 Off-Stream Closed Loop Pumped Storage Project – Tamil Nadu
Location (Including coordinates)	The proposed project involves creation Upper Reservoir 11°45'33.44" N & 77°45'1.29"E Lower Reservoir 11°45'30.07"N & 77°46'42.43"E
Inter- state issue involved	No

Seismic zone	Zone -II (least active)

- **Category details:**

Category of the project	1(c) River Valley Projects
Provisions	
Capacity / Cultural command area (CCA)	1000 MW
Attracts the General Conditions (Yes/No)	Yes
Additional information (if any)	Nil

- **Electricity generation capacity:**

Powerhouse Installed Capacity	1000 MW (6090 MWH)
Generation of Electricity Annually	2111 MU
No. of Units	5 Nos. (3 X 250 MW) + (2 X 125 MW)
Additional information (if any)	Nil

- **ToR/EC Details:**

Cost of project	5957.45 Cr.
Total area of Project	274.94 Ha
Height of Dam from River Bed (EL)	Height of Embankment max- 45 m & Avg-24 m
Length of Tunnel/Channel	98.55 m
Details of Submergence area	137.68 Ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	Not Applicable, as this is Off-Stream Closed Loop Pumped Storage Project (OCPSP)
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then e) E-flow with TOR	No

/Recommendation by f) EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	

- **Muck Management Details:**

No. of proposed disposal area/ (type of land-Forest/Pvt. land)	One Location of 40 Ha in Non-Forest Area
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

- **Land Area Breakup:**

Private land	95.49 ha
Government land/Forest Land	Forest Land- 179.45 Ha
Submergence area/Reservoir area	137.68 Ha-Upper & Lower reservoirs
Land required for project components	274.94 Ha- Total Land requirement
Additional information (if any)	Nil

- **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	--	Distance from nearest protected area (Thanthai Periyar WLS) is about 4.0 Km.
National Park	--- --	
Wildlife Sanctuary	--- --	

- **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

- **Affidavit/Undertaking details:**

Affidavit/Undertaking	Enclosed
Additional information (if any)	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	Yet to Apply
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Yet to Apply

- **Miscellaneous**

Particulars	**Details**
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (*NABET* Accredited *Consultant Organization*) Certificate No : NABET/EIA/2225/RA0274 Validity : August 15, 2025 Contact Person : Mr. Ravinder Bhatia Name of Sector : River Valley and Hydroelectric Projects Category : A MoEF Schedule : I(C) Address : 402, Radisson Suites Commercial Plaza, B Block, Sushant Lok Phase I, Gurugram, Haryana - 122009. E-mail : ravi@rstechnologies.co.in

	Land Line : (0124) 4295383 Cellular : (+91) 9810136853
Project Benefits	• Pumped storage hydropower is a modified use of conventional hydropower technology to store and manage energy or electricity by moving water between an upper and lower reservoir. Currently, pumped storage round-trip or cycle energy efficiencies exceed 80%, comparing favorably to other energy storage technologies and thermal technologies. This effectively shifts, stores, and reuses energy generated until there is corresponding demand for system reserves and variable energy integration. This shifting can also occur to avoid transmission congestion periods, to help more efficiently manage transmission grid, and to avoid potential interruptions to energy supply. This is important because many of the renewable energy resources being developed (e.g., wind and solar) are generated at times of low demand and off-peak energy demand periods are still being met with fossil fuel resources, often at inefficient performance levels that increase the release of greenhouse gas emissions. • Further, pumped storage projects are critical to the national economy and overall energy reliability because it's: ○ Least expensive source of

	electricity, not requiring fossil fuel for generation o An emission-free renewable source o Balancing grid for demand driven variations o Balancing generation driven variations o Voltage support and grid stability Apart from this, proposed PSP will also benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic conditions.
Status of other statutory clearances	**Forest Clearance:** Online application seeking forest diversion for around 179.45 Ha after receipt of ToR Approval. Alongside, other statutory clearances (as applicable) from State as well as Central government will be obtained post completion of Detailed Project Report.
R&R details	Details shall be evaluated during EIA/EMP Studies
Additional detail (If any)	Nil

15.4.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted and presented during the meeting, observing that the proposal seeks the grant of Terms of Reference (ToR) for the Greenko TN-11 Off-Stream Closed Loop Pumped Storage Project **[**1000 MW (6090 MWH)**],** covering an area **of** 274.94 hectares in Navappatti village, Sub District Mettur, District Salem, Tamil Nadu by M/s Greenko Energies Private Limited**.**

The project falls under Category A of item 1(c) 'River Valley projects' as per the Environmental Impact Assessment Notification, 2006, requiring appraisal at the Central level by the sectoral EAC in the Ministry.

The total land requirement for the project is 274.94 hectares, which includes 179.46 hectares of forest land and 95.49 hectares of non-forest land. The application for Stage-I Forest Clearance is yet to be submitted.

It was also noted that the Project Proponent has submitted an MoU dated 21.08.2024 signed between Government of Tamil Nadu**,** and M/s Greenko Energies Private Limited for setting up the Pumped Storage Project in District Salem, near Mettur, Palamalai (upper reservoir) and Navappatti (near the powerhouse and lower reservoir).

The EAC observed that the project site is located on a predominantly high-density, rich forest area that hosts a variety of plant and animal species, including those classified as Schedule I and endangered species. While the EAC has reviewed and considered alternative sites and determined that the selected site is appropriate for the project, they have recommended that the PP shall explore ways to minimize the use of forest land by optimizing the project's capacity as well as appropriate action plan for minimizing the impacts of project on the biota. Additionally, the EAC has advised conducting a cost-benefit analysis that will take into account the potential loss of forest area and the impact on biodiversity.

15.4.4 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 Closed Loop Pumped Storage Projects vide OM dated 14.08.2023 for conducting EIA study to the project for Greenko TN-11 Off-Stream Closed Loop Pumped Storage Project [1000 MW (6090 MWH)] in an area of 274.94Ha in village Navappatti, Sub District Mettur, District Salem, Tamil Nadu by M/s Greenko Energies 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. Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 179.46 Ha of forest land involved in the project shall be submitted.

ii. 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.

iii. PP shall submit the detailed plan for filling the reservoir for generating envisaged capacity with excess monsoon water only.

iv. Transportation Plan for transporting construction materials shall be submitted. Separate chapter for risk assessment of such transportation through/within the Wildlife Sanctuary shall be included in the EIA report.

v. 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.

vi. 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.

vii. Calculation and values of GHGs (CO2, CH4 etc.) emissions during construction and during operation till the life of the project shall be estimated and submitted.

viii. The longitudinal connectivity/Free flowing sketch be provided in the EIA/EMP report. Presence of any critical mineral zone in the proposed area be clarified from GSI.

ix. 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.

x. Conducting site-specific ecological study with respect to riverine ecology focus on 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.

xi. Cumulative Impact of project on carrying capacity and sustainability of Reservoir/ River /nala of catchment area / due to tapping of water for filling reservoir.

xii. Action plan for survival or diversion of the rivulets/stream leading to join river shall be submitted.

xiii. 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 three seasons.

xiv. 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.

xv. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.

xvi. 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.

xvii. The project area should not come up on any critical mineral zone to be verified by GSI/NMDC.

xviii. Any archaeological sites in the vicinity of the project, if any, then it shall be certified by ASI. No mineral zone on the proposed site be certified by Geological Survey of India or any other concerned Government Organization.

[B] Socio-economic Study

xix. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.

xx. 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. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.

xxi. 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 7th October, 2014 for the project land to be acquired.

xxii. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.

xxiii. Budget earmarked for R&R, CSR shall not include in the cost of EMP and compliance of issues raised during Public Hearing.

[C] Muck Management/ Disaster Management

xxiv. 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.

xxv. 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.

xxvi. 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.

xxvii. Restoration plan for construction area including dumping site of excavated materials by levelling, filling up of burrow pits, landscaping etc.

[D] Disaster Management

xxviii. 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.

xxix. PP shall submit the proposal of EAC and seek approval of CEA/CWC for DPR, with a distance of 100 mts from HFL to avoid future damage due to flood. The data and distance of HFL shall be certified by concerned State Government and shall be submitting grant submitting the proposal of grant of EC.

[E] Miscellaneous

xxx. Both capital and recurring expenditure under EMP shall be submitted.

xxxi. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.

xxxii. 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.

xxxiii. Drone video of project site shall be recorded and to be submit.

xxxiv. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.

xxxv. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.

xxxvi. 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.

xxxvii. As per Ministry's OM dated 1st 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 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.

xxxviii. Detailed report on cumulative effect of multiple projects already proposed within the region on the same water source.

Agenda Item No. 15.5

Construction of Thana Plaun HEP (191 MW) in an area of 432.79 Ha in Guini Village, Mandi District, Himachal Pradesh by M/s Himachal Pradesh Power Corporation Ltd. - Reconsideration for Environmental Clearance (EC) - reg.

[Proposal No. IA/HP/RIV/75041/2013; F. No. J-12011/12/2011-IA-I]

15.5.1: The proposal is for grant of Environmental Clearance (EC) to the project for Construction of Thana Plaun HEP (191 MW) in an area of 432.79 Ha in Guini Village, Mandi District, Himachal Pradesh by M/s Himachal Pradesh Power Corporation Ltd.

Background:

i. The proposed Thana Plaun HEP (191 MW) is a storage scheme and the water conductor system of the project is on the left bank of river Beas. The project envisages the construction of concrete gravity dam across river Beas in the Mandi District of Himachal Pradesh, with a live storage capacity of 44.93 MCM to enhance the peaking benefits during the lean months. The entire catchment comprises mountainous terrain with steep hill slopes and is very thinly populated.

ii. The Terms of Reference for carrying out the EIA studies and preparation of EMP as per the provisions of Environmental Impact Assessment Notification 2006 and subsequent Notification in 2009 was approved and permission for pre- construction activities was accorded vide letter No. J-12011/12/2011-IA-I dated 29.11.2012 for Thana Plaun HEP with installed capacity of 141 MW of Mandi District of Himachal Pradesh by M/s. HPPCL.

iii. M/s HPPCL submitted application dated 12.09.2013 for revalidation of approved ToR for the enhanced installed capacity for the project from earlier 141 MW to revised installed capacity of 191 MW which entailed change in layout also. EAC noted that the capacity of the project has been enhanced from 141 MW to 191 MW and it is not a case of merely extension of the validity of TOR. The scope of the project has been changed as the capacity has been substantially revised to 191 MW. Therefore, the project will be reconsidered by the EAC.

iv. The project proponent submitted Form-1 afresh and the same has been presented before the EAC at its meeting held during 20-21 February, 2014. The EAC recommended for a fresh TOR for Thana-Plaun HEP (191 MW) as per MoEF& CC norms and also recommended to use already collected base line data for the purpose of EIA/EMP studies subject to the condition that the data should not be older than 3 years and with some additional TOR conditions. The ToR was accorded on 05.06.2014 for a period of 3 years, which was further extended for one year. Hence, the validity of the ToR was up to 04.06.2018. Public Hearing for the proposed project has been conducted by the Himachal Pradesh State Pollution Control Board, Himachal Pradesh at villages Mahan, Khalanu, Kotli and Kadakalayan, Tarnosh, Kotli and Gram Panchayat Office at Barhi, Dharampur, Mandi during on 22-23 March, 2018.

v. PP has submitted the application for EC online on 19.05.2018. However, the base line data collected for the EIA / EMP studies is from 1st March 2013 to 31st December, 2013. EAC noted that the data collected for the study is more than three years old and hence could not be considered for appraisal of the project. After detailed deliberation, considering all the facts as presented by the project, EAC in its 15th meeting recommended that PP should collect baseline data for one more season afresh and resubmit the EC application. The following more additional information were also sought:

   a. Recommendation of E-flow and maintenance of free flow stretches between two HEPs as per the CIA and CC of Beas River Basin studies to be followed.

   b. Resultant pollution loads of all the environmental parameters be derived again for all the possible pollution sources. Based on the findings, mitigative measures be suggested including allocation of capital budgets for different heads.

vi. PP has submitted the details sought in the 15th EAC meeting held on 28.06.2018 to the Ministry, accordingly the proposal has been considered by the EAC in 20th EAC meeting held on 27.11.2018 wherein PP has informed to EAC that base line studies were conducted within 10km radius during monsoon season in the months of July- August-September 2018. Project Proponent committed that, E-flows have to be followed as per recommendation under CIA & CCS of Beas River Basin studies under consideration with MoEF&CC, GOI. Provisions finally approved in respect of environmental flow will be adhered by the project authorities of Thana Plaun HEP. PP also presented before the Expert Appraisal Committee impacts of the proposed project on environmental attributes such as water, air, noise, land & biological environment and social-economic environment along with mitigation measures.

15.5.2: The Project Proponent made a detailed Presentation on the salient features of the project and informed that:

i. The proposal is for environmental clearance to the project for the construction of Thana Plaun (191MW) Hydro Power Project on River Beas located in Mandi, District of Himachal Pradesh by M/s. Himachal Pradesh Power Corporation Ltd.

ii. The project proposal was considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 20th meeting held during 27.11.2018 and recommended for grant of Environment Clearance in favour of the Project subject to conditions.

iii. The geographical co-ordinate of the project are: Latitude (N): 31º49'28.22", Longitude (E): 76º50'20.53".

iv. **Land requirement:** 431.62 Hectares (406.79 Hectares Forest/Govt. Land and 26.1796 Pvt. Land)

v. **Project Cost:** The estimated project cost is Rs 1530.13 Crore excluding existing investment of Rs 48.20 crores. Total capital cost earmarked towards environmental pollution control measures is Rs 115.92 Crore and the Recurring cost (operation and maintenance) will be about Rs 12.31 Crore.

vi. **Project Benefit:** Apart for generating 191 MW of electricity. A work force of about 1000 (skilled/semi skilled/unskilled) will be engaged during construction period. Road access in the area will be widened as three roads are going to be constructed for project construction and will be later used as public utility. Various socioeconomic developments in the project area are anticipated on establishment of this project. A bridge connecting Tehsil Jogindernagar and Kotli is also to be constructed for public purpose only. Other development works at village level will be taken up from Local Area Development Fund (i.e.@1.5% of Total Project Cost).

vii. **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.

viii. **Resettlement and rehabilitation:** Private Land is being acquired by the "Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013". The total private land area to be acquired under Thana Plaun HEP is approximately 20.1796 Hectare. Social Impact Assessment (SIA) study for acquisition of Private land has been completed and approved from GoHP. As per 'Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013", the project specific R&R Plan will be prepared during the process of land acquisition. Notification under Section 11(1) of RFCTLARR Act, 2013 has been published in Gazette on dated 20.12.2023. At present proceedings under Section 12 and 15 are underway. The R&R Scheme will be notified under Section 19(1) of RFCTLARR Act, 2013, shortly.

ix. Details of Solid waste/ Hazardous waste generation/ Muck and its management

Solid Waste:

- 600 Kg of dry weight waste per day during construction phase.
- 60 Kg of dry weight waste per day during operation phase.

Total Muck Disposal Area	22,18,709 cum
Estimate Muck to be generated	20,14,969 cum

Detailed Solid Waste Management Plan and Muck Management Plan have been appended as Chapter 11 & 7 of EMP submitted to MOEF&CC in May, 2018.

x. Public Hearing for the proposed project has been conducted under the chairmanship of Additional District Magistrate, Mandi organised by the State Pollution Control Board on 22.03.2018 & 23.03.2018.

xi. Status of Litigation Pending against the proposal, if any. **NIL**

xii. The salient features of the project area is as under :-

1. EAC Meeting Details:

EAC meeting/s	15th EAC Meeting
Date of Meeting/s	13th September 2024
Date of earlier EAC meetings	For TOR : 10th – 11th Feb 2012. 7th – 8th Sep 2012. 11th – 12th Nov 2013 20th – 21st Feb 2014 For EC: 28th June 2018. 27th Nov 2018.

2. Project details:

Name of the Proposal	Thana Plaun (191MW) Hydro Power Project on River Beas in Mandi, District of

	Himachal Pradesh by M/s Himachal Pradesh Power Corporation Ltd.
Proposal No.	***IA/HP/RIV/75041/2013***
Location (Including Coordinates)	The location of this project is about 500 meters downstream at the confluence of Rana Khad with River Beas near village Thana and Kunkatar Bridge in Tehsil Jogindernagar, Distt. Mandi Himachal Pradesh. The dam site is proposed at Longitude: 76º50'20.53" (E) and Latitude: 31º49'28.22" (N).
Company's Name	M/s Himachal Pradesh Power Corporation Ltd.
CIN no. of Company/ user agency	U000010HP2006SGC030591
Accredited Consultant and certificate no.	Environment Management Division (DoE), ICFRE, Dehradun in association with M/s. Mantech Consultants Pvt. Ltd. Noida (U.P.), **(NABET/EIA/1619/RA0063)**
Project location (Coordinates/River/ Reservoir)	The dam site is proposed at Longitude: 76º50'20.53" (E) and Latitude: 31º49'28.22" (N).
Inter-state issue involved	No
Proposed on River/Reservoir	River Beas
Type of Hydro-electric project	Dam to Toe Type
Seismic zone	Zone-V

3. Category details:

Category of the project	Category A
Capacity/Cultural command area (CCA)	191 MW
Attracts the General Conditions (Yes/No)	Yes

Additional information (if any)	--

4. ToR / EC Details:

EC Proposal No.	***IA/HP/RIV/75041/2013***
EAC meeting date	11th – 12th Nov 2013 and 20th – 21st Feb 2014
ToR Letter No.	Letter No. J-12011/12/2011-IA-I
ToR grant Date	5th June 2014
Cost of project	2223.59 crores including IDC and Financing Charges
Total area of Project	431.62 Hectares
Height of Dam from River Bed (EL)	106.70 m above deepest foundation level
Details of submergence area	Forest Land : 224.09 Hectares Government Land : 88.49 Hectares Private/Deemed Forest : 1.34 Hectares Private Land = 16.29 Hectares **Total = 330.21 Hectares**
District to provide irrigation facility (if applicable)	NA
Details of tunnels on upper level & lower Level and length of canal(if applicable)	HRT1– 108.17m, HRT2 – 146.89m
No. of affected Village.	23
No. of Affected Families	709 Families
Project Benefits	Apart for generating 191 MW of electricity. A work force of about 1000 (skilled/semi skilled/unskilled) will be engaged during construction period. Road access in the area will be widened as three roads are going to be constructed for project construction and will be later used as public utility. Various socioeconomic developments in the project area are anticipated on establishment of this

<table>
<tr><td></td><td>project. A bridge connecting Tehsil Jogindernagar and Kotli is also to be constructed for public purpose only. Other development works at village level will be taken up from Local Area Development Fund (i.e.@1.5% of Total Project Cost).</td></tr>
<tr><td>R&R details</td><td>Private Land is being acquired by the “Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013”.
The total private land area to be acquired under Thana Plaun HEP is approximately 20.17 Hectare.
Social Impact Assessment (SIA) study for acquisition of Private land has been completed and approved from GoHP.
Notification under Section 11(1) of RFCTLARR Act, 2013 published in Gazette on dated 20.12.2023.
Proceedings under Section 12 and 15 are underway.
R&R Scheme will be notified under Section 19(1) of RFCTLARR Act, 2013, shortly.
<table>
<tr><th>#</th><th>Description</th><th>Details</th></tr>
<tr><td></td><td>Private Land to be acquired</td><td>20.1796</td></tr>
<tr><td>2</td><td>No. of Affected Panchayat’s</td><td>12</td></tr>
<tr><td>3</td><td>No. Of affected Villages</td><td>21</td></tr>
<tr><td>4</td><td>No. of affected Landowners</td><td>709</td></tr>
<tr><td>5</td><td>Families loosing Land and House</td><td>08</td></tr>
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	6	Others (*Gharats and Pashushalas*)	Out of 38, 19 Gharats are in working order and 11 have stopped working. 12 nos. Pashushalas.
	7	Total of SC landowners	79
	8	Women SC landowners	37 (31 daughters, 5 wife and 1 widow)
	9	Total Villages of SC Landowners	05
	10	SC family to be displaced	01
	No ST Landowners family is present in the project		
Catchment area/ Command area	7378 Sq. Kms.		
Types of Waste and quantity of generation During construction/ Operation	600 Kg of dry weight waste per day during construction phase. 60 Kg of dry weight waste per day during operation phase. Detailed Solid Waste Management Plan has been appended as Chapter 11 of EMP submitted to MOEF&CC in May, 2018.		
Material used for blasting and its Composition as per DGMS standards.	Material Used for Blasting: Gelatin. Electric Detonators. Ordinary Detonators. Safety Fuse Coil. Detonating Cord.		

	Cordtex.
E-Flows for the Project	
Is Projects earlier studied in Cumulative Impact assessment & Carrying Capacity studies(CIA&CC) for River in which project located. If yes then c) E-flow with TOR/Recommendation by EAC as per CIA&CC study of River Basin. d) If not the E-Flows maintain criteria for sustaining river ecosystem.	a) The EAC, MOEF&CC, GOI in its 20th meeting on dated 27.11.2018, recommended for grant of Environmental Clearance to the project subject to condition *"Environment Clearance in respect of Thana Plaun HEP (191 MW) subject to adhering with the conditions/recommendations under CIA & CCS of Beas River Basin studies under consideration with MoEF&CC, GOI"*. An undertaking in compliance to the recommendations regarding E-Flow of CIA&CCS of Beas Basin has been submitted by HPPCL. ➢ **Recommended E-flow as % of average discharge in 90% DY** Lean Season = 20 Peak Season = 15 Other Months = 15 ➢ **Recommended E-flow (cumec)** Lean Season = 5.05 Peak Season = 46.62 Other Months = 11.64
Details on provision of fish pass	A detailed Fisheries Management Plan has been appended as Chapter 5 of EMP submitted to MOEF&CC in May, 2018.
Project benefit including employment details (no of employee)	Apart for generating 191 MW of electricity. A work force of about 1000 (skilled/semi skilled/unskilled) will be engaged during construction period. Road access in the area will be widened as three roads are going to be constructed for project construction and will be later used as public utility. Various socioeconomic developments in the project area are anticipated on establishment of this project. A bridge connecting Tehsil Jogindernagar and Kotli is also to be

	constructed for public purpose only. Other development works at village level will be taken up from Local Area Development Fund (@1.5% of Total Project Cost).
Area of Compensatory Afforestation (CA) with tentative no of plantation.	Area for CA = 829 Hectares of Govt. wasteland Plantation = 1100 trees / hectares
Previous EC details	NA
EC Compliance Report by R.O, MOEF&CC	NIL

5. Electricity generation capacity:

Power house Installed Capacity	191 MW
Generation of Electricity Annually	Annual Energy in 90% dependable year on 95% machine availability Main units : 522.25 GWh Environmental units : 139.57 GWh
No. of Units	Five Units = 3x50.33 MW +2x20 MW=191 MW

6. Muck Management Details:

No. of proposed disposal area/(type of land-Forest/Pvt land)	2 Nos.
Cross-section of proposed muck area, Height of muck with slope.	Already submitted to MOEF&CC in EMP as Annexure-II in May 2018.
Distance of muck disposal area (location), from muck generation sources (project area)/River, HFL of proposed muck disposal area.	Distance from Project = 6 Kms Detailed Chapter submitted to MOEF&CC in EMP as Chapter-7, in May 2018.
Total Muck Disposal Area	22,18,709 cum
Estimate Muck to be generated	20,14,969 cum
Transportation	Through Dedicated Road from Project Site.

Monitoring mechanism for Muck Disposal Transportation	The excavated material shall be evacuated from site with suitable usable muck to be utilized in project works by the project proponents and also allowed to be used by private users and the non-usable muck is to be disposed off on designated areas so as not be interfere with either environment/ecology or the river flow regime. Thus there is an imperative need to monitor regularly the quantum of muck generated and its disposal, for which purpose the project proponent shall furnish monthly statement of muck/debris disposal to H. P. State Pollution Control Board.

7. Land Area Breakup:

Private land	26.1796 Hectares
Government land/ Forest Land	406.79 Hectares
Submergence area /Reservoir area	Forest Land : 224.09 Hectares Government Land : 88.49 Hectares Private/Deemed Forest : 1.34 Hectares Private Land = 16.29 Hectares **Total = 330.21 Hectares**
Land required for project components	17.34 Hectares

8. 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	Total of 269.65 Hectares out of 406.79 Hectares of Forest Land Proposed for Diversion falls under UPF/DPF.
National Park	No	
Wildlife Sanctuary	No	

Archaeological sites monuments/historical temples etc.	No	
Additional information(if any)	-	

Availability of Schedule-I species in study area: NIL

9. Public Hearing (PH) Details

Advertisement for PH with date	Copies of Advertisement have been appended as Annexure-V of EIA submitted to MOEF&CC in May 2018..
Date of PH	22.03.2018 & 23.03.2018
Venue	• Village Mahan, Tehsil Kotli, Distt. Mandi. • Village Khadkalyana, Tehsil Kotli, Distt. Mandi • Village Behri, Tehsil Dharampur, Distt. Mandi
Chaired by	Additional District Magistrate, Mandi
Main issues raised during PH	Proceedings of PH have been appended as Annexure-V of EIA in May 2018.
No. of people attended	307

10. Court case details: NIL

11. Status of other statutory clearances

Particulars	Letter no. and date
Status of Stage-I FC	Stage-I, FC accorded on dated 11.01.2024 vide Letter no. 8-21/2021-FC.
Approval of Central Water Commission	--
Approval of Central Electricity Authority	The Central Electricity Authority (CEA) accorded concurrence to Thana Plaun Hydro Electric Project (3 x 50.33 MW +2 x 20

	MW=191 MW) under section 8 of Electricity Act, 2003 on dated 07.09.2021
Additional detail (If any)	--
Is FRA(2006) done for FC-I	Yes (To be submitted in compliance to Stage-I FC conditions).

12. Details of the EMP

Activities	**Capital cost (Lakhs)**	**Recurring cost (Lakhs /annum)**
Catchment Area Treatment Plan	5560.00	981.04
Compensatory Afforestation Plan	1011.27	0
Green Belt Development Plan	20.00	7.76
Biodiversity Management Plan	160.00	0
Fisheries Management Plan	117.00	59.04
Reservoir Rim Treatment	200.00	0
Muck Management Plan	176.00	10.8
Restoration Plan for Quarry Sites and Landscaping	35.00	0
Plan for Public Health Delivery System	100.00	0
Energy Conservation Plan	130.00	0
Solid Waste Management Plan	160.00	0
Rehabilitation And Resettlement Plan	3522.00	0
Local Area Development Plan*	3335.00*	0
Plan for Air, Water & Noise Quality Management	50.00	0
Disaster Management Plan & Risk Assessment	80.00	60.00
Environment Monitoring Plan	249.00	112
Road Management Plan	21.00	0
Total	11592 or 115.92 Crore	1230.64 or 12.31 Crore
***Cost already included in the project establishment cost**		

13. ADS details (If any)

ADS Point	**Reply**

Project Deferred in 15th EAC held on dated 28.06.2018, Agenda item no. 15.8 with recommendation to collect baseline data for one more season, afresh.	Fresh EC application along with baseline data for one more season, afresh submitted on dated 31.08.2018.
Proposal recommended for grant of EC subject to following conditions in 20th EAC held on dated 27.11.2018 as Agenda item 20.7 1. Environment Clearance in respect of Thana Plaun HEP (191 MW) subject to adhering with the conditions/recommendations under CIA & CCS of Beas River Basin studies under consideration with MoEF&CC, GOI. 2. Submission of FC Stage-I Clearance to the Ministry.	Stage-I FC granted on 11.01.2024. Request letter in compliance to conditions recommended by EAC sent to MOEF&CC on 11.01.2024. However, the compliance could not be uploaded to PARIVESH 1.0 due to some technical glitch till 03.09.2024.

15.5.3 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 for the Construction of Thana Plaun HEP (191 MW), covering an area of 432.79 hectares in Guini Village, Mandi District, Himachal Pradesh by M/s Himachal Pradesh Power Corporation Ltd.

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 noted that the Terms of Reference (ToRs) were issued by the Ministry via letter No. J-12011/12/2011-IA-I dated 29.11.2012 for the Thana Plaun HEP with an installed capacity of 141

MW in Mandi District, Himachal Pradesh, by M/s HPPCL. Subsequently, a fresh ToR was accorded on 05.06.2014 for a period of three years, as the scope of the project had changed, resulting in a substantial revision of the capacity from 141 MW to 191 MW.

The EAC further noted that in its 20th meeting held on 27.11.2019, it recommended the grant of Environmental Clearance for the proposed project, subject to the following additional conditions:

i. Environment Clearance in respect of Thana Plaun HEP (191 MW) subject to adhering with the conditions/recommendations under CIA & CCS of Beas River Basin studies under consideration with MoEF&CC, GOI.
ii. Submission of FC stage I Clearance to the Ministry.

The Project Proponent submitted the Stage-I Forest Clearance for the diversion of 406.79 Ha of forest land, granted by the MoEF&CC via letter dated 11.01.2024. This was uploaded on the Parivesh portal on 03.09.2024, nearly 57 months after the EAC's recommendation. Therefore, in accordance with the Office Memorandum dated 18.05.2012, read with the Office Memorandum dated 19.06.2014, the proposal is being considered by the sectoral EAC in the present meeting.

The EAC noted that the total land requirement has decreased from 444.29 hectares to 431.62 hectares, while the forest land area remains unchanged at 406.79 hectares.

The EAC observed that the initial baseline data for the EIA/EMP studies was collected from 1st March 2013 to 31st December 2013, with an additional season of data collected in October 2018. The EAC recommended that the Project Proponent conduct one season of baseline data collection in accordance with the stipulated norms for the proposed project, to accurately assess the environmental scenario, including Scheduled-I species and the river flow data.

15.5.4 The EAC after detailed deliberations deferred the proposal for want of following information:

i. The Project Proponent shall conduct one season of baseline data collection in accordance with the standard Terms of Reference for the river valley and hydroelectric sector.

ii. The Project Proponent shall prepare a comparison table that outlines the previous baseline data collected in past years alongside the current scenario.

The meeting ended with vote of thanks to the Chair.

****

ANNEXURE

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.	Dr. Mukesh Sharma	Member	P
5.	Shri Kartik Sapre	Member	P
6.	Shri Ajay Kumar Lal	Member	P
7.	Shri Rajeev Varshney	Member Representative of Central Electricity Authority (CEA)	P
8.	Shri Piyush Ranjan	Member Representative of Central Water Commission (CWC)	A
9.	Dr. J. A. Johnson	Member Representative of Wildlife Institute of India (WII)	P
10.	Dr. A.K. Sahoo	Member Representative of CIFRI	P
11.	Shri Yogendra Pal Singh	Member Secretary	P
12.	Dr. Krishnendu Mondal	Scientist 'D'	P

APPROVAL OF THE CHAIRMAN

From: "Chakrapani GovindaJoseph" <govind.chakrapani@es.iitr.ac.in>
To: "Yogendra Pal Singh" <yogendra78@nic.in>, "Dr Krishnendu Mondal" <krishnendu.mondal@gov.in>
Cc: "Sarvesh Narwal" <sarvesh.narwal@gov.in>
Sent: Thursday, September 26, 2024 5:53:57 PM
Subject: Re: Draft minutes of 15th EAC meeting held on 13.09.2024 - reg

Approved.
Chakrapani