



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



Minutes of 14TH MEETING OF EXPERT APPRAISAL COMMITTEE meeting R
iver Valley and Hydroelectric Projects held from 30/08/2024 to 31/08/2024

Date: 11/09/2024

MoM ID: EC/MOM/EAC/186527/8/2024

Agenda ID: EC/AGENDA/EAC/186527/8/2024

Meeting Venue: N/A

Meeting Mode: Virtual

Date & Time:

30/08/2024	10:30 AM	05:30 PM
31/08/2024	10:30 AM	05:30 PM

1. Opening remarks

The 14th 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 30th August, 2024 – 31st August, 2024 through Virtual mode, under the Chairmanship of Prof. G. J. Chakrapani.

2. Confirmation of the minutes of previous meeting

The Minutes of the Meeting held on 13th EAC meeting on 13th August, 2024 were confirmed.

3. Details of proposals considered by the committee

Day 1 -30/08/2024

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Bhavali Pumped Storage Project (1500 MW) by JSW ENERGY PSP TWO LIMITED located at NASHIK,MAH ARASHTRA			
Proposal For		Fresh EC	
Proposal No	File No	Submission Date	Activity

			(Schedule Item)
IA/MH/RIV/481391/2024	J-12011/08/2022-IA-I(R)	08/08/2024	River Valley/Irrigation projects (1(c))

3.1.2. Project Salient Features

14.1.1: The proposal is for grant of Environmental Clearance (EC) to the project for Bhavali Pumped Storage Project (1500 MW) in an area of 278.92 Ha in Village Kalbhonde, Kothale and Jamunde Sub District Shahapur and Igatpuri, District Thane and Nashik, Maharashtra by M/s JSW Energy PSP Two Limited.

14.1.2: The Project Proponent and the accredited Consultant M/s. EQMS India Private Limited, 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 Bhavali Pumped Storage Project (1500MW), located at Village Kalbhonde, Kothale and Jamunde Sub District Shahapur and Igatpuri, District Thane and Nashik, Maharashtra, by M/s JSW Energy PSP Two Ltd.
- ii. The project proposal was considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 27th meeting held during 09.05.2022 and recommended for grant of Terms of References (ToR) for the Project. The ToR has been issued by Ministry vide letter No J-12011/08/2022-IA. I(R) dated 27.6.2022.
- iii. The project is listed at S.N.1(c) (i) of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and is appraised at Central Level by Expert Appraisal Committee (EAC).
- iv. The geographical co-ordinate of the project are -
Latitude: 19⁰34' 56.38" N to 19⁰36'31.69" N
Longitude: 73⁰ 35'10.0" E to 73⁰35' 45.06" E
- v. The Bhavali Pumped Storage Project envisages creation of an upper reservoir (gross storage:12.35 MCM & live storage:11.419 MCM) by constructing 962.47m long dam comprising of 822.47 m long Geomembrane faced rockfill dam (GRFD) with maximum height of 48.64m from foundation, 60m long and 61m height ungated spillway with 4 bays of 12.5m each; 4 blocks of 20m length each non-overflow section of maximum height of 49.57m from foundation, two each on either side of spillway. 80m long saddle dam (maximum height 10m from foundation) to reduce backwater to enter ESZ area. The lower reservoir (gross storage:13.26MCM; live storage:11.71MCM) shall be created by constructing concrete gravity dam 365.5m long at top with maximum height of 48.15m from foundation and 104 m long ,74m high (from foundation) ungated spillway with 8 bays of 10.5m each. Diffuser type Intake structure with 3 intakes (25.5mx10.5m) of 42.44m length shall be provided. The water conductor system shall comprise of 67.96 m long three intake tunnels of 7m diameter each with design discharge of 131.74cumec each. 5.1m diameter, followed Steel lined pressure shaft 3 nos. of independent, 5.1m diameter with length varying from 1568.09m to 1594.89m, six 3.8m diameter branch pressure shaft after first bifurcation of design discharge 65.96cumec each; two 2.9m diameter 46.83m long steel lined branch pressure shaft after second bifurcation of design discharge 32.98cumec each. Underground powerhouse (167mx22mx52.9m) housed with 7 No's. Francis vertical shaft reversible pump-turbine (5 X 250MW & 2 X 125 MW) discharging into circular draft tube 5.20 m and 4.0m diameter for large and small unit; two 4m diameter concrete lined branch tail race tunnel for 32.98cumec discharge after 3rd bifurcation; six 5.2meter diameter concrete lined branch tail race tunnel for 65.78 cumec discharge after 4th bifurcation; followed by three 7m diameter main tail race tunnel with length varying from 621.17m to 646.57m,each discharging 131.74cumec, 105m long trapezoidal tail race pool followed by 560m long trapezoidal tail race channel. Annual energy generation by Bhavali PSP in turbine mode is 4044.06 MU whereas annual energy consumed in pump mode is 5120.53 MU.
- vi. **Land Requirement:** The total land requirement under the project for upper and lower rock fill dam, reservoir & other works, has been assessed as 278.92 ha of which private land is 35.18 ha, forest land 243.74 ha.

- vii. **Demographic details in 10 km radius of project area:** The study area comprises of 40 villages. As per the Census of India 2011, the total households under study area villages are 9190. The total population of villages is 52201 composed of 26398 males and 25803 females with sex ratio of 977. The cast wise composition of the total population made up the Scheduled Cast population is 2234 (4.28%) and Scheduled Tribe population is 32079 (61.45%), which shows that the Scheduled Tribe is the dominant cast in most of the villages in study area. The total literate population is 28605, of which male and female population is 16974 and 11631 respectively. Total literate population is 64.83%, of which male and female literates are 76.40 % are 53.09 % respectively. The total working population is 24293 (46.53%) which comprises of main workers 18849 (36.10%) and marginal workers 5444 (10.43%) while non-workers are 27908 (53.47%). Among main workers, cultivators constitute the highest category (54.3%), followed by cultivators (29.7%) and other workers (15.90%). Among marginal workers agricultural labour constitutes the highest category (50.7%) followed by cultivators (31.9%) and other workers (15.4%).
- viii. **Water Requirement:** The total water requirement during construction shall be 1000 kld(Domestic:100kld & Construction 900kld) and shall be met from the surface sources viz., nearby reservoir(s).
- ix. **Project Cost:** The estimated project cost is Rs. 8964.02 Crores. Total capital cost earmarked towards environmental pollution control measures is Rs10680 lakh. and the Recurring cost will be about Rs 1168 lakh to be spent in four years (Average annual: Rs.292 lakh).
- x. **Project Benefit:** Employment will be 3000 persons as direct. PP proposes to allocate Rs 600 lakh for implementing issues raised during public hearing towards CER (As per Ministry's O.M. F.No.22-65/2017-IA.III, dated 30th September,2020, CER cost is not based on percentage cost of project)
- xi. **Environmental Sensitive area:** Kalsubai Harichandragad Wildlife Sanctuary exists within 10 km of project boundary. However, no part of the project lies within Eco-sensitive zone of the Sanctuary. The nearest project boundary is about 12.5 m from ESZ boundary.
- xii. **MoU / any other clearance/ permission signed with State government:**
(1) The MOU for setting up of the proposed Bhavali Pumped Storage Project (1500MW) has been made on 14th day of September,2021, between the Industries Department, Government of Maharashtra and M/s JSW Neo Energy Ltd.
(2) Govt. of Maharashtra, Water Resources Department, Hydrology and Dam Safety, issued certificate for water availability for project vide No. WFR/Ulhas/894, dated 21.11.2022.
- xiii. **Resettlement and rehabilitation:** The total private land required for the project is 35.18 ha which is spread over Jamunde village in Tehsil Igatpuri, District Nashik, Maharashtra. There shall be 130 affected families of which 10 shall be displaced families. The acquisition of the land shall be carried out by mutual negotiation in consonance with "RFCTLARRA", 2013. The total cost for implementing Rehabilitation and Resettlement Plan is Rs 1232 lakh comprised of the cost of land acquisition (Rs 854.54 lakh), R&R entitlement (Rs 82.05 lakh) and the cost of Tribal Development Plan (Rs 295 lakh).
- xiv. **Scheduled –I species:** Nine mammalian species (Panther, Striped Hyaena, Jackal, Khokad, Jungle cat, Wolf, Chow Singha, Barking deer and Porcupine); ten avifauna species (White backed Vulture, Slender billed vulture, Sparrow hawk. Brahminy kite, Booted eagle, Crested serpent eagle, Grey junglefowl, Indian peafowl, Barn owl and Brown wood) and three herpetofauna species (Indian Cobra, Russell's Viper and Rat snake) were recorded/reported from study area.
- xv. **Alternative Studies:**
Based on ground topography and surface geo-mapping for preliminary understanding of the geological set up of the project area, for layout of WCS and powerhouse, two alternatives, viz., Alternate -1 with all components of WCS and powerhouse as underground and the Alternate-2 with surface powerhouse, were studied. Alternate-1 was preferred over Alternate-2 as the latter involved about 135m deep surface excavation for surface powerhouse, which would necessitate intricate supports and slope stability measures, besides posing seepage problem during operation compounded with problems with storm water drainage. The selected alternative has been found to be more suitable considering the minimal overall forest land requirement and minimal requirement of private land and least displacement of people habitations.

Period	1.3.2020 to 30.12.2022 (Three seasons)
AQA parameters at 6 locations (minimum & maximum)	PM ₁₀ : 38.3 to 66.3 $\mu\text{g}/\text{m}^3$
	PM _{2.5} : 15.6 to 55.5 $\mu\text{g}/\text{m}^3$
	SO ₂ : 5.1 to 9.6 $\mu\text{g}/\text{m}^3$
	NO _x : 6.5 to 12.8 $\mu\text{g}/\text{m}^3$



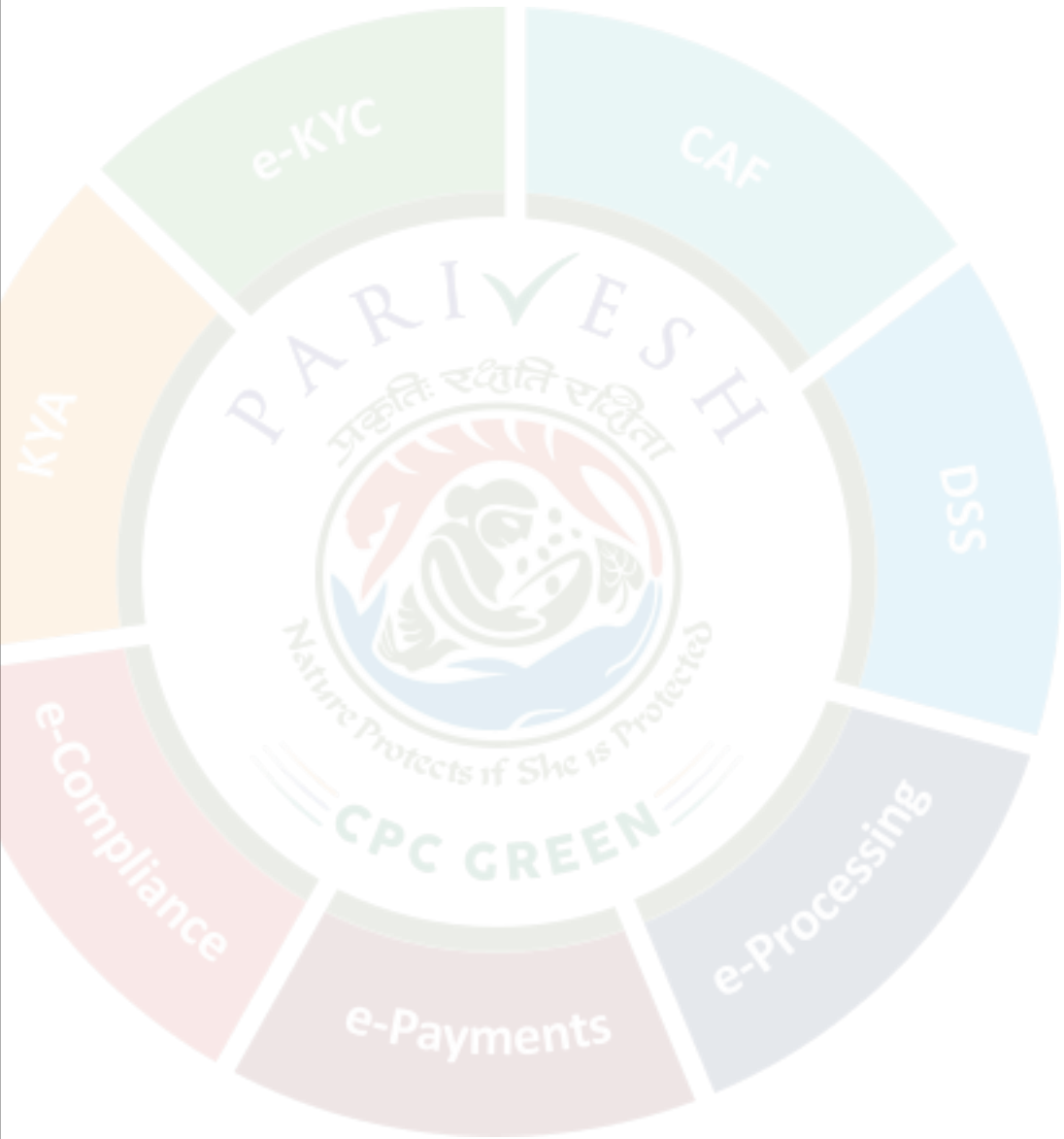
In cr e m en tal G L C Le ve l	P M ₁ 0: Ma x. GL C: 13. 83 μ g/ m ³
	P M 2.5: Ma x. GL C: 1.2 2 μ g/ m ³
	SO 2: Ma x. GL C: 1.0 g/ m ³
	N O x: Ma x. GL C: 12. 67 μ g/ m ³
Ri ve r w at er	p H: 6.9 7to 7.4 1



sa m pl es at 3 l oc ati on s	Di sso lve d Ox yg en: 7.3 to 8.3 m g/l
	To tal Di sso lve d S oli ds: 74t o 8 1m g/l
	To tal Ha rhn ess (as Ca C O ₃):5 6 t o 6 3m g/l
	To tal Al kal ini ty (as Ca C O ₃):2



to28 mg/l
Ca lci um (as C a): 16. 8to 18. 4 mg/l
Ma gn esi um (as M g): 2.9 to 4.7 mg/l
Oil an d Gr eas e: <2 mg/l
Su lph ate (as SO 4): 8.2 to1 1.6 mg/l



Nit rat e (as N a): 2.4 to 6.7 m g/l
Ch lor ide (as C l): 30. 3 t o 4 0.8 m g/l
Iro n (as F e): 0.1 2to 0.3 m g/l
Co pp er (as C u): <0. 05 m g/l
Le ad (as P b):



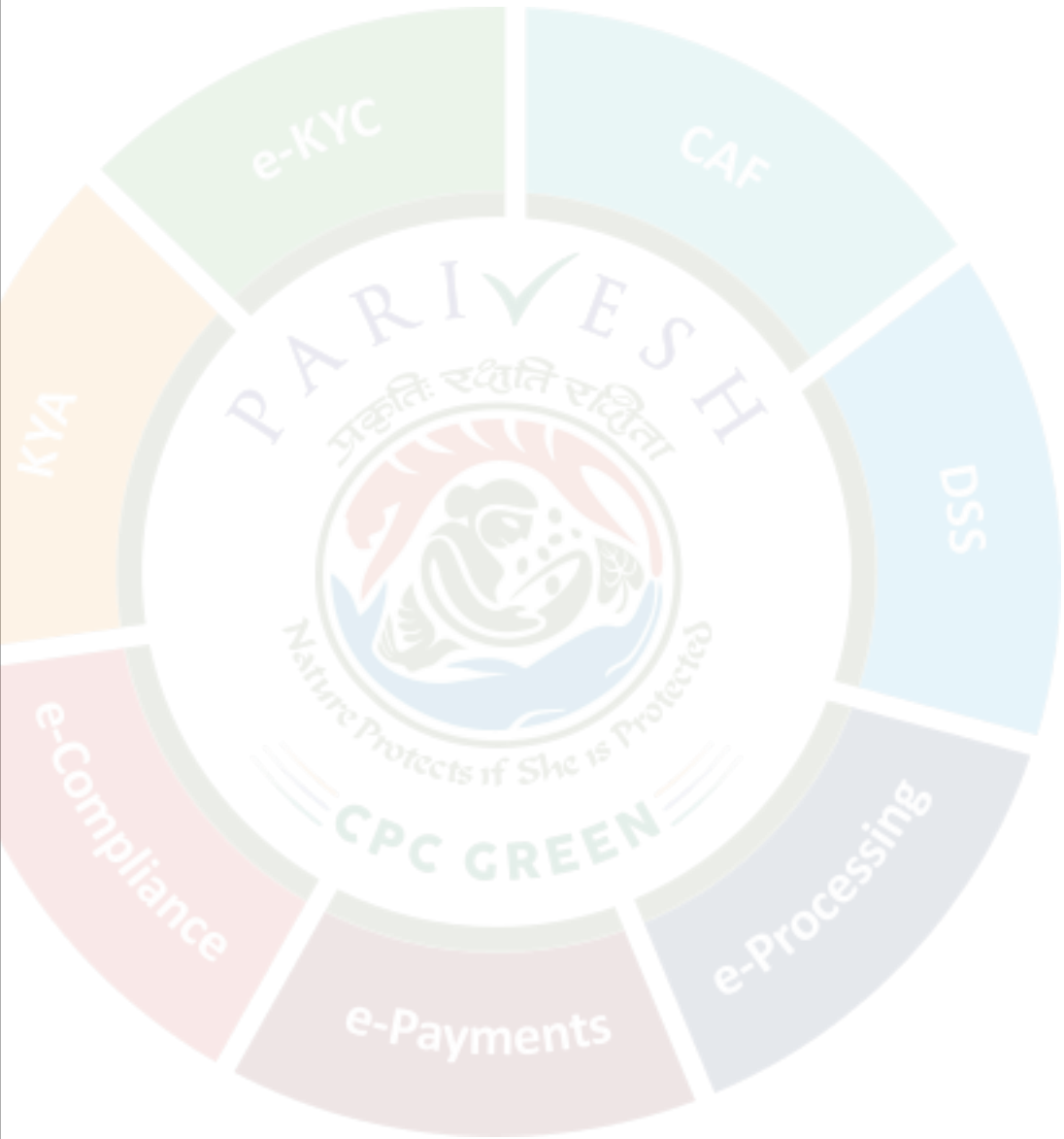
<0.01 mg/l
Cadmium (as Cd): <0.003 mg/l
Chromium (as Cr): <0.05 mg/l
Manganese (as Mn): <0.05 mg/l
Arsenic (as As): <0.01 mg/l



	Me rcu ry (as H g): <0. 00 1m g/l
Po nd w at er sa m pl es at 3 l oc ati on s	p H: 7.1 2 t o 7. 56
	Di sso lve d Ox yg en: 6.9 to 8.4 m g/l
	To tal Di sso lve d S oli ds: 82t o 1 07 m g/l
	To tal Ha rdn ess (as Ca



C O ₃) : 5 9 to 77 m g/l	To tal Al kal ini ty (as Ca C O ₃) : 2 to 2 7m g/l	Ca lci um (as C a) : 18. 1 to 21. m g/l	Ma gn esi um (as M g) : 3.3 to 5.8 m g/l	Oil an d Gr
--	---	---	---	----------------------



eas e:< 2m g/l
Su lph ate (as SO 4): 7.4 to1 4.1 m g/l
Nit rat e (as N a): 3.1 to 4.9 m g/l
Ch lor ide (as C l): 30. 9to 41. 1 m g/l
Iro n (as F e): 0.0 5 t o 0.2 1m



g/l
Co pp er (as C u): <0. 05 m g/l
Le ad (as P b): <0. 01 m g/l
Ca dm iu m (as C d): <0. 00 3m g/l
Ch ro mi um (as C r): <0. 05 m g/l
Ma ng an ese (as



	Mn): <0.05 mg/l
	Arsenic (as As): <0.01 mg/l
	Mercury (as Hg): <0.001 mg/l
Ground Water samples at 6 locations	pH: 6.5 to 7.86 Total Dissolved Solids: 216 to 310 mg/l



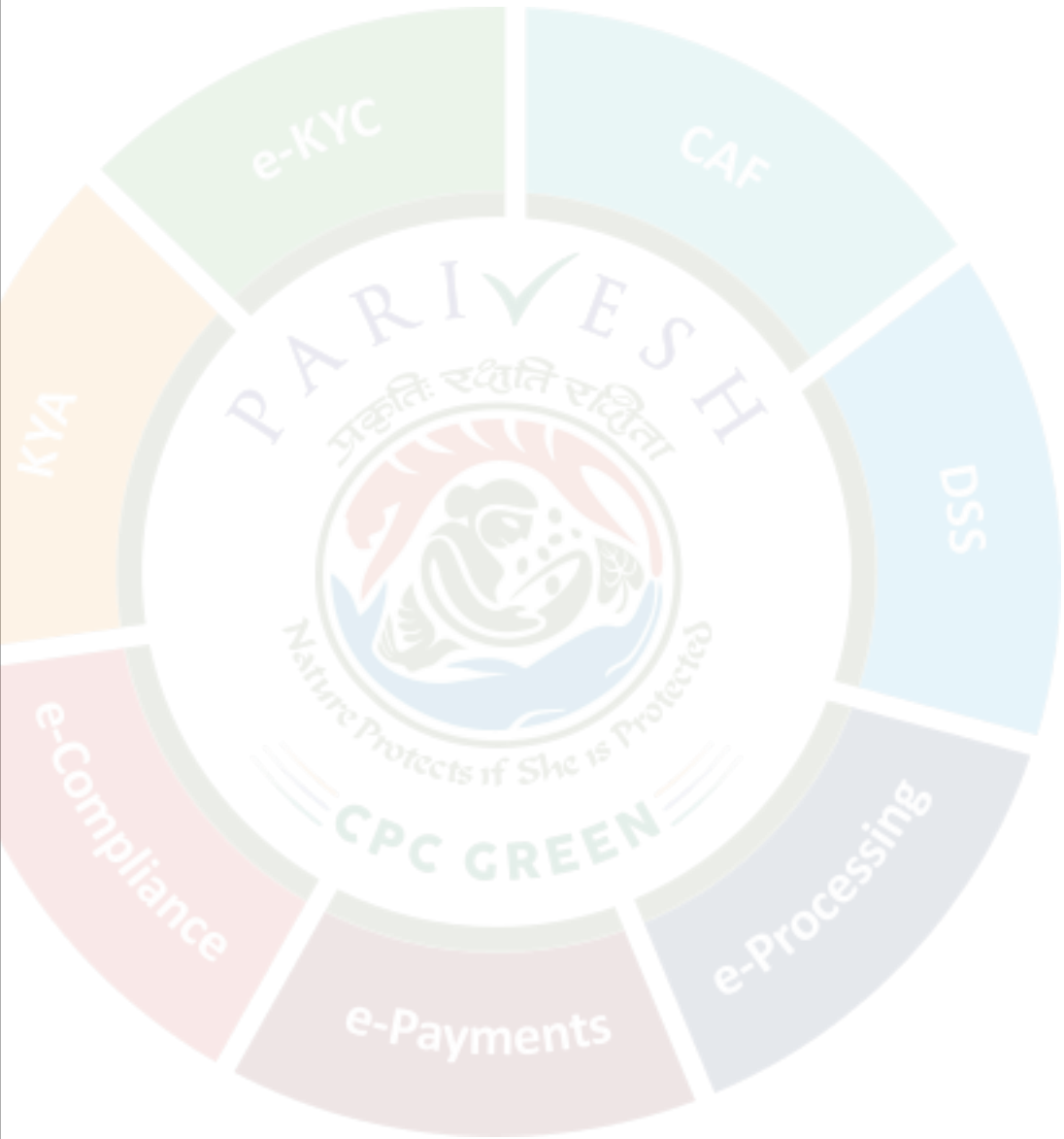
Total Hardness (as CaCO ₃): 140 to 190 mg/l
Total Alkalinity (as CaCO ₃): 37 to 89 mg/l
Calcium (as Ca): 34.1 to 47 mg/l
Magnesium (as Mg):



12.4 to 12.6 mg/l
Oil and Grease: < 2 mg/l
Sulphate (as SO ₄): 21.3 to 36.0 mg/l
Nitrate (as N): 2.8 to 5.1 mg/l
Chloride (as Cl): 57.1 to 83 mg



g/l
Iro n (as Fe) : 0. 3 t o 0.1 0m g/l
Co pp er (as C u): <0. 05 m g/l
Le ad (as P b): <0. 01 m g/l
Ca dm iu m (as C d): <0. 00 3m g/l
Ch ro mi um (as C r)



	<p>r): <0.05 mg/l</p>
	<p>Ma ng an ese (as Mn): <0.05 mg/l</p>
	<p>Ar sen ic (as As): <0.01 mg/l</p>
	<p>Me rcu ry (as Hg): <0.001 mg/l</p>
<p>Noi se le ve ls Le q (Day & Ni</p>	<p>Re sid ent ial Ar ea Le q. (Day & Ni</p>



gh t) at 6 l oc ati on s	o 5 3.1 dB (A)
	Re sid ent ial Ar ea Le q. (Ni gh t): 35. 7 t o4 2.8 dB (A)
	Co m me rci al Ar ea Le q. (Da y): 59. 9 t o6 2.6 dB (A)
	Co m me rci al Ar ea Le q. (



	Ni gh t): 48. 3 t o 5 0.3 dB (A)
So il Q ua li ty at 10 lo ca tio ns	Bu lk de nsi ty: 1.2 8 t o 1. 49 g m/ cc
	pH ran ge: 6.6 0-t o 7. 34
	Ele ctri cal co nd uct ivi ty (E C); 10 7 t o 4 46 μ mh os/ cm
	Ca lci



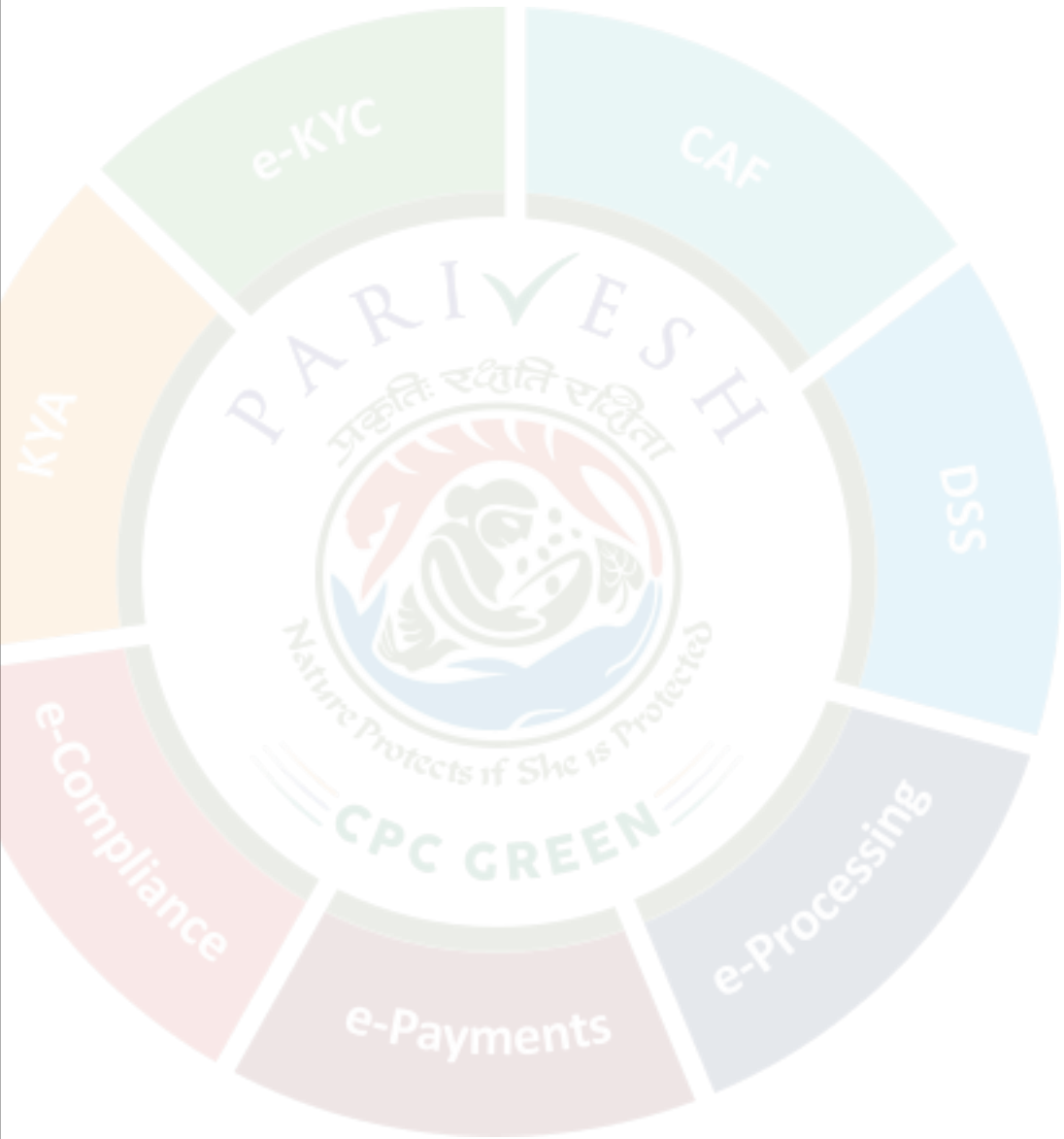
um co nte nt: 15 24 to 32 81 m g/k g;
So diu m: 15 4 t o 4 18 m g/k g
Po tas siu m: 12 7to 82 6 m g/k g;
Nit rog en: 15 3to 84 9 m g/k g
Ph os ph oro us:



6.6 to 46.9 mg/kg;	Ca tio n Ex ch an ge Ca pa cit y (CEC): 10.7 to 23.67 meq/100 gm	Magnesium: 24.2 to 452 mg/kg	Sulphur: 15.4 to 32.8 mg/kg
--------------------	--	------------------------------	-----------------------------



	g
	Or ga nic Ma tte r: 1.3 3 % to 5.2 6%
Fl or a & Fa un a	Fl or a: Du rin g p ri ma ry an d s ec on dar y s tud y c arr ied out un der pre sen t p roj ec t, 8 8 t ree spe cie s (37 fa mi lie s),



41 shrub species (23 families), 40 herb species (26 families) and 14 species of climber (10 families) and 18 species of grasses (1 family) were recorded



ord
ed
fro
m t
he
stu
dy
are
a.
Ab
out
5 e
co
no
mi
cal
ly i
mp
ort
ant
an
d 3
6 i
mp
ort
ant
me
dic
ina
l/et
hn
ob
ota
nic
al i
mp
ort
an
ce
pla
nt
spe
cie
s
we
re
rec
ord
ed.
On
e e
nd
em



ic
spe
cie
wa
s a
lso
rep
ort
ed.

**Fa
un
a**
Si
xte
en
ma
m
ma
lia
n s
pe
cie
s
we
re
fou
nd/
rep
ort
ed
fro
m
sec
on
dar
y s
our
ces
as
we
ll a
s fr
om
the
pri
ma
ry
sur
ve
y a
nd
co



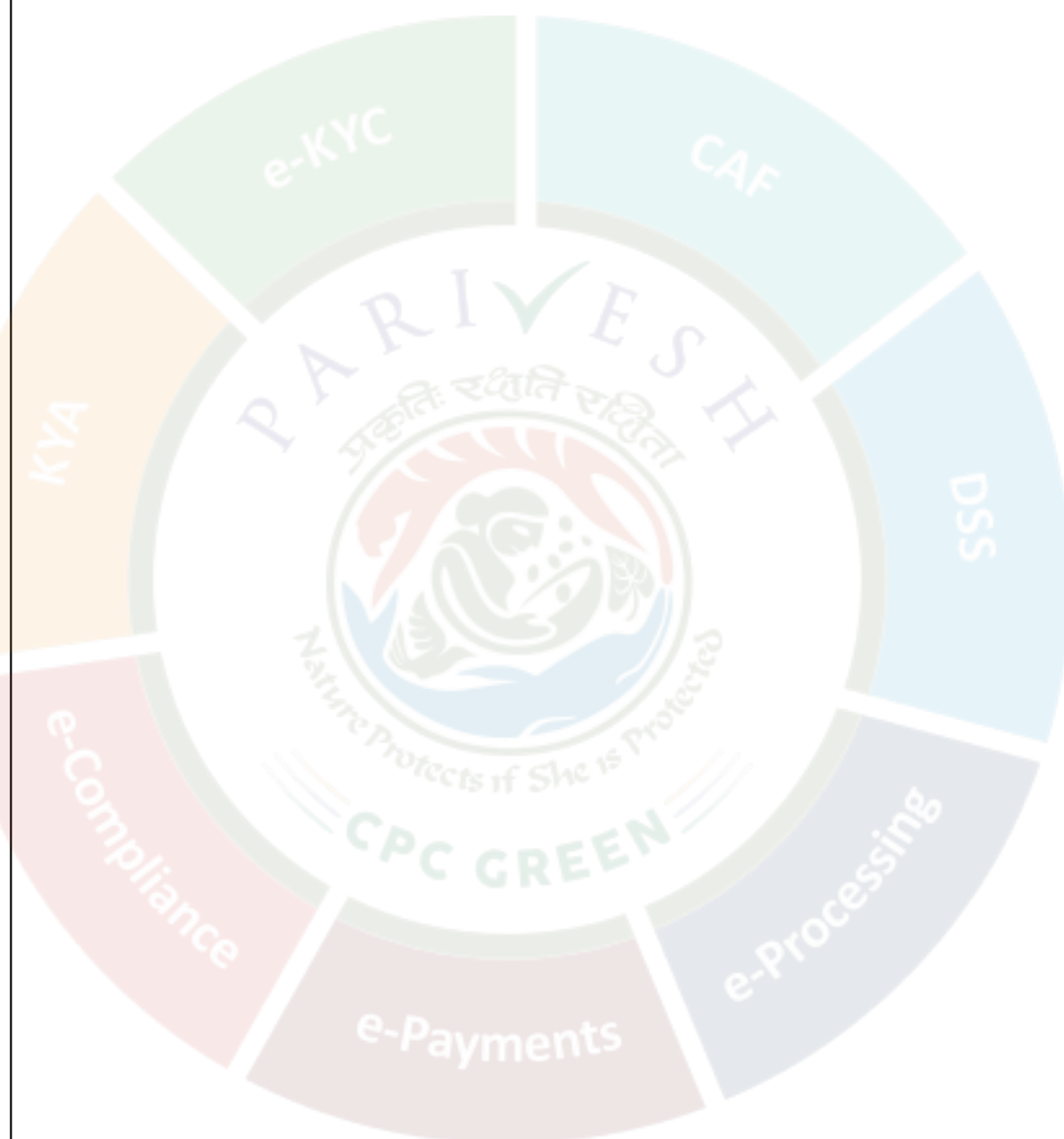
ns
ult
ati
on
s.
Ou
t o
f r
ep
ort
ed
spe
cie
s n
ine
spe
cie
s a
re
Sc
he
dul
e-I
spe
cie
s a
nd
thr
ee
spe
cie
s a
nd
fou
r s
pe
cie
s b
elo
ng
to
Sc
he
dul
e -
II
an
d I
V r
esp
ect
ive
ly.



As per IU C N criteria (3.1) study are a harbors three vulnerable species and one species categorized under threatened category, Fort y-nine birds species



we
re
ob
ser
ved /
rep
ort
ed
dur
ing
the
sur
vey o
f w
hic
h t
en
spe
cie
s b
elo
ng
to
Sc
he
dul
e-1
of
W
P
A,
19
72.
Re
st
of
the
spe
cie
s b
elo
ng
to
eit
her
Sc
he
dul
e-I
I o
r I



V. As per the IU C N Red list two species Vulnerable are categorized as “Critically Endangered” and all the species are listed as “Least Concern”. Two



pe
cie
s o
f a
mp
hib
ian
s,
4 s
pe
cie
s o
f s
na
kes
an
d 4
spe
cie
s o
f li
zar
ds
rec
ord
ed/
co
nfi
rm
ed
in t
he
stu
dy
are
a o
f w
hic
h I
ndi
an
Co
br
a,
Ru
sse
ll's
Vi
per
an
d
Ra
t s



na
ke
bel
on
g t
o S
ch
ed
ul
e-I
of
W
P
A,
19
72,
as
am
en
de
d i
n
De
ce
mb
er,
20
22.
Ei
ght
spe
cie
s o
f b
utt
erf
lie
s
we
re
rec
ord
ed/
rep
ort
ed
of
wh
ich
no
ne
bel
on



g t
o S
ch
ed
ul
e-1
**Aq
ua
tic**
Tw
ent
y-o
ne
Ph
yto
pla
nkt
on
spe
cie
s
we
re
rec
ord
ed:
Cy
an
op
hy
cea
n (8),
Ba
cill
ari
op
hy
cea
e (5),
Ch
lor
op
hy
cea
e (7),
Eu
gle
no
ph
yci



n (1). Twelve species of Zooplankton were recorded: Rotifera (5), Cladocera (4), Copepods (2) and Ostracoda (1). Among fish population 10 species



cie
 s b
 elo
 ngi
 ng
 to
 4 f
 am
 ilie
 s v
 iz.,
 Cy
 pri
 nid
 ae
 (C
 atl
 a c
 atl
 a,
 La
 be
 o r
 ohi
 ta,
 Ci
 rri
 hin
 us
 mr
 iga
 la,
 La
 be
 o c
 alb
 as
 u,
 Pu
 nti
 us
 ch
 ola
 an
 d
 Ga
 rra
 mu
 lly
 a);
 Ch
 an
 nid



ae
(C
ha
nn
a g
ac
hu
a&
Ch
an
na
pu
nct
atu
s);
Ba
gri
da
e(
Rit
a r
it
a);
Sa
cc
obr
an
chi
da
e (
He
ter
op
ne
ust
es
fos
sili
s)
we
re i
de
nti
fie
d.



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

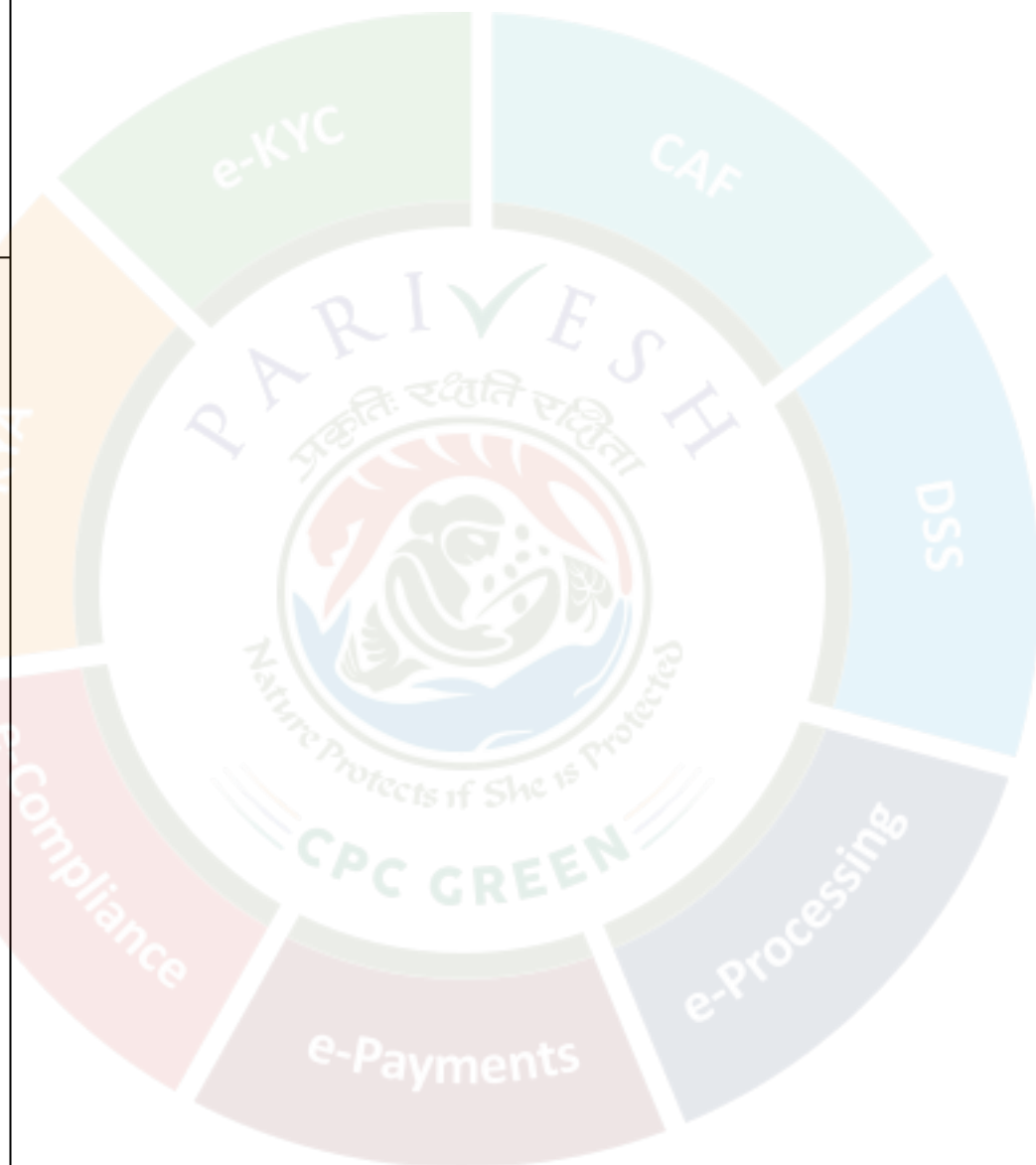
a) Solid Waste: Municipal Solid Waste (MSW) likely to be generated during construction and operation shall be 38.8 Ton/annum and 7.2ton/annum respectively which shall be managed as per Solid Wastes Management Rules, 2016.

Hazardous waste: It inter alia includes burnt mobile oil and greases (6ton/annum) from vehicles and construction machinery and equipment which shall be handled and disposed through authorised dealer as per Hazardous and other Wastes (Management & Transboundary Movement) Rules, 2016.

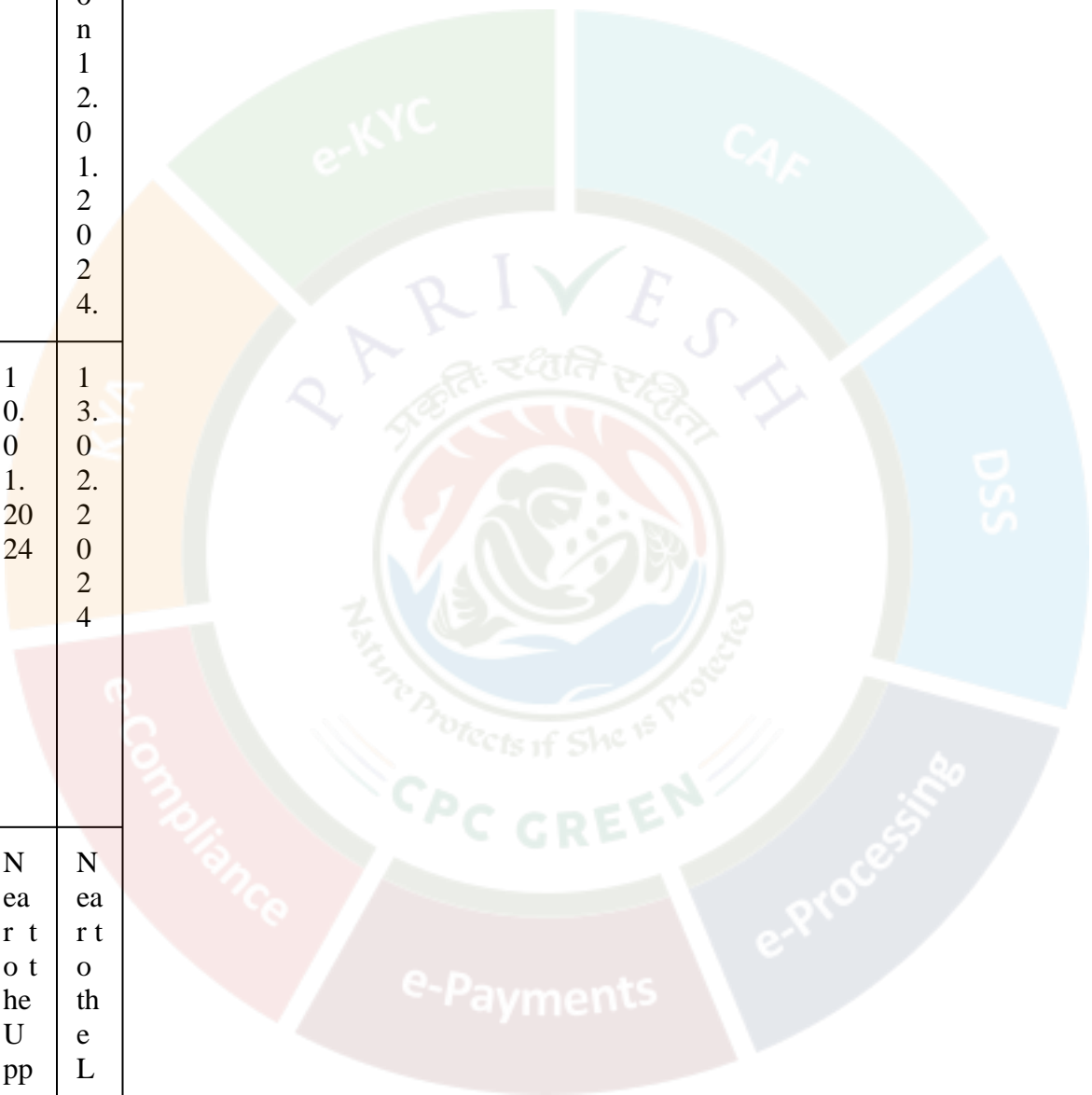
The total quantity of muck / debris, to be generated due to the project, shall be 64.06 lakh cum, out of

which 36.08 lakh cum shall be consumed on the project work leaving 28.43 lakh cum, which with 42% swell factor shall amount to 40.37 lakh cum shall be disposed at two designated muck disposal sites in an area of 44.09 ha. The muck disposal sites shall be developed from below the ground level by providing Retaining wall. After construction of retaining wall, the muck brought in dumpers shall be dumped and manually spread behind the wall. The muck shall be laid with vertical angle not exceeding 28⁰ in such a manner that rock mass is properly stacked behind the wall with minimum of voids. The muck pile shall be later covered with geo-Geo-coir textile properly held to the ground by steel wire U-nails and rehabilitated by afforestation of herbs and shrubs.

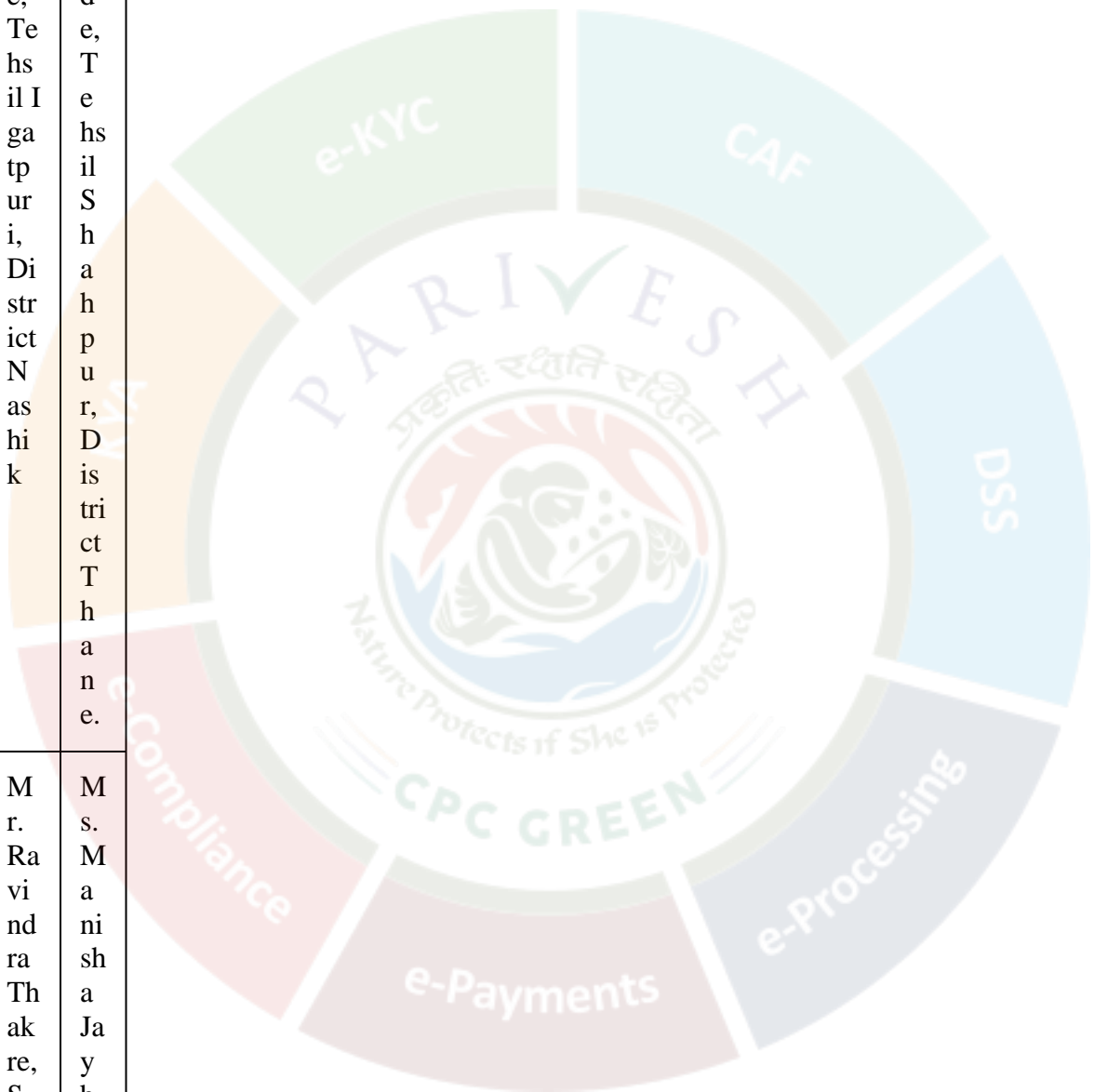
P ar ti c u l ar	Di str ict N as hi k	D is tri ct T h a n e
A d v er ti se m e nt fo r P H w it h d at e	Lo ca l n e ws pa pe r “ Sa ka l” (M ar at hi) an d t he “T im es of In di a” (E ng lis h) on 0 7. 1 2.	L o ca l n e ws pa pe r” S a k a l” (M ar at h i) a n d th e “ Fr ee Pr es s Jo



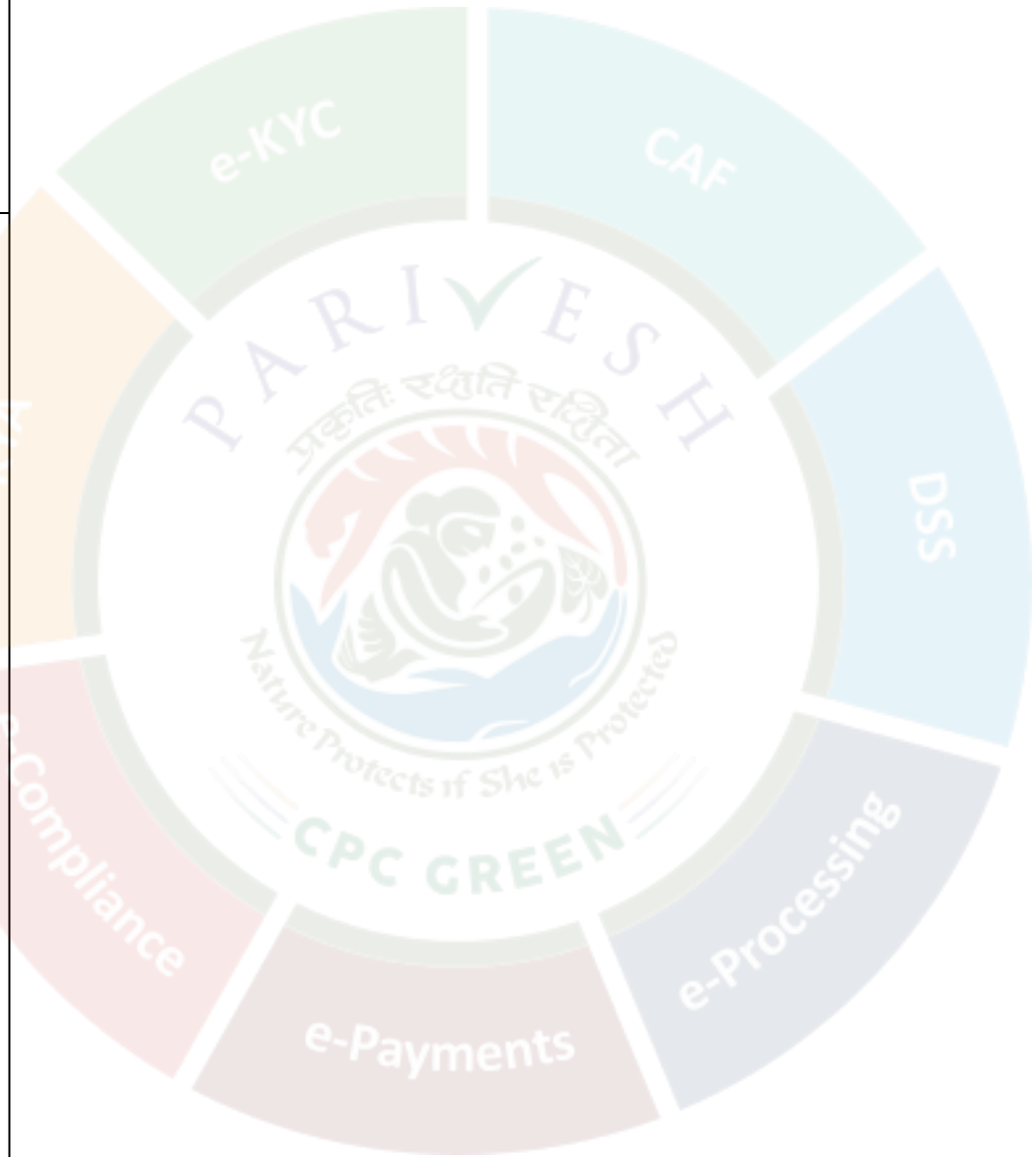
	2023.	urnal” (English) on 12.01.2024.
Date of Public Hearing	10.01.2024	13.02.2024
Venue	Near to the Upper Reservoir, in village Ja	Near to the Lower Reservoir, in vi



	m un d e, Po st M an ve d e, Te hs il I ga tp ur i, Di str ict N as hi k	ll a g e K al b h o n d e, T e hs il S h a h p u r, D is tr ict T h a n e.
C h a i r e d b y	M r. Ra vi nd ra Th ak re, S D M, Ig at pu ri, N as hi k	M s. M a ni sh a Ja y b h a y e D h ul e, A d

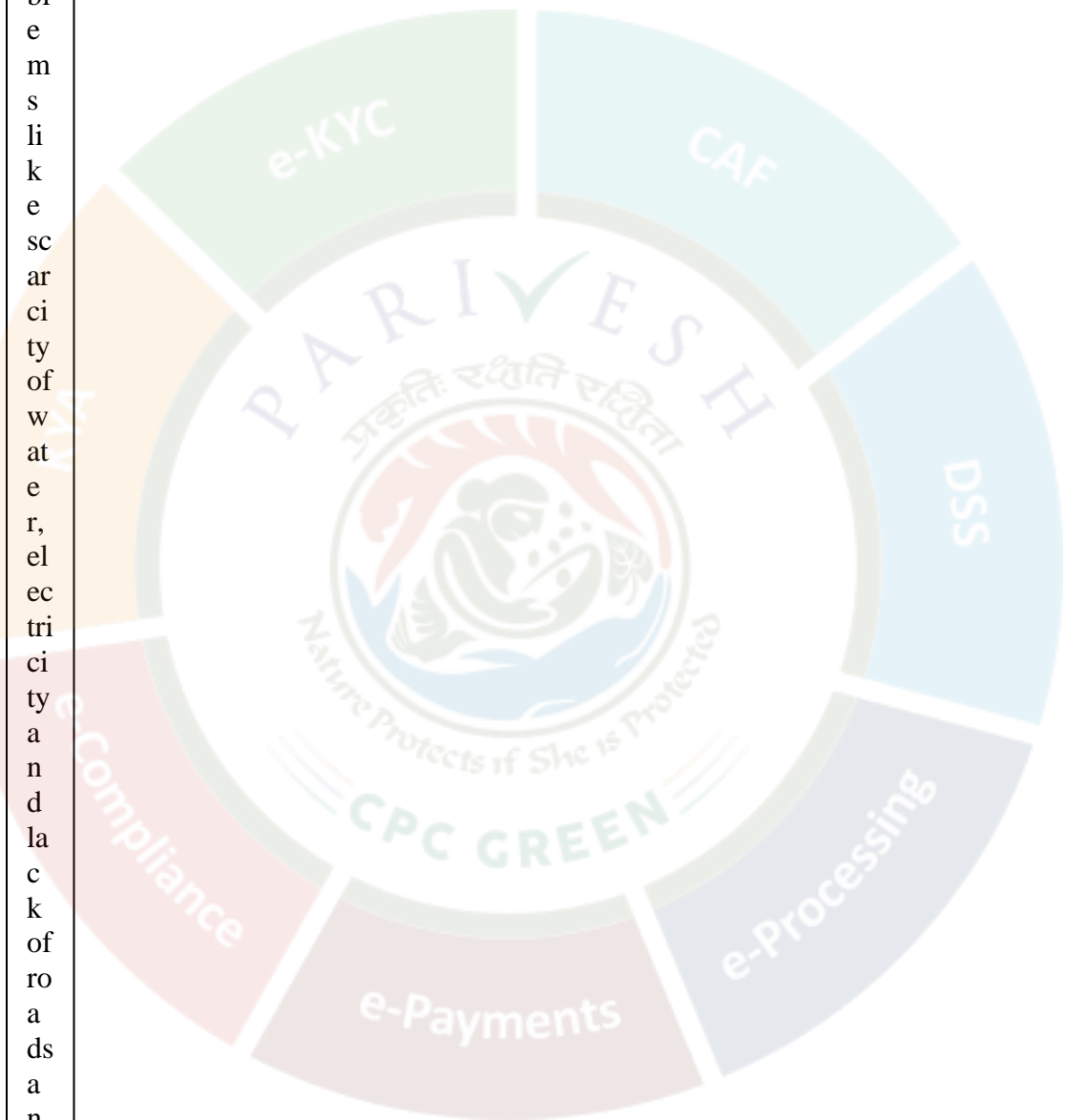


		ditional Collector, Thane
Main issues raised during PH	<ul style="list-style-type: none"> • Adequate compensation should be granted for acquiring their land • Job opportunities 	<ul style="list-style-type: none"> • Job opportunities for the youth and unemploye

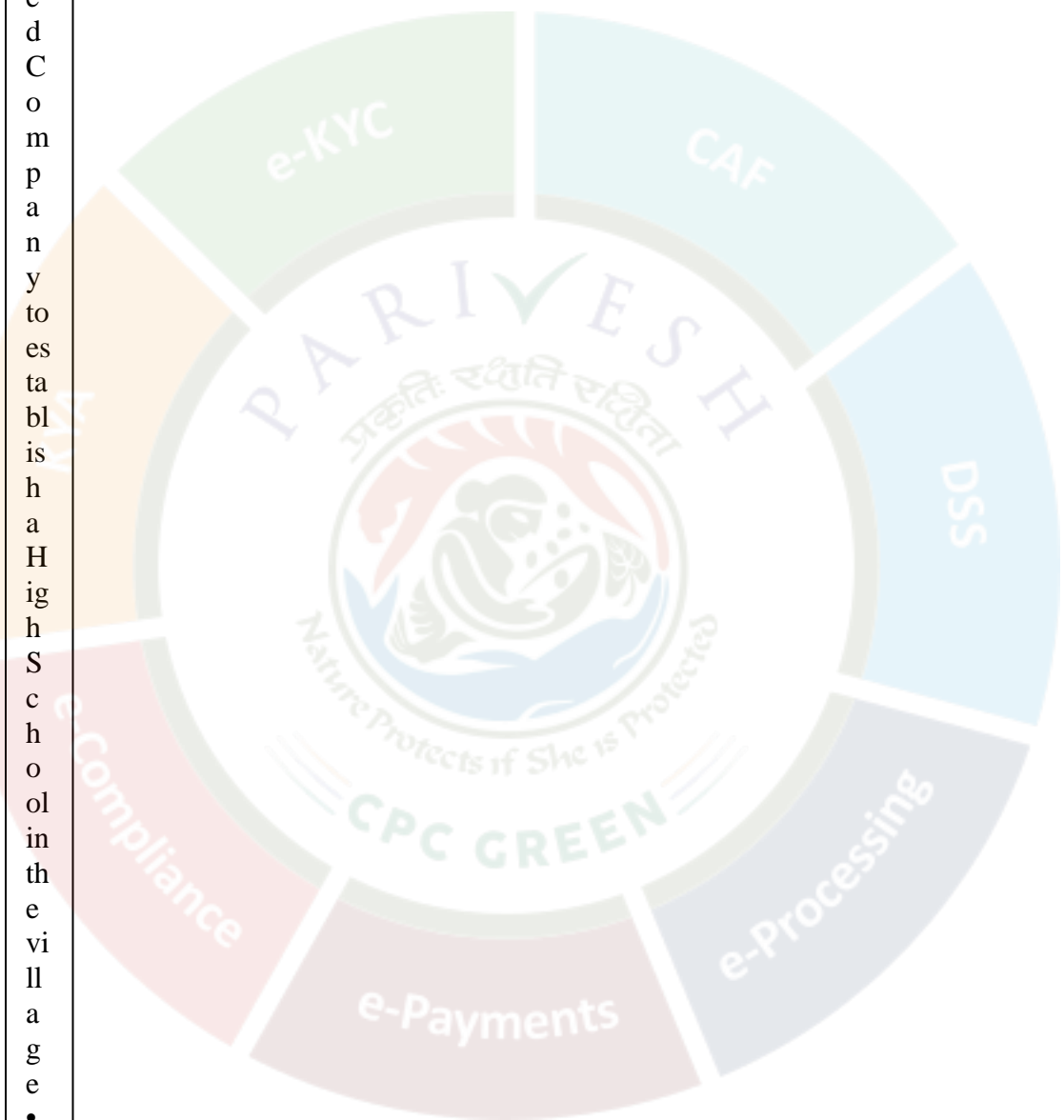


for the youth and unemployed people. Impact to flow of water, wildlife, trees and medicinal plants, agricultural and horticulture

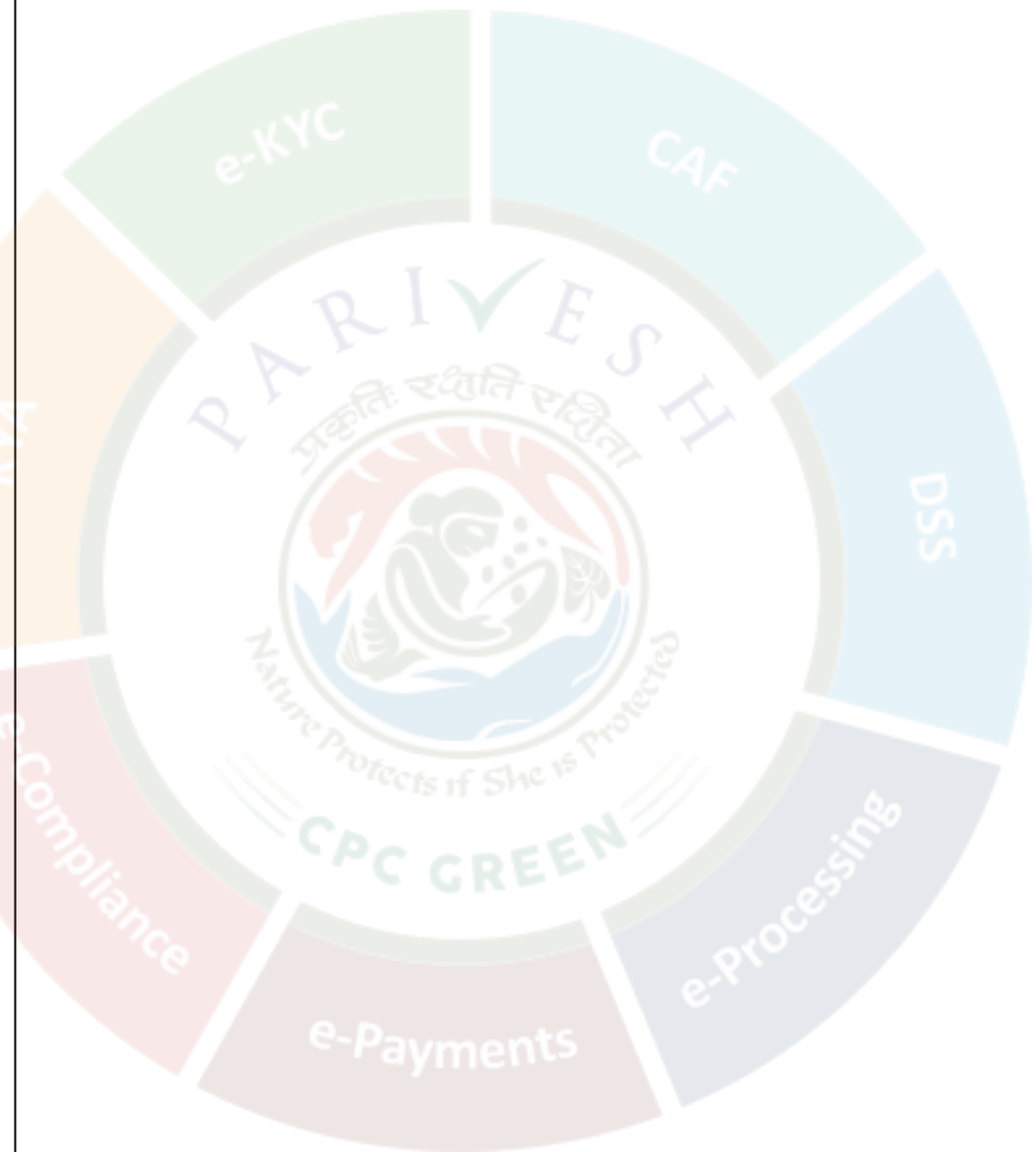
- Addressal of problems like scarcity of water, electricity and lack of roads and educational facilities



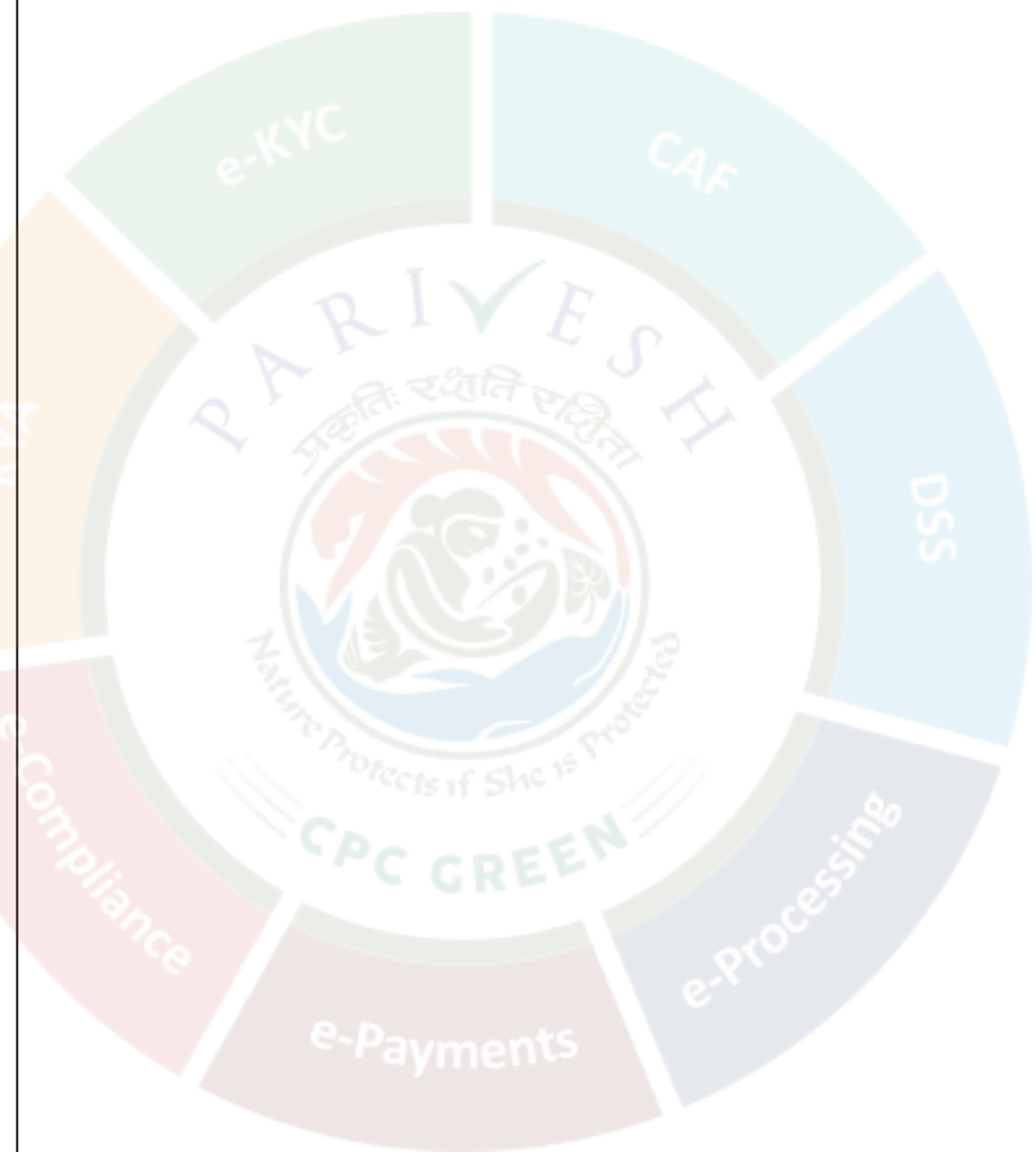
<p>cul- tu- ral cr- op- s</p> <ul style="list-style-type: none"> • Re- m- e- d- i- a- l mea- su- re s for ad- dres- sing po- llu- tion con- trol and wild- life im- pacts dur- ing con- struc- tion • Ad- dres- sal of prob- 	<p>lit- ie- s</p> <ul style="list-style-type: none"> • De- m- a- n- d- e- d Com- p- a- ny to es- ta- bl- ish a High School in the vill- age • Re- p- ai- rs of lo- cal D
--	--



le m s l ik e s ca rci ty of w at er, el ec tri cit y an d l ac k of ro ad s a nd ed uc ati on fa cil iti es, • Re lo ca tio n of Te m pl e i n J a m un d e. • D	ei ti es & cl a n G o d • M o bi le te a m of h ea lt h w or k er s sh o ul d b e pr o vi de d • B o o ks a n d cl ot h es sh
---	--



e m an de ds ch oo l b us fo r c hil dr en	o ul d b e di st ri b ut e d to vi ll a g e c hi ld re n
•A ssi sta nc e t o t he vil la ge rs in ed uc ati o n, he alt h an d e m pl oy m en t s ec tor	•Pl a nt at io n of tre e s b y th e c om p a n y
•L iv eli ho od op po rtu	•J ob op po rtu



nit
ies
fo
r t
he
pe
op
le
of
th
e a
re
a
•C
S
R
gr
an
t f
or
de
ve
lo
pi
ng
lo
ca
l v
ill
ag
es

ni
ti
es
fo
r t
he
y o
ut
h a
n d
u n
e m
pl o
y e d
p e o
pl e

Name of the Proposal

“Bhavali Pumped Storage Project” (1500M W) at village Jamunde, Tehsil Igatpuri, District Nashik and villages Kalbhonde and Kothale, Tehsil Shahpur District Thane, Maharashtra M/s JSW Energy PSP Two Limited

Proposal No.

Proposal No.: IA/MH/RIV/481391/2024; File No. J-12011/08/2022-IA. I(R)

Location
(Including Coordinates)

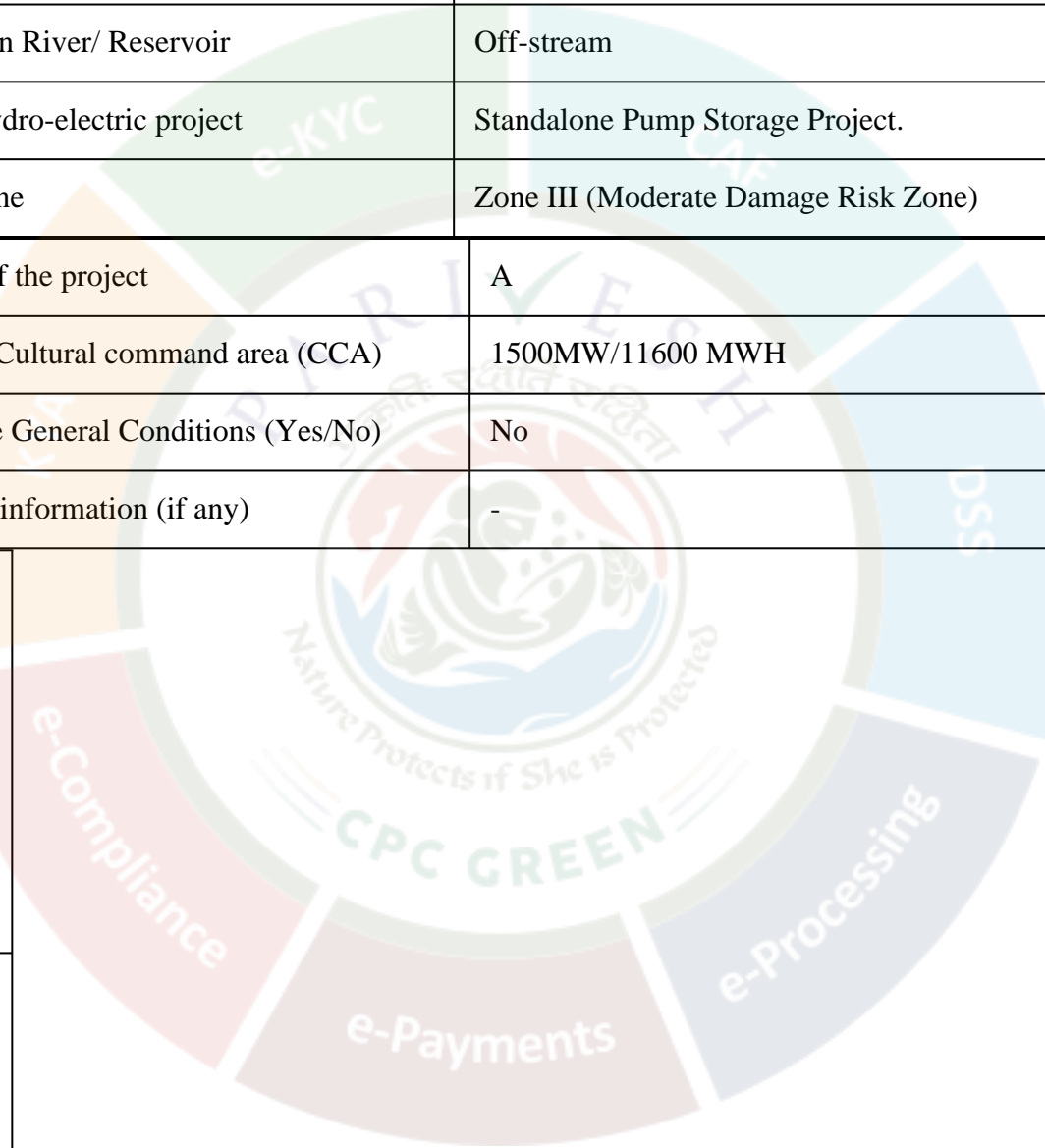
Upper dam: Jamunde (Igatpuri Tehsil-Nasik)
 Lower dam: Kalbhonde & Kothale (Shahapur Tehsil - Thane)
 Upper Reservoir: 19⁰36'31.69" N ,73⁰35' 45.06" E; Lower Reservoir: 19⁰34' 56.38" N,73⁰ 35'10.0" E

Company's Name

JSW Energy PSP Two Ltd.

CIN no. of Company/user agency

U40108MH2021PLC367136

Accredited Consultant and certificate no.		EQMS India Pvt. Ltd., Karkardooma, Delhi-110092 QCI/NABET/ENV/ACO/2225/0303, Valid up to 23.11.2025.
Project location (Coordinates /River/Reservoir)		Upper Reservoir: 19°36'31.69" N, 73°35' 45.06" E; Lower Reservoir: 19°34' 56.38" N, 73° 35'10.0" E
Inter- state issue involved		No
Proposed on River/ Reservoir		Off-stream
Type of Hydro-electric project		Standalone Pump Storage Project.
Seismic zone		Zone III (Moderate Damage Risk Zone)
Category of the project		A
Capacity / Cultural command area (CCA)		1500MW/11600 MWH
Attracts the General Conditions (Yes/No)		No
Additional information (if any)		-
To R P r o p o s a l N o.	IA/ M H/ RI V/ 26 51 29/ 20 22	
EA C m e t i n g d a t e	27th me eti ng hel d o n 0 9.0 5.2 02 2.	
To R	J-1 20	

Letter No.	11/08/2022-IA. I(R)
To R g ran t D ate	27 th June 2022.
Cost o f pr oje ct	Rs. 89 64. 02 Cr ore s
Tot al a rea of Pro ject	27 8.9 2 h a (exc lud ing tra ns mis sion li ne RO W)
Hei ght of Da m f ro m Riv er b ed (E L)	Up per da m: Ma xi mu m 48. 64 m f ro m f ou

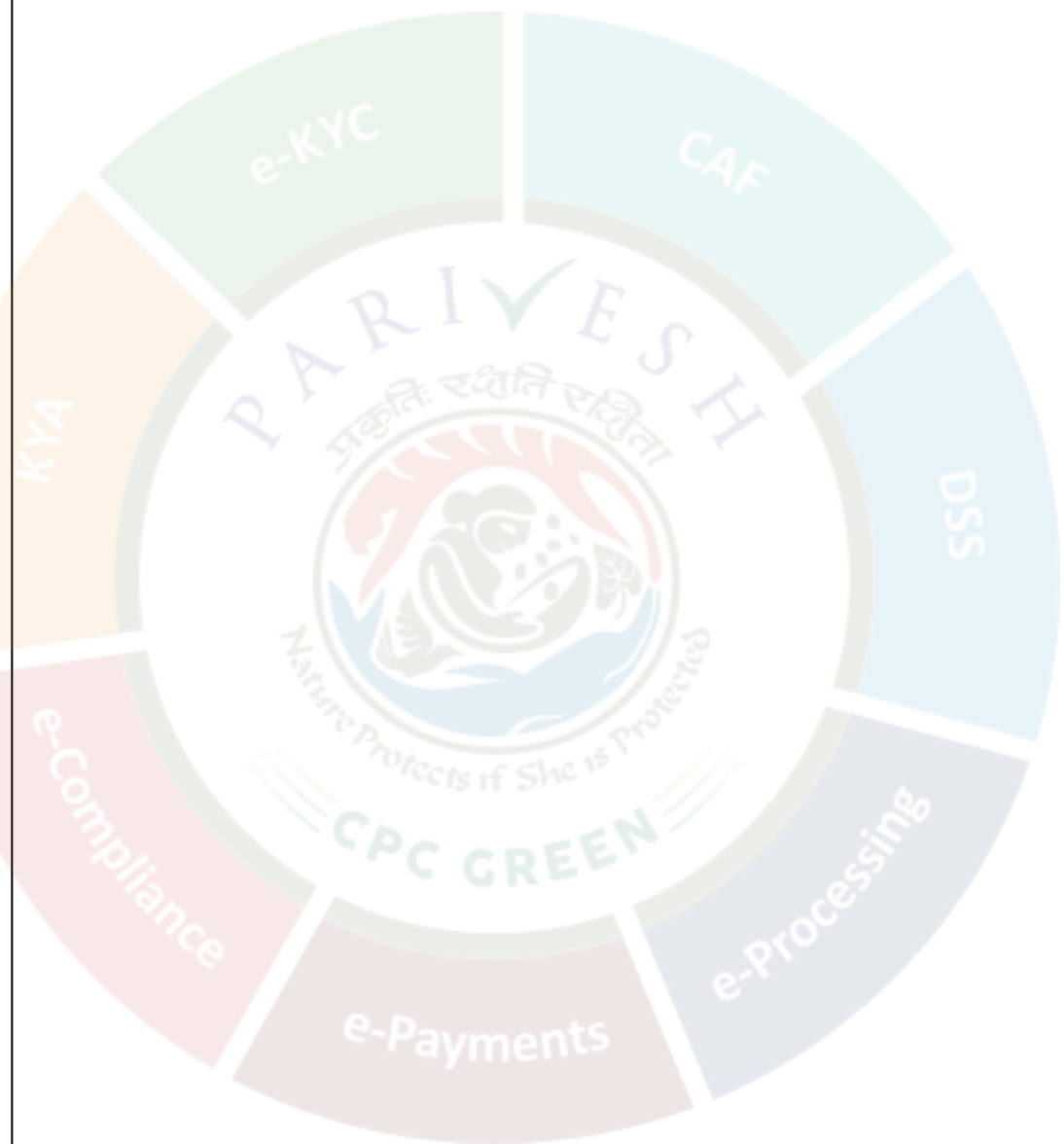


	nda tio n Lo we r d a m: Ma xi mu m 48. 15 m f ro m f ou nda tio n
Det ails of s ub me rge nce are a	16 9.6 0 h a
Dis tric t to pro vid e ir rig atio n f acil ity (if app lica bl e)	No t a ppl ica ble
Det ails of t unn	Int ake tun nel



els
on
upp
er l
eve
l &
low
er
lev
el a
nd
len
gth
of
can
al (if a ppl ica bl e)

(3
No
s ,
7.0
m
dia
and
67.
96
m l
on
g)
3
No
s. o
f In
dep
end
ent
Pe
nst
ock
s (5.2
m
di
a.)-
2 n
os.
bif
urc
ati
ng
int
o 4
no
s. i
ndi
vid
ual
uni
ts (25
0
M
W
eac
h)
and
1 n
o.
bif
urc



ating for 3 nos. individual unit 1 no. 250 MW unit & 2 nos. 12.5 MW Units). Length of Project/Procurement/Shaft: 1741m Main TRT (7.0m dia.; 621.17 to 646.



57 m l on g) Bran ch ed TR T (4.0 m & 5.2 0 m dia me ter Tot al l eng th of TR T: 71 3.4 3 m f ro m Dr aft tub e

No. of aff ect ed Vil lag e.

3

No. of Aff ect ed Fa mil ies

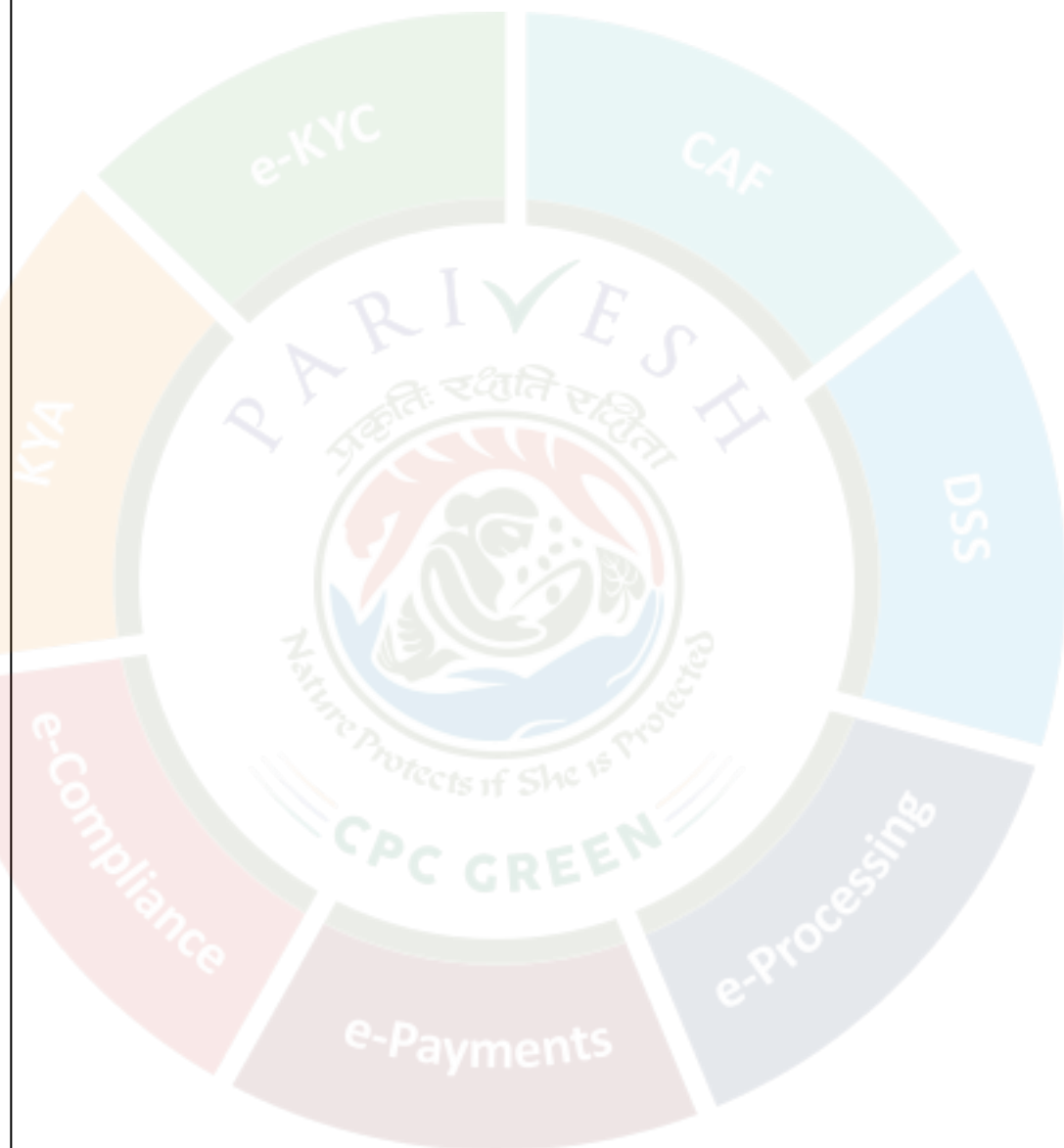
13 0



Project Benefits	Project benefits <i>inter alia</i> shall include the benefits like (i) Average annual generation of 4.04.06 MU of energy with 95% plant availability; (ii) Increased vegetal cover
------------------	--



due to implementation of CAT Plan and Green Belt Development Plans (ii) Employment Potential during construction (300 labour); (iv) Overall development of area



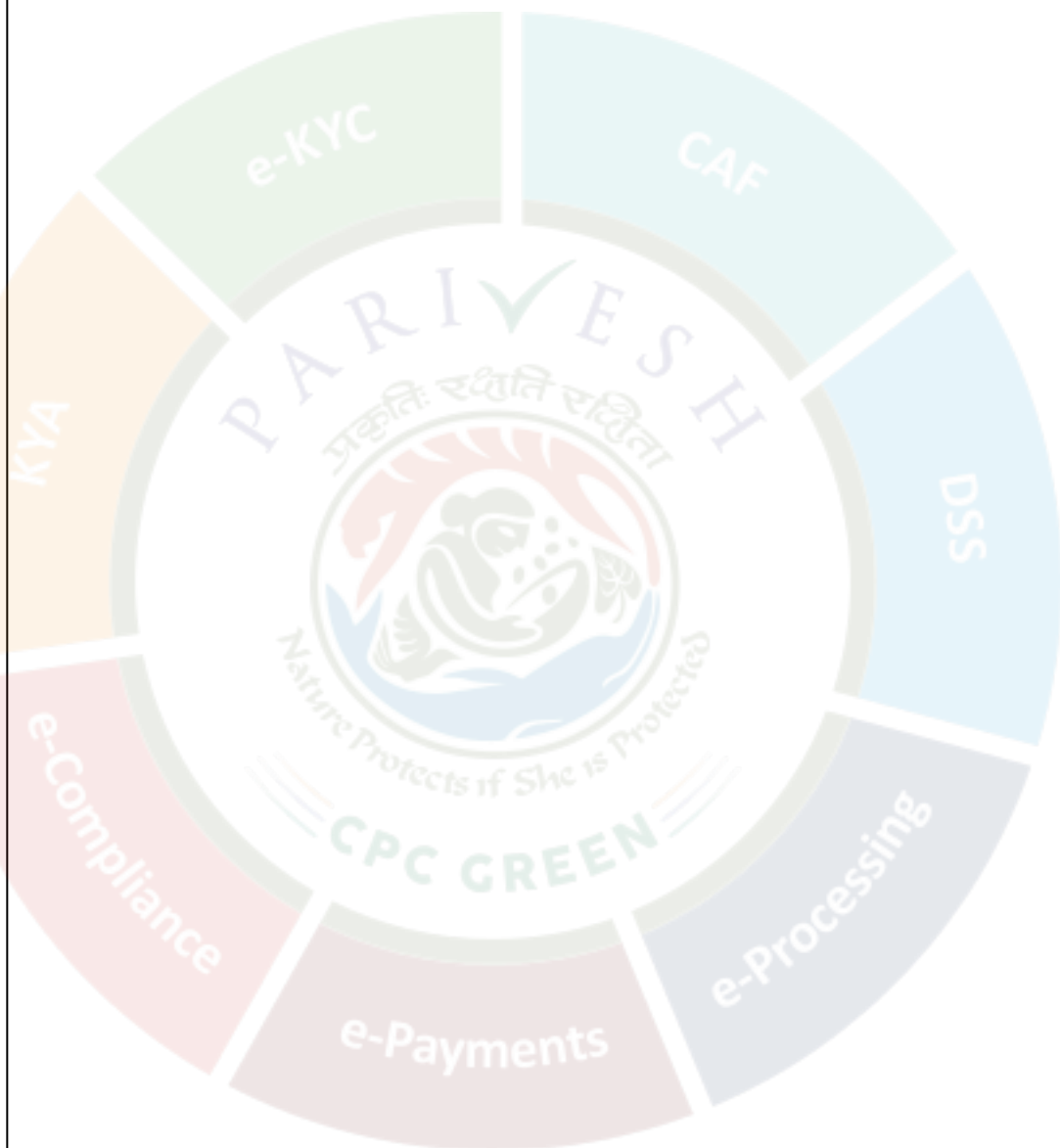
y i
mp
le
me
nti
ng
CE
R i
niti
ati
ves
bas
ed
on
the
Pu
bli
c h
ear
ing
iss
ues
and
Wa
ters
hed
De
vel
op
me
nt
Pla
n.

R&
R d
etai
ls

Tot
al
Pri
vat
e la
nd
to
be
acq
uir
ed:
35.
18
ha.
Dis
pla
ced
fa
mil



ies:
10
Pro
ject
Aff
ect
ed
Fa
mil
ies:
13
0
La
nd
acq
uisi
tio
n c
ost:
Rs
85
4.5
4 l
akh
R&
R
Gr
ant
s:
Rs
82.
05
lak
h
Tri
bal
De
vel
op
me
nt
Pla
n:
Rs
29
5 l
akh
Tot
al:
Rs
12
32
lak



	h
Cat ch me nt a rea/ Co m ma nd are a	Cat ch me nt : 11. 72 sq. k m; Co m ma nd are a: Nil
Ty pes of Wa ste and qua ntit y o f g ene rati on dur ing con stru ctio n/O per atio n	MS W- 38. 8 T on/ ann um dur ing con stru ctio n and 7.2 To n/a nn um dur ing ope rati on
Ma teri al u sed for bla stin g a nd	A m mo niu m Nit rat e F uel

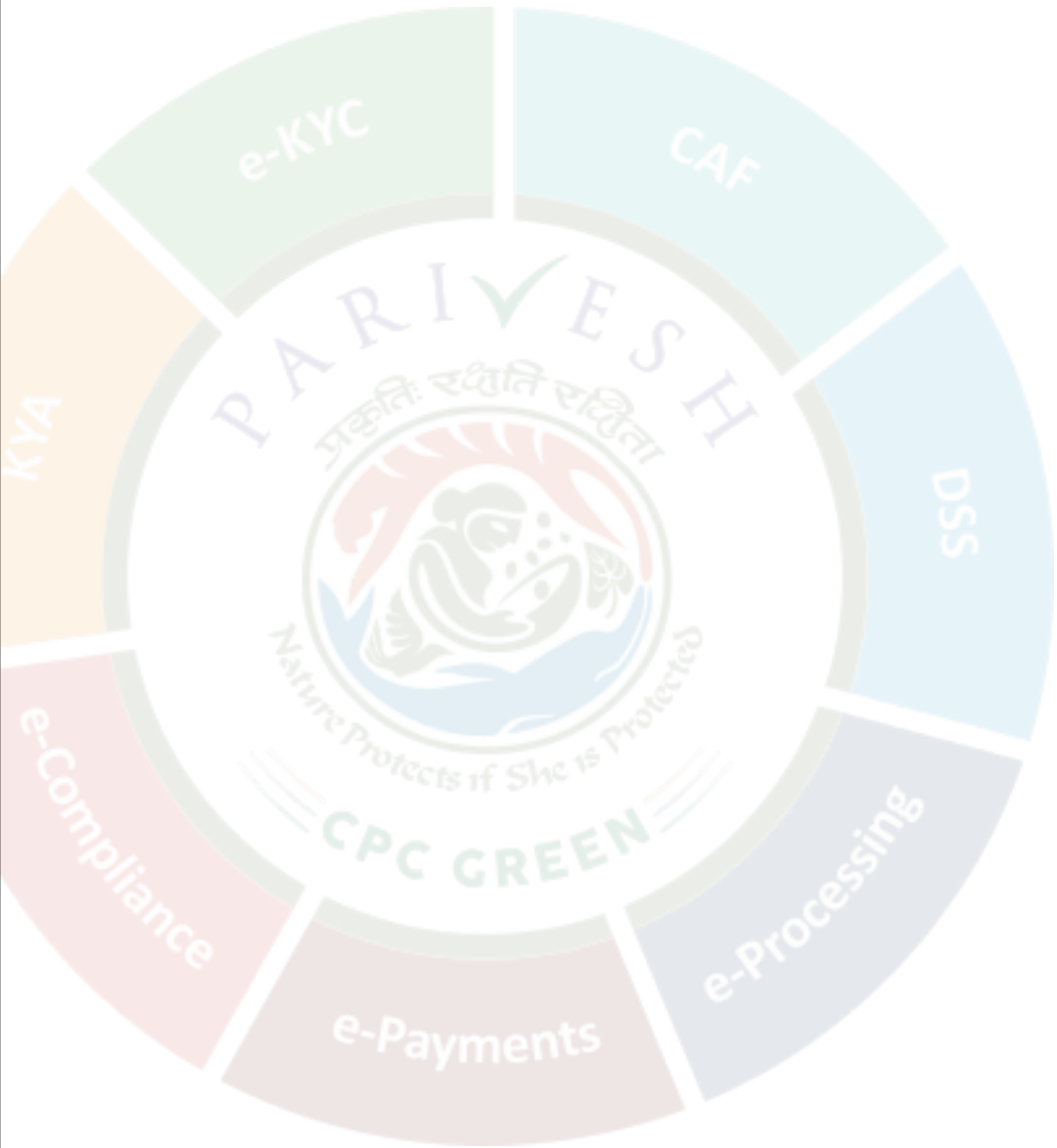


its composition as per DGMS standards

Oil (ANFO), a mixture of ammonium nitrate and fuel oil.

E-F lows for the Project

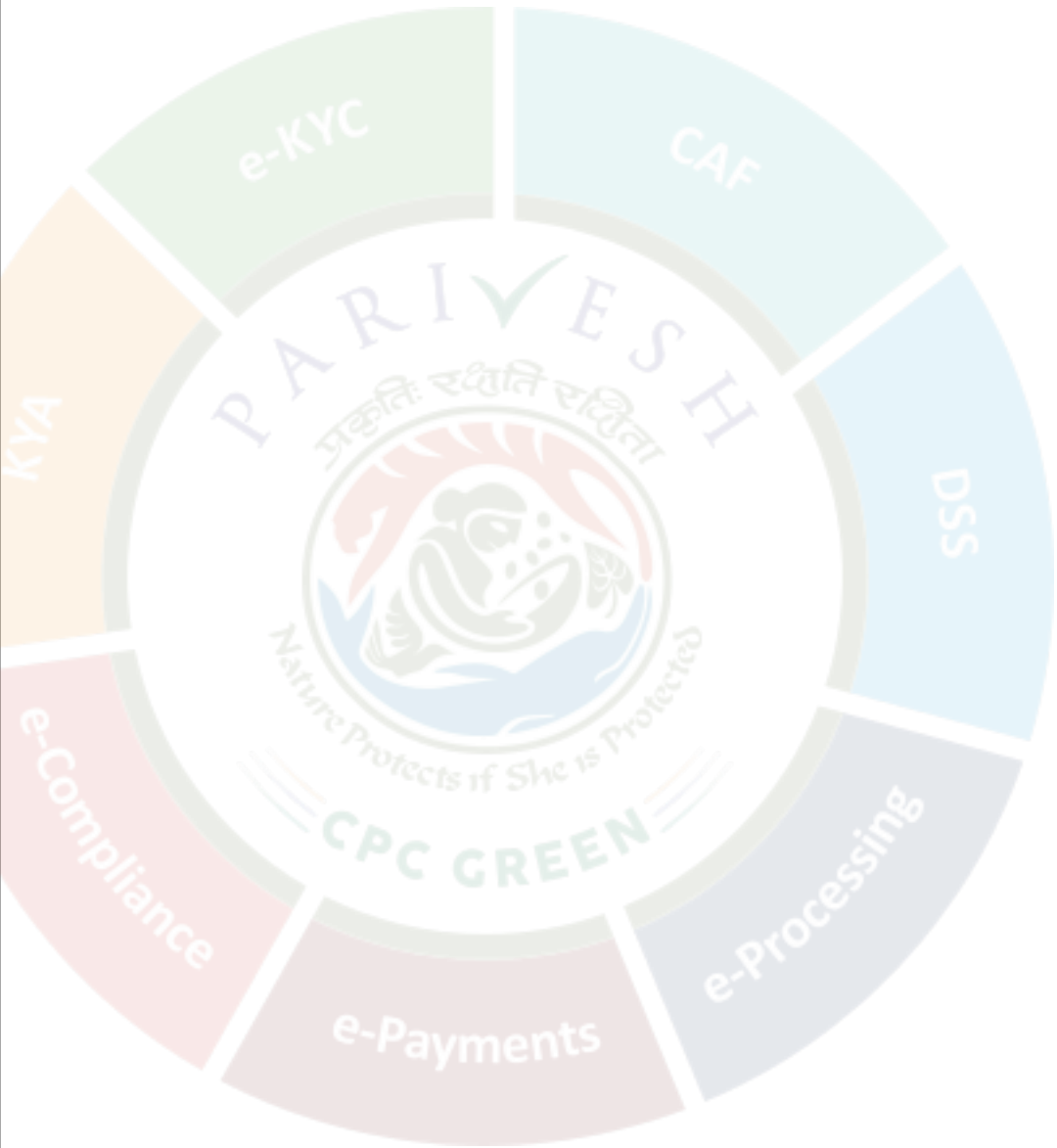
The inflow of Darna River at upper dam site shall be released from bottom outlet throughout the year



r. The inflow of Chromium River at low we r d am site shall be released from spillway after first filling of reservoir.

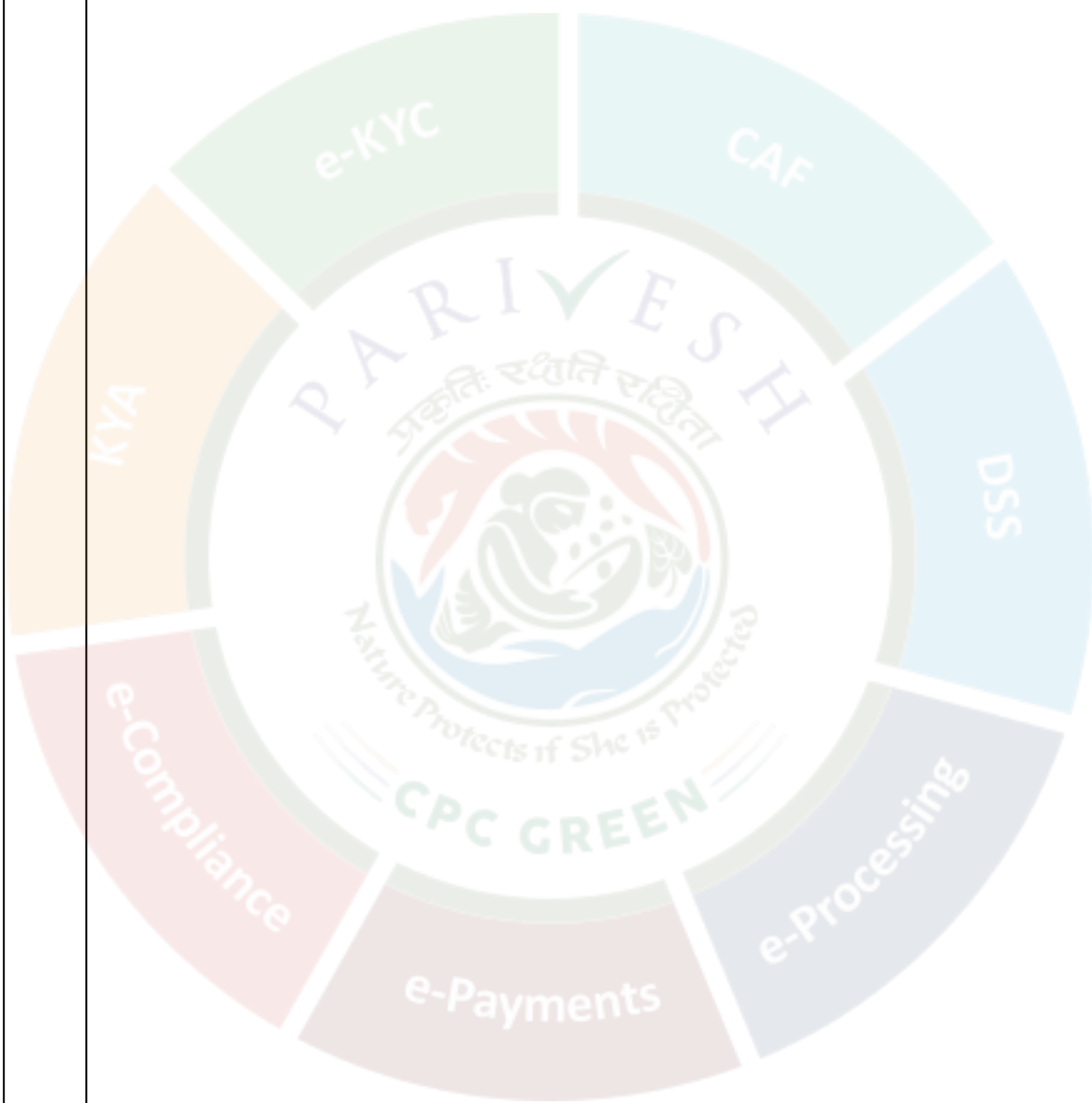
Is Project earlier studied in Cumulative Impact assessment

No Not applicable, in case of PSP. Not applicable, i

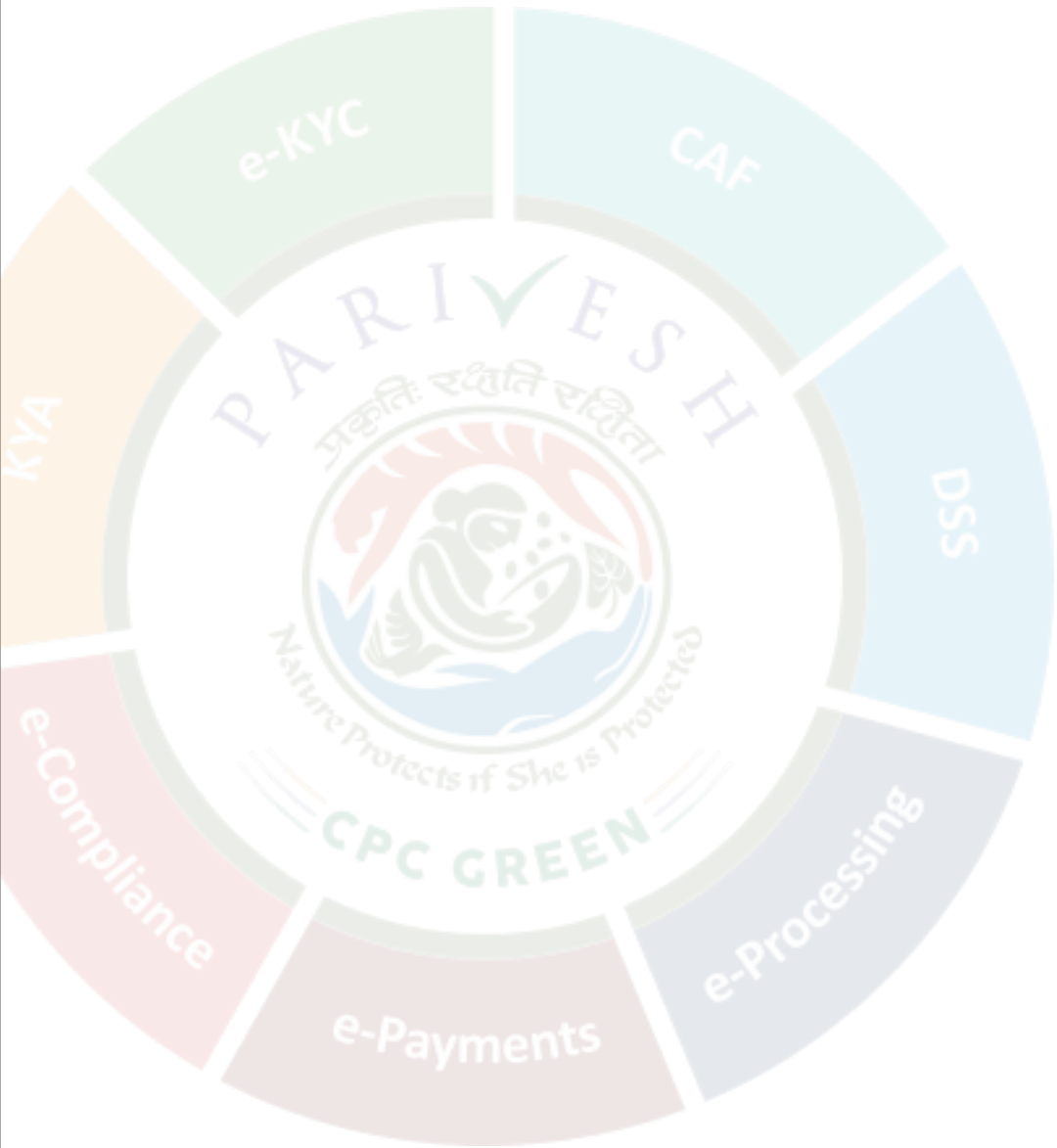


ent & Carrying Capacity studies (CIA&C) for River in which project located. If yes, then c) E-flow with TOR/ Recommendation by EA Case per CIA&C study

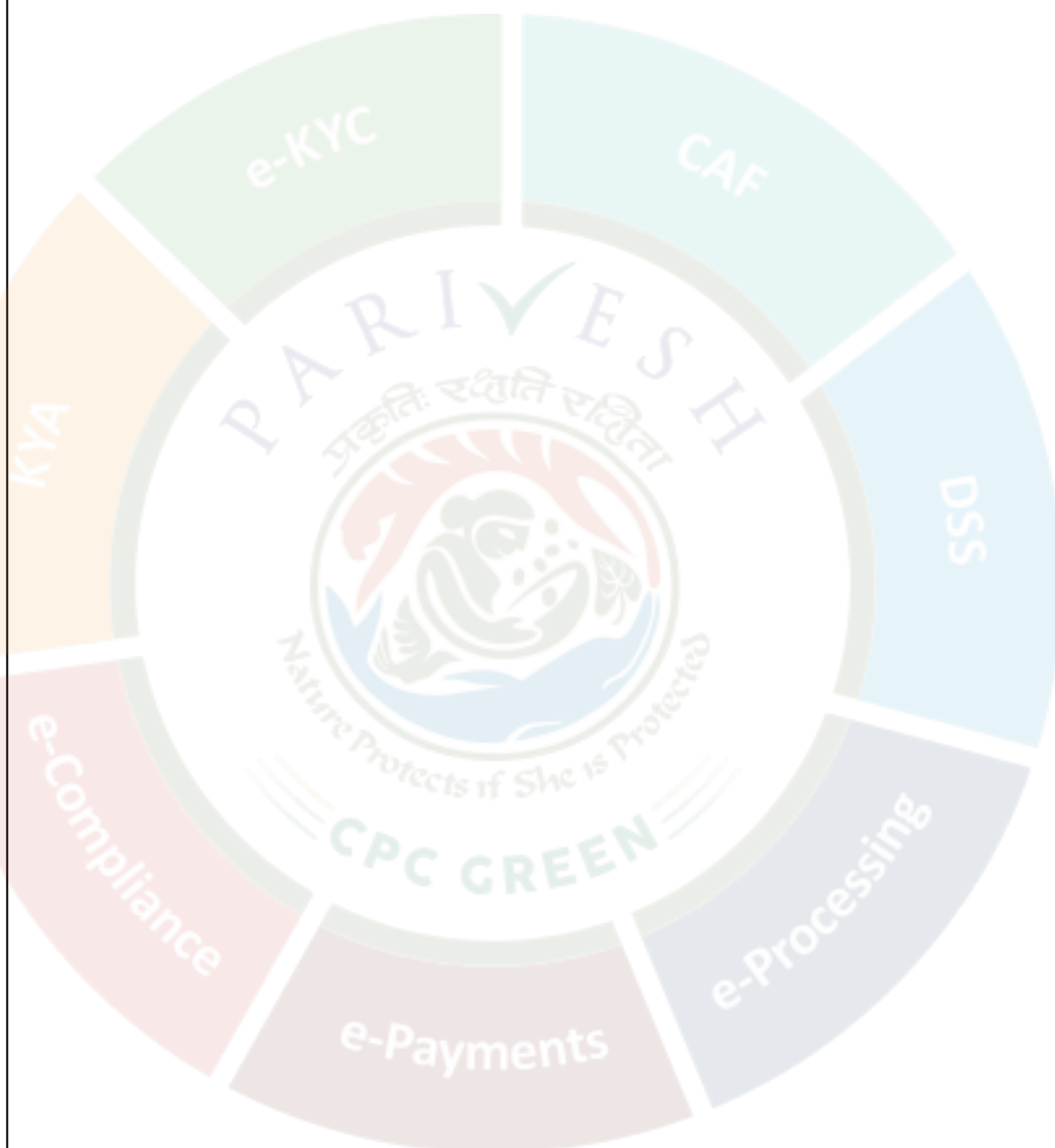
n case of PSP



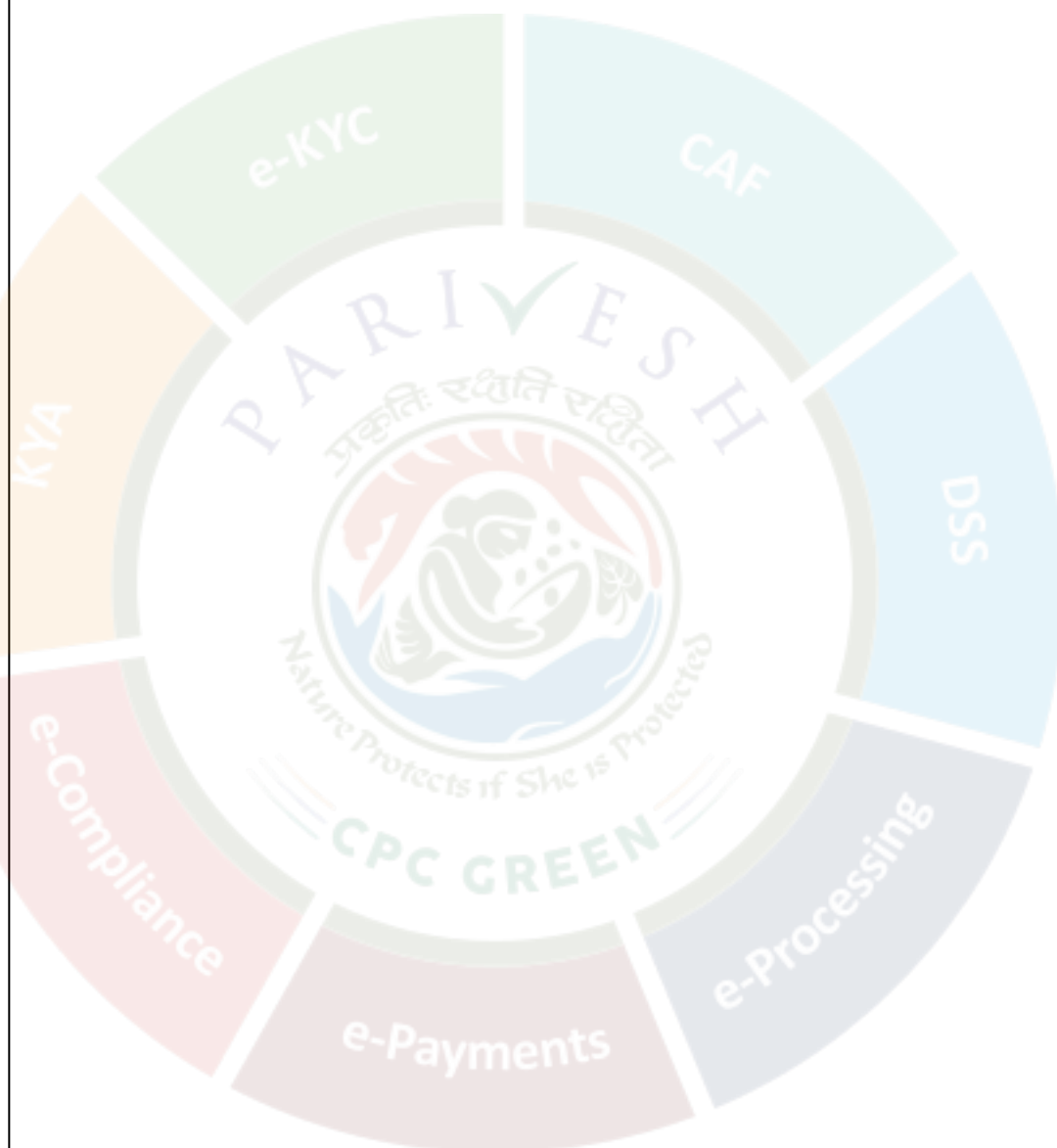
dy of Riv er Bas in. d) I f n ot t he E-F low s m aint ain crit eria for sus tain ing riv er e cos yst em.	
Det ails on pro visi on of f ish pas s	Pu mp ing ope rati on can hav e st ron g i mp act s li ke mo rtal ity of f ish es t hro ug h t urb ine



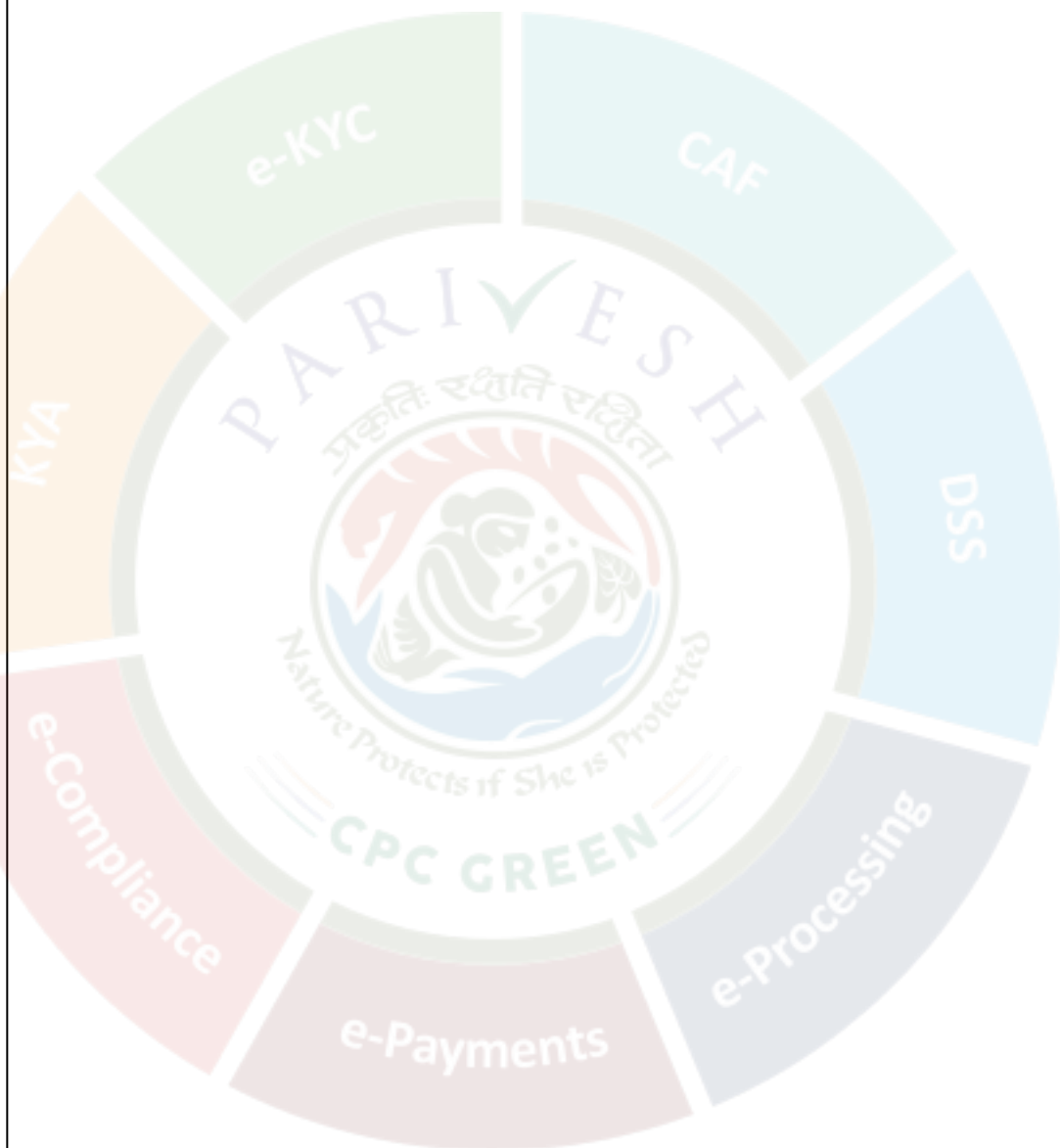
pas
sag
e, c
han
ge
of
hab
itat
etc.
Du
rin
g o
per
ati
on
pha
se
wat
er s
hal
l tr
ave
l th
rou
gh
rev
ersi
ble
tur
bin
es
un
der
high
p
res
sur
e fr
om
the
col
um
n o
f w
ate
r a
bo
ve
it,
con
diti
ons
for



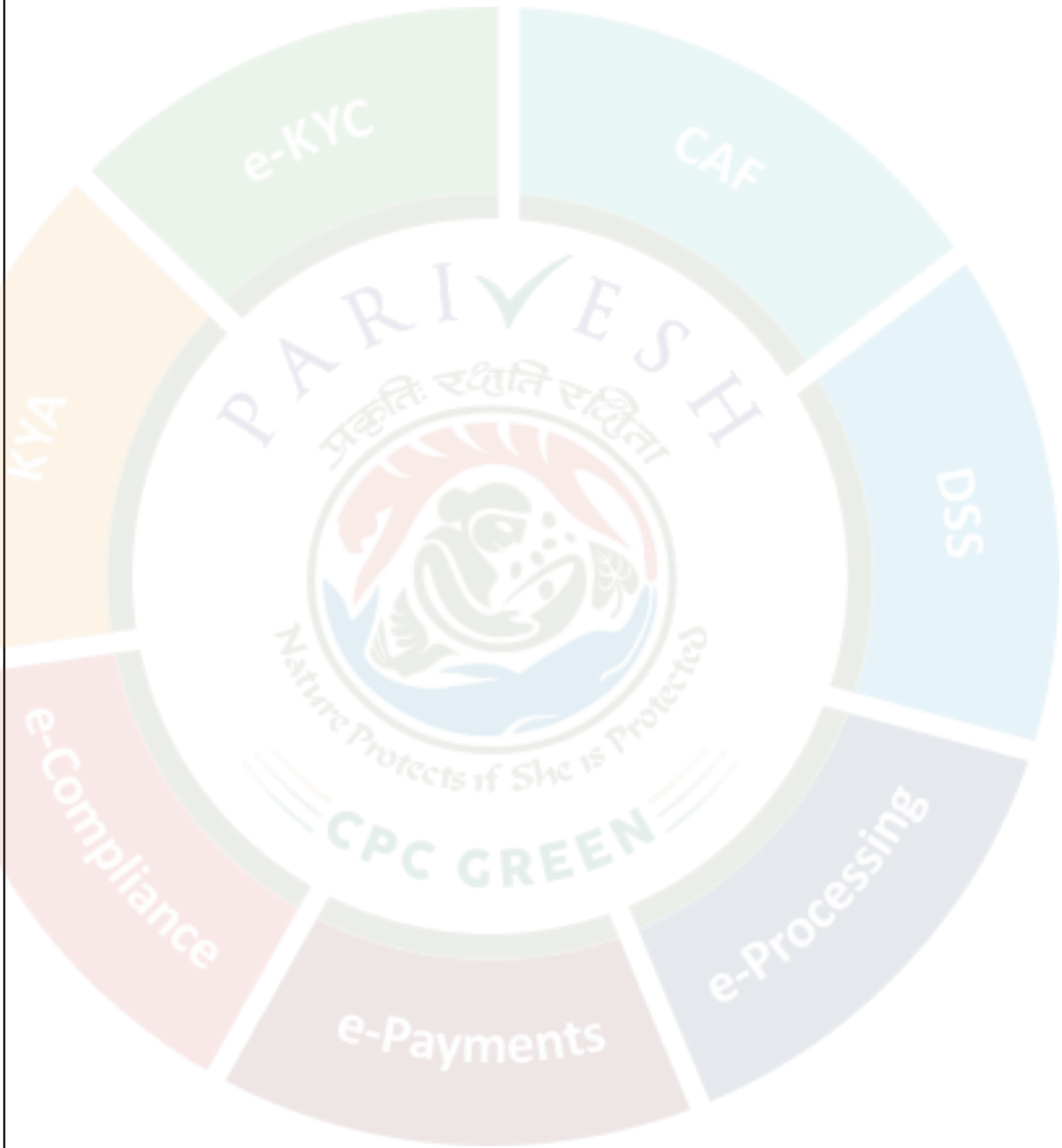
org
ani
c s
pec
ies
are
qui
te t
ou
gh.
Lar
ger
spe
cie
s li
ke
fis
h o
r w
ate
r a
ni
ma
ls c
ann
ot s
urv
ive
pas
sin
g t
hro
ug
h t
urb
ine
s. Th
e d
iur
nal
ver
y h
igh
ext
ent
of
wat
er-l
eve
l fl
uct
uat



ion
of
abo
ut
26
m i
n t
he
up
per
res
erv
oir
and
30
m i
n l
ow
er r
ese
rvo
ir
ma
y a
ffe
ct c
han
ges
in t
he
fis
h-f
ood f
aun
a a
nd cau
se
mo
rtal
ity
of f
ries
and
fin
ger
lin
gs.
Ext
re
me
flu



ctu
 ati
 ons
 can
 inc
 rea
 se t
 urb
 idit
 y
 wh
 ich
 is d
 etri
 me
 nta
 l to
 egg
 and
 fry
 sur
 viv
 al. Th
 ere
 for
 e, n
 o fi
 she
 ries
 ma
 nag
 em
 ent
 pla
 n is
 pro
 pos
 ed
 in
 eit
 her
 of
 pu
 mp
 sto
 rag
 e r
 ese
 rvo
 ir.

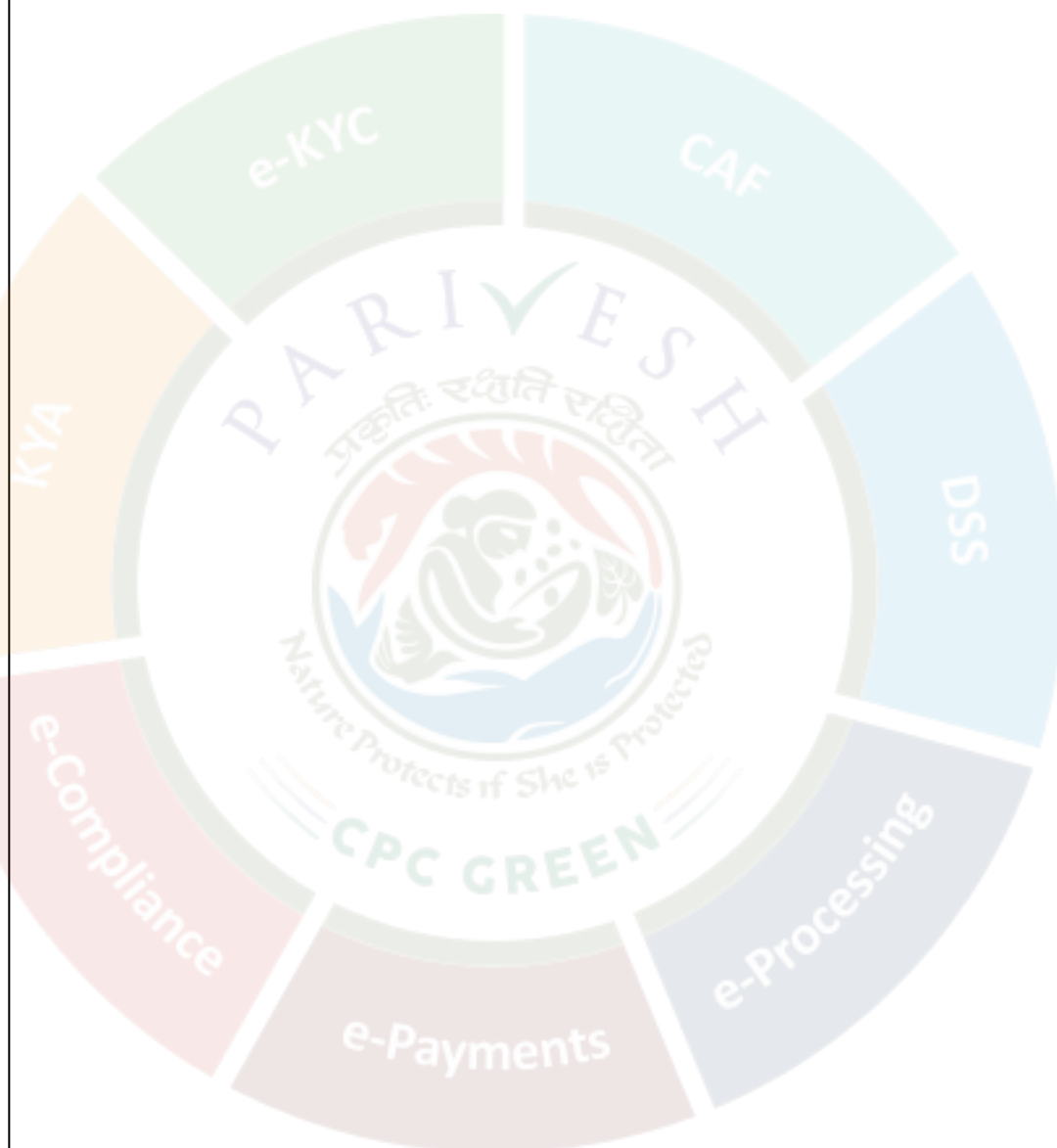


Pro

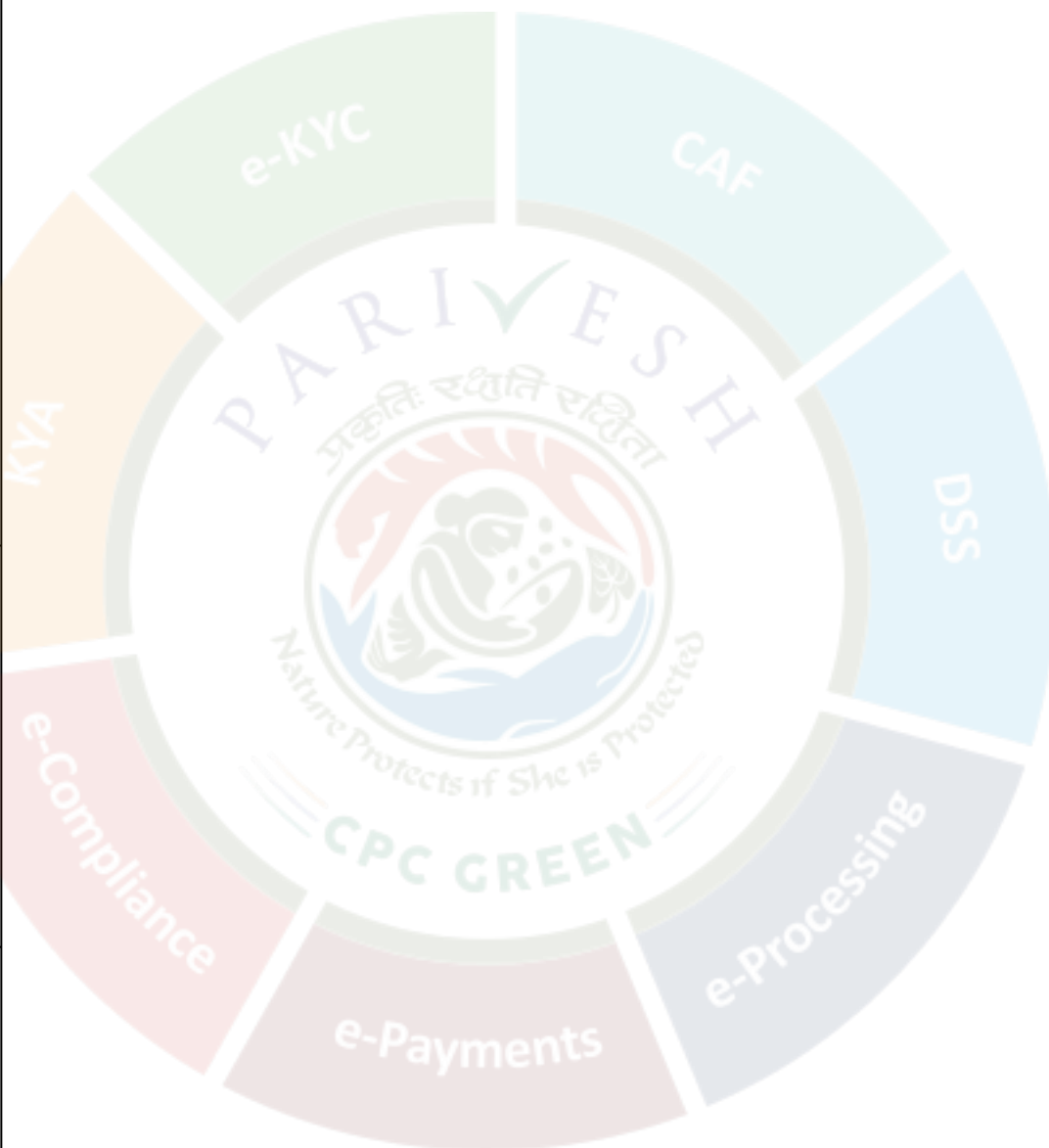
Be

ject
ben
efit
incl
udi
ng
em
plo
ym
ent
det
ails
(no
of
em
plo
ye
e)

nef
its
fro
m
pro
ject
alr
ead
y st
ate
d a
t S.
N.
4
Te
mp
ora
ry
em
plo
ym
ent
dur
ing
con
str
uct
io
n:
15
75
00
0
ma
n-d
ays
Per
ma
nen
t e
mp
loy
me
nt
dur
ing
con
str
uct
ion
:10
0
No



	s.
Are a o f C om pen sat ory Aff ore stat ion (C A) wit h te ntat ive no of pla ntat ion n.	24 3.7 4 h a (26 81 14 tre e s apl ing s)
Pre vio us EC det ails	No ne, as EC is y et t o b e g ran ted
EC Co mp lian ce Re por t b y R. O, M OE F& CC	No t a ppl ica ble



Electricity Generation Capacity

Powerhouse Installed Capacity	1500MW
Generation of Electricity Annually	4044.06 MU
No. of Units	5 X 250MW + 2 X 125 MW

Muck Management Details:

No. of proposed disposal area/ (type of land- Forest/Pvt land)	2 (Forest land)
Cross section of proposed muck area, height of muck with slope.	D-1: Area=22.3ha, Height average=12.50m D-2: Area=22.6ha, Height average=5.5m Slope of muck shall be lesser than 28°
Distance of muck disposal area(location), from muck generation sources (project area)/River, HFL of proposed muck disposal area.	1.0-2.5 km No river at muck disposal site.
Total Muck Disposal Area	44.90 ha (forest)
Estimate Muck to be generated	Muck to be generated: 64.51 lakh cum Consumed on work: 36.08 lakh cum To be disposed: 28.43 lakh cum
Transportation	By road
Monitoring mechanism for Muck Disposal	The project authorities shall erect a barrier to regulate to and fro movement of traffic from the excavation site. Entry of all vehicles passing the barrier and the information regarding quantities of earth material being transported shall be properly arrayed in a register in a transparent manner and shall be liable to be made public by the project authorities as and when required. Proper e-challan shall be issued.

Land Area Breakup:

Private land	35.18 ha
Forest Land	243.74 ha
Government land	0.00 ha
Submergence area/Reservoir area	169.60
Land required for project components	74.14 ha

Presence of Environmentally Sensitive areas in the study area:

Forest Land/ Protected Area/	Yes/No	Details of Certificate/
------------------------------	--------	-------------------------

Environmental Sensitivity Zone		letter/Remarks
Reserve Forest/Protected Forest Land.	Yes	-
National Park	No	Kalsubai Harichandragad Wildlife Sanctuary exists within 10 km of project boundary. However, no part of the project lies within Eco-sensitive zone of the Sanctuary. The nearest project boundary is about 12.5 m from ESZ boundary which has been certified DCF (wildlife), Nashik, Maharashtra
Wildlife Sanctuary	Yes	
Archaeological sites monuments/historical temples etc	No	-
Additional information (if any)	No	-

Court case details: No court case/litigation is pending.

Status of other statutory clearances:

Particulars	Letter no. and date
Status of Stage-I FFC	No, yet. The forest land diversion case submitted vide FFC/

M
H/
H
Y
D/
15
32
4
0/
20
22,
dat
ed
06.
03.
20
22.
dat
ed
6.
3.2
02
2,
is
un
de
r e
xa
mi
nat
io
n.

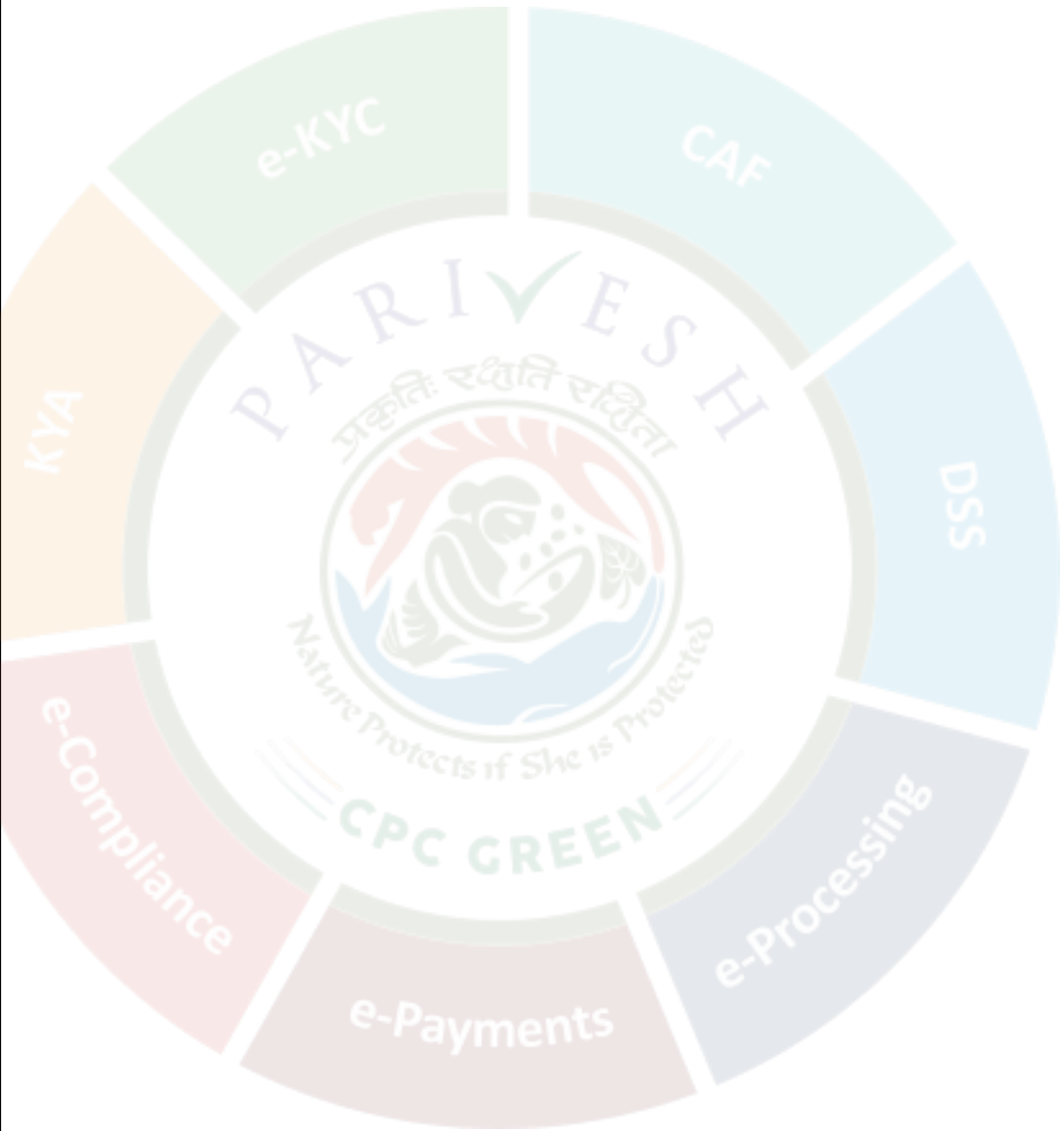
A
pp
ro
va
l
of
C
en
tr
al
W
at
er
C
o
m
m
is
si
on

Hy
dr
ol
og
y a
pp
ro
ve
d v
ide
let
ter
C
W
C
U.
O.:
7/
M
ah



a-2021-Hy d(S)/107, dated 28.6.2022

Approval of Central Electrical Authority
The potential studies have been cleared by Directorate (HPA) CE A, New Delhi, vide I/2



36
9
1/
20
22,
Fil
e
N
o.
C
E
A-
H
Y-
1
2-
2
4-
4-
20
2
1-
H
P
A,
Di
vis
io
n,
dat
ed
16.
9.2
02
2.

A
dd
iti
on
al
de
tai
l (If
an
y)

The
D
PR
has
be
en
sub
mi
tte
d to
the
C
E
A,



	Ne w De lhi for co nc urr en ce.
Is F R A (2 00 6) do ne fo r F C- I	Un de r p ro gr ess

S. N.	Plans	Cost (Rs. L akh)	Capital cost (Rs lakh)	Annual recurri ng cost (Rs lakh)
1.	Catchment Area Treatment Plan	250.00	210.00	10.00
2.	Compensatory Afforestation Scheme	4854.00	4854.00	0.00
3.	Wildlife and Bio-diversity Management plan	326.00	286.00	10.00
4.	Resettlement & Rehabilitation Plan	1232.00	1232.00	0.00
5.	Green Belt Development Plan	120.00	80.00	10.00
6.	Reservoir Rim Treatment Plan	30.00	30.00	0.00
7.	Fisheries Management Plan	130.00	130.00	0.00
8.	Muck Management Plan	2390.00	2350.00	10.00
9	Restoration Plan for Quarry Sites & lands capping	65.00	45.00	5.00

10.	Disaster Management Plan	30.00	26.0	1.00
11.	Water, Air and Noise Management Plan	140.00	48.00	23.00
12.	Public Health Delivery Plan	95.00	31.00	16.00
13.	Labour Management Plan	160.00	42.00	29.50
14.	Sanitation & Solid Waste Management Plan	145.00	85.00	15.00
15.	Local Area Development Plan	100.00	100.00	0.00
16.	Environmental Safeguards During Const.	316.00	00.00	79.00
17.	Energy Conservation Measures	225.00	15.00	52.50
18.	Environmental Monitoring Plan	140.00	16.00	31.00
19.	CER Plan for addressing issues raised during public hearing	600.00	600.00	0.00
20.	Watershed Management	500.00	500.00	0.00
Total EMP		11848.00	10680.00	292.00

3.1.3. Deliberations by the committee in previous meetings

N/A

3.1.4. Deliberations by the EAC in current meetings

14.1.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of Environmental Clearance to the project for Bhavali Pumped Storage Project (1500 MW) in an area of 278.92 Ha in Village Kalbhonde, Kothale and Jamunde Sub District Shahapur and Igatpuri, District Thane and Nashik, Maharashtra by M/s JSW Energy PSP Two Limited

The Hydro-electric project is listed as item no. 1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification, 2006, as amended under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).

The project proposal was earlier considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 27th meeting held during 09.05.2022 and recommended for grant of Terms of References (ToR) for the Project. The ToR has been issued by Ministry vide letter No J-12011/08/2022-IA. I(R) dated 27.6.2022.

The EAC noted that the total land requirement under the project for upper and lower rock fill dam, reservoir & other works, has been assessed as 278.92 ha of which private land is 35.18 ha, forest land 243.74 ha. The EAC also noted that, Kalsubai Harichandragad Wildlife Sanctuary exists within 10 km of project boundary. However, no part of the project lies within Eco-sensitive zone of the Sanctuary. The nearest project boundary is about 12.5m from ESZ boundary. Same has been certified by Deputy

Conservator of Forest (Wildlife). Nashik, vide letter O.W. No. Cell-4/Survey/C.N.1/7/ Year 2023-24, Date: 06/4/2023. There are no tiger/elephant corridors within the project area.

The EAC members expressed serious concerns about the availability of water for filling the reservoir, as the PP indicated that the reservoir would be filled only once during the rainy season. However, based on existing records, rainfall during the rainy season is very limited. Under these conditions, the reservoir cannot be adequately filled during the monsoon season. The EAC also observed that the regular flow of water in the tream/nalah is crucial for mangrove plants, and any blockage may have negative impacts on them. Additionally, the EAC noted that soil sampling analysis revealed a high carbon content in the soil which has no correlation with the topography of the region.

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

- i. The Project Proponent (PP) shall re-visit soil sampling analysis as results shows very high contain carbon in Soil analysis and submit the revised results mentioning permissible limits in the results of soil analysis.
- ii. PP shall relocate the location of Muck Disposal site and should be away from Forest land.
- iii. Assessment of water requirement of local population and water availability shall be studied.
- iv. Permission for water availability obtained from CWC /concerned department mentioning that rain water is sufficient for filling one time filling reservoir.
- v. PP shall submit the undertaking stating that no water flow stoppage/blockage shall be done for filling reservoir during monsoon season.
- vi. The PP shall prepare wild life conservation plan in consultation with expert Institutions and submit the wildlife conservation plan approved by Chief Wildlife Warden as Kalsubai Harichandragad Wildlife Sanctuary exists within 10 km of project boundary. As the project cover area is located in Western Ghats, the EAC sub-committee shall conduct site visit for assessing the ground conditions and possible environmental impacts due to project comprehensively before further consideration of the proposal.
- vii. Given that 243.74 ha. Forest land are involved, the PP shall provide a detailed classification /land use pattern /vegetation details of the project area including information on forest density, species diversity, and other relevant ecological characteristics.
- viii. Submit details of tree to be removed for construction of the project.

3.1.5. Recommendation of EAC

Deferred for ADS

3.2. Agenda Item No 2:

3.2.1. Details of the proposal

Brutang Irrigation Project by CHIEF ENGINEER PROJECT PLANNING FORMULATION AND INVESTIGATION located at NAYAGARH,ODISHA			
Proposal For		Fresh EC	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/OR/RIV/476403/2024	J-12011/09/2020-IA-I(R)	07/08/2024	River Valley/Irrigation projects (1(c))

3.2.2. Project Salient Features

14.2.1: The proposal is for grant of Environmental Clearance to the project for Brutang Irrigation Project (CCA 23300Ha) in an area of 3552.06 ha in village Manjari, Sub District, District Nayagrah, Odisha by Chief Engineer Project Planning Formulation and Investigation.

14.2.2: The Project Proponent and the accredited Consultant Centre for Envotech & Management Consultancy Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

- i. The proposal is for grant of Environmental Clearance to the project for Brutang Irrigation Project located at village Manjari, 30 km away from Daspalla town in Nayagarh district of Odisha by Water Resources Department, Govt. of Odisha.
- ii. The project proposal was considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 33rd meeting held during 24.06.2020 and recommended for grant of Terms of References (ToRs) for the Project. The ToR has been issued by Ministry vide letter No.; J-12011/09/2020-IA-I(R)] dated 01.09.2020.
- iii. The geographical co-ordinate of the project are:
- iv. Ministry had issued EC earlier vide letter no. J-12011/87/2005-IA-I dated 02.06.2006 in favour of Chief Engineer, Planning, Dept of Water Resources, Govt. of Odisha. 1st extension of validity of EC was also accorded for additional five years i.e. up to 02.06.2016 vide letter No. J-12011/87/2005-IA-I dated 10.01.2013. The project was not given further extension because of delay in application for grant of extension of validity.
- v. Brutang irrigation project contemplates a dam across river Brutang, a tributary of river Mahanadi, near village Manjari, 30 km away from Daspalla town in Nayagarh district of Odisha. This river is located in a hilly area without having sufficient ayacut of its own basin. Hence the water from Brutang reservoir will be fed to the existing Kuanria reservoir through a link canal of 12 km length and the Brutang Main Canal will offtake from Kuanria reservoir through a new head regulator to the right side of Kuanria Dam and will run parallel to the existing right distributary of Kuanria project for a distance of 9.25 km and thereafter will have a new canal system covering the total ayacut of 23300 ha. The existing features of Kuanria Project are not affected due to feeding of additional water from Brutang reservoir since it will be regulated from Burtang reservoir as per the requirement of Brutang Main Canal.
- vi. **Purpose of the Project:** The purpose of the Project is to irrigate 23300 ha of CCA at an investment cost of Rs. 165872.44 lakhs. The ayacut coverage of Canal System will boost the crop cultivation through assured irrigation water supply. It envisages a Khariff ayacut of 20970 ha and Rabi ayacut of 9320 ha resulting an Annual Irrigation Potential of 30290.00 ha @ 130% irrigation intensity.
- vii. A provision of 360 HaM of surface water has been kept in this project to provide drinking water to 50,000 people of the command area.
- viii. **Land requirement:** Total land required for this project is 3552.06 ha, out of this forest land is 1524.17 ha. At FRL 165.00 m, submerged area = 2077.61 ha, Of which Forest area = 1014.49 ha, Govt. land = 575.43 ha, Private land = 487.69 ha
- ix. Demographic details in 10 km radius of project area:

Total number of villages & towns	385
Number of Households	64096
Total Population	269638
Total number of Males	141553
Total number of Females	128085
Male/ Female (Sex) ratio	942

Percentage of S.C population	14.7%
Percentage of S.T Population	5.7%
Percentage of Literates	72.1%

xi. **Project Benefit:** Total Employment will be 3300 persons during construction phase and 134 persons during operation phase. as direct & persons indirect after expansion. Rs. 3.00 crores has been kept towards CSR activities such as development of local roads, installation of lift irrigation system, piped water scheme for drinking water purpose and construction of community hall. Also Rs.7.5 lakhs has been budgeted towards annual maintenance of above activities.

xii. **Environmental Sensitive area:** There are Baisipali wildlife sanctuaries (1.29 km), Buguda-Central RF elephant corridor (2.65 km) and Satkoshia gorge (1.29 km) etc. are within 10 km distance from the project site. River/ water body: three streams such as Lapari Nala, Bhimakandha Nala, Kalua Nala other than Brutang River are flowing at a distance of approximately 4.35 km in SW, 7.28 km in Southern, 9.8 km in ENE direction.

xiv. **Schedule – I species:**

- Mammals (Manis crassicaudata, Canis lupus pallipes, Elephas maximus, Melarsus ursinus, Mellivora capensis, Ratufa indica, Canis aureus, Hyaena hyaena, Cervus unicolor, Felis chaus, Herpestes edwardsi, Hystrix indica),
- Birds (Pavocristatus, Spilornix cheela),
- Reptiles (Python molurus, Varanus bengalensis, Viperaruselli, Ptyasmucosus, Xenochrophis piscator, Lissemys punctata, Chamelaeozeylanicus, Varanus flavescens, Naja Kaouthia)

	· PM10 = 54.2 to 61.2 µg/m ³ · PM2.5 = 27.2 to 32.2 µg/m ³ · SO ₂ = 7.2 to 12.2 µg/m ³ · NO _x = 10.8 to 18.26 µg/m ³ · CO = 0.31 to 0.45 mg/m ³
	• PM10 = 51.64 to 59.72 µg/m ³ • PM2.5 = 25.76 to 30.84 µg/m ³ • SO ₂ = 7.04 to 11.33 µg/m ³ • NO _x = 9.5 to 15.8 µg/m ³ • CO = 0.21 to 0.43 mg/m ³
	pH: 7.26 to 7.62, Total Hardness (as CaCO ₃): 142 to 146 mg/lit & Total Alkalinity (as CaCO ₃): 106 to 118 mg/lit; Calcium (as Ca): 35.3 to 36.1 mg/lit; Magnesium (as Mg): 13.1 to 13.6 mg/lit; Oil and grease: <1 to <1 (mg/lit); Sulphate (as SO ₄): 18.4 to 19.1 mg/lit, Nitrate (as NO ₃): 4.3 to 5.4 mg/lit; Iron (as Fe): 0.35 to 0.41 mg/lit;

	<p>Heavy metals like Copper (as Cu)-0.19 to 0.25, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05, Manganese (as Mn), Arsenic (as As)- <0.001 and</p>
	<p>pH: 7.43to 7.58, Total Hardness (as CaCO₃): 150to 164 mg/lit & Total Alkalinity (asCaCO₃):110to 120 mg/lit; Calcium (as Ca): 37.7to 42.5 mg/lit; Magnesium (as Mg) :13.6to 14.6 mg/lit; Oil and grease: <1to <1 (mg/lit); Sulphate (as SO₄): 14.6to18.8 mg/lit, Nitrate (asNO₃) :5.6to 6.4 mg/lit; Chloride (as Cl) : ---to --- mg/lit; Iron (as Fe): 0.31to 0.35 mg/lit; BOD 2.0to2.6 mg/lit;</p>
	<p>Heavy metals like Copper (as Cu)-0.23 to 0.41, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05,</p>
	Monsoon
	<p>pH7.46 to 7.71, Total Hardness (as CaCO₃): 126 to 132 mg/lit & Total Alkalinity (asCaCO₃):110 to 122 mg/lit; Calcium (as Ca): 32.1 to 32.9 mg/lit; Magnesium (as Mg) : 11.2 to 12.2 mg/lit; Oil and grease: <1to <1 (mg/lit); Sulphate (as SO₄): 15.1 to16.2 mg/lit, Nitrate (asNO₃) :4.8 to 6.1 mg/lit; Iron (as Fe): 0.29 to 0.33 mg/lit; BOD 2.5 to2.6 mg/lit;</p>
	<p>Heavy metals like Copper (as Cu)-0.13 to 0.19, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05, Manganese (as Mn), Arsenic (as As)-<0.001 and Mercury (as Hg)- <0.001</p>
	<p>pH: 7.62 to 7.75, Total Hardness (as CaCO₃): 134 to 146 mg/lit & Total Alkalinity (asCaCO₃):116 to 128 mg/lit; Calcium (as Ca): 34.5 to 37.7 mg/lit; Magnesium (as Mg) : 11.7 to 13.6 mg/lit; Oil and grease: <1to <1 (mg/lit); Sulphate (as SO₄): 11.4 to15.3 mg/lit, Nitrate (asNO₃):6.6 to 7.2 mg/lit; Iron (as Fe): 0.22 to 0.26 mg/lit;</p>

	BOD 2.0 to 2.6 mg/lit;
	Heavy metals like Copper (as Cu)-0.18 to 0.34, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05, Manganese (as Mn), Arsenic (as As)-<0.001 and Mercury (as Hg)- <0.001
	Post-Monsoon
	pH 7.33 to 7.63, Total Hardness (as CaCO ₃): 136 to 140 mg/lit & Total Alkalinity (as CaCO ₃): 110 to 122 mg/lit; Calcium (as Ca): 34.5 to 35.3 mg/lit; Magnesium (as Mg): 12.2 to 12.6 mg/lit; Oil and grease: <1 to <1 (mg/lit); Sulphate (as SO ₄): 17.2 to 18.2 mg/lit, Nitrate (as NO ₃): 3.8 to 4.6 mg/lit; Iron (as Fe): 0.32 to 0.39 mg/lit; BOD 2.4 to 2.5 mg/lit;
	Heavy metals like Copper (as Cu)-0.16 to 0.22, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05, Manganese (as Mn), Arsenic (as As)-<0.001 and Mercury (as Hg)- <0.001
	pH 7.54 to 7.66, Total Hardness (as CaCO ₃): 142 to 158 mg/lit & Total Alkalinity (as CaCO ₃): 116 to 128 mg/lit; Calcium (as Ca): 36.9 to 40.9 mg/lit; Magnesium (as Mg): 12.2 to 14.6 mg/lit; Oil and grease: <1 to <1 (mg/lit); Sulphate (as SO ₄): 13.2 to 17.6 mg/lit, Nitrate (as NO ₃): 4.4 to 5.6 mg/lit; Iron (as Fe): 0.28 to 0.30 mg/lit; BOD 2.2 to 2.7 mg/lit;
	Heavy metals like Copper (as Cu)-0.21 to 0.38, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05, Manganese (as Mn), Arsenic (as As)-<0.001 and Mercury (as Hg)- <0.001
	Pre-monsoon

	<p>Total Dissolved Solids: 248.2 to 327.4 mg/lit; Total Hardness (as CaCO₃): 168 to 192 mg/lit; Total Alkalinity(asCaCO₃): 108 to 126 mg/lit; Calcium (as Ca): 46.3 to 54.8 mg/lit; Magnesium (as Mg): 10.9 to 13.8 mg/lit; Oil and grease: (<1.4 mg/lit); Sulphate (asSO₄): 20.8 to 26.6 mg/lit, Nitrate (asNO₃): 1.6 to 4.4 mg/lit; Chloride (as Cl): 14.9 to 90.9 mg/lit; Iron (as Fe):0.18 to 0.28 mg/lit; Heavy metals like Copper (as Cu)-<0.03, Lead (as Pb)-<0.1, Cadmium (as Cd) - <0.003, Chromium (as Cr)- <0.05, Manganese (as Mn)- <0.02, Arsenic (as As)- <0.001 and Mercury (as Hg)-<0.001</p>
	Monsoon
	<p>pH: 6.83to 7.56; Total Dissolved Solids: 242.6to 311.8 mg/lit; Total Hardness (as CaCO₃): 172to 194 mg/lit; Total Alkalinity(asCaCO₃): 110to 130 mg/lit; Calcium (as Ca): 48.2to 58.3 mg/lit; Magnesium (as Mg): 11.8to 12.9 mg/lit; Oil and grease: (<1.4 mg/lit); Sulphate (asSO₄): 17.3to 23.6 mg/lit, Nitrate (asNO₃): 1.7to 4.2 mg/lit; Chloride (as Cl): 9.9 to 82.9 mg/lit; Iron (as Fe): 0.13to 0.22 mg/lit; Heavy metals like Copper (as Cu)-<0.03, Lead (as Pb)-<0.1, Cadmium (asCd) - <0.003, Chromium (as Cr)- <0.05, Manganese (as Mn)- <0.02, Arsenic (as As)- <0.001 and Mercury (as Hg)-<0.001</p>
	Post-Monsoon
	<p>pH: 6.72to 7.43; Total Dissolved Solids: 266.4to 318.6 mg/lit; Total Hardness (as CaCO₃): 170to 190 mg/lit;</p>
	<p>Total Alkalinity(asCaCO₃): 118to 136 mg/lit; Calcium (as Ca): 48.2 to 54.4 mg/lit; Magnesium (as Mg): 12.5to 14.5 mg/lit; Oil and grease: (<1.4 mg/lit); Sulphate (asSO₄): 19.4to 25.2 mg/lit, Nitrate (asNO₃): 1.4to 3.9 mg/lit; Chloride (as Cl): 11.9 to 86.9 mg/lit; Iron (as Fe): 0.16to 0.25 mg/lit; Heavy metals like Copper (as Cu)-<0.03, Lead (as Pb)-<0.1, Cadmium</p>

	(as Cd) - <0.003, Chromium (as Cr)- <0.05, Manganese (as Mn)- <0.02, Arsenic (as As)- <0.001 and Mercury (as Hg)-<0.001
	Pre-Monsoon
	The Leq values for day time was observed to be 49.3 to 52.3 dB (A) in residential area, while during night time 42.5 to 44.4 dB (A).
	Monsoon
	The Leq values for day time was observed to be 47.0 to 50.0 dB (A) in residential area, while during night time 40.2 to 42.1 dB (A).
	Post-Monsoon
	The Leq values for day time was observed to be 48.1 to 51.1 dB (A) in residential area, while during night time 41.3 to 43.2 dB (A).
	Pre-Monsoon
	Bulk density: 0.94 to 1.15 gm/cm ³ ; pH range 7.02 to 7.45; Electrical conductivity (EC); 208.7 to 234.2 μ hos/cm; Calcium content: 362.2 to 396.3 mg/kg; sodium: 180.6 to 210.0 mg/kg; potassium: 101.4 to 120.6 mg/kg; Nitrogen: 478.2 to 608.2 mg/kg; Phosphorous: 20.6 to 32.8 mg/kg; Magnesium: 165.2 to 180.4 mg/kg; Organic
	Monsoon
	Bulk density: 0.82 to 1.02 gm/cm ³ ; pH range 7.28 to 7.72;
	Electrical conductivity (EC); 162.6 to 201.4 μ hos/cm; Calcium content: 351.4 to 382.6 mg/kg; sodium: 161.6 to 201.6 mg/kg; potassium: 92.3 to 119.3 mg/kg; Nitrogen: 458.2 to 589.2 mg/kg; Phosphorous: 16.4 to 29.2 mg/kg; Magnesium: 158.6 to 173.4 mg/kg;
	Post-Monsoon

	<p>Bulk density:0.88 to 1.11 gm/cm³; pH range 7.16 to 7.61; Electrical conductivity (EC);188.8 to 218.6 μhos/cm; Calcium content: 357.2 to 389.4mg/kg; sodium:172.2 to 206.4 mg/kg; potassium:98.6 to 117.2 mg/kg; Nitrogen: 466.4 to 596.4 mg/kg; Phosphorous: 18.9 to 31.2 mg/kg; Magnesium: 162.8 to 178.6 mg/kg;</p>
Flora & Fauna Schedule-I species observed in the study area	<p>Mammals: (Manis crassicaudata, Canis lupus pallipes, Elephas maximus, Melarsus ursinus, Mellivora capensis, Ratufa indica, Canis aureus, Hyaena hyaena, Cervus unicolor, Felis chaus, Herpestes edwardsi, Hystrix indica)</p> <p>Birds: (Pavocristatus, Spilornix cheela),</p> <p>Reptiles: (Python molurus, Varanus bengalensis, Viperaruselli, Ptyasmucosus, Xenochrophis piscator, Lissemys punctata, Chamelaeozeylanicus, Varanus flavescens, Naja Kaouthia)</p>

xvii. The salient details of the project are as follows:

1. Project details:

Name of the Proposal	Brutang Irrigation Project
Proposal No	IA/OR/RIV/476403/2024
Location (Including coordinates)	Village Manjari in Dasapalla Block under Naya garh District, Odisha.
Company's Name	
CIN no. of Company/user agency	
Accredited Consultant and certificate no.	Centre for Envotech and Management Consultancy Pvt. Ltd. Certificate No: NABET/EIA/2124/RA 0243
	Latitude : 20 ⁰ 22' 57.83" N
Inter- state issue involved	No
Proposed on River/ Reservoir	River Brutang
Type of Hydro-electric project	NA
	Zone-II

2. Category details:

Category of the project	River Valley Projects
Capacity / Cultural command area (CCA)	23300 ha
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	NA

3. ToR/EC Details:

ToR Proposal No.	
EAC meeting date	
ToR Letter No.	
ToR grant Date	
Cost of project	165872.00 lakhs
Total area of Project	3552.06 ha
Height of Dam from River Bed (EL)	42.00 M
Details of Submergence area	2077.61 ha
District to provide irrigation facility (if applicable)	
Details of tunnels on upper level & lower level and length of canal (if applicable)	No tunnel construction will be done. Canal length: 71.5 km
No. of affected Village.	
No. of Affected Families	As per approved plan- 680 As per present assessment -1034
Project Benefits	Brutang Irrigation Project envisages assured irrigation to 30290 ha. Kharif and Rabi cultivation and financial benefit by Rs.31892.512 lakhs per annum. The State Govt. intends to achieve food security and social upliftment of the people by initiating this project proposal.
R&R details	
Catchment area/ Command area	Gross Command Area (GCA) = 31110 ha. Culturable Command Area (CCA) = 23300 ha

Types of Waste and quantity of generation during construction/ Operation	Spoils will be generated during construction of dam and canals. Spoils from Base stripping, excavation of foundation etc. would account for about 3000MT. Most of the spoils would be reutilized for area levelling and temporary Haul Roads.
Material used for blasting and its composition as per DGMS standards.	Explosive will be used for a very small period related to Blasting of Hard Rock in the foundation.
E-Flows for the Project	Attached as Appendix-1
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	30% in monsoon season, 20% in lean season and 25% in non-monsoon & non-lean season, to be followed corresponding to flow of 90% dependable year.
Details on provision of fish pass	Provision for fish pass will be kept through Construction sluice and proposed link Channel to Kuanria Reservoir.
Project benefit including employment details (no of employee)	Brutang Irrigation Project envisages assured irrigation to 30290 ha. Kharif and Rabi cultivation and financial benefit by Rs.31892.512 lakhs per annum. The State Govt. intends to achieve food security and social upliftment of the people by initiating this project proposal. No. of Employee: During Construction- 3300 Nos. During Operation- 134 Nos.
Area of Compensatory Afforestation (CA) with tentative no of plantation.	CA Land- 1524.17 ha Non-Forest Land. 1000 Nos. of Plants per hectare in identified Land.
Previous EC details	<ul style="list-style-type: none"> • Environmental Clearance accorded to this project earlier vide letter no. J-12011/87/2005-IA-I dated 02.06.2006. •
EC Compliance Report by R.O, MOEF&CC	

4. Muck Management Details:

No. of proposed disposal area/ (type of land- For est/Pvt land)	In places such as low pockets at the downstream of dam, haul roads, temporary approach roads to
---	---

	quarry & borrow areas.
Cross section of proposed muck area, Height of muck with slope.	
Distance of muck disposal area (location), from muck generation sources (project area)/River, HF L of proposed muck disposal area.	<p>Muck disposal areas is appx. within 5 Km radius of the Dam site</p> <p>Earth debris Filling & leveling of low pockets at the downstream of dam for developing garden, Backfilling of borrow areas and low pockets around the colony.</p> <p>Excavated rock debris Construction of haul roads, temporary approach roads to quarry & borrow areas.</p> <p>Debris from stone quarry Debris to be reused for restoration of quarry and back filling after the construction period is over.</p> <p>Domestic garbage from project owned colony Transported to a distant incineration around (low laying pit) and burn to ashes.</p>
Total Muck Disposal Area	
Estimate Muck to be generated	
Transportation	
Monitoring mechanism for Muck Disposal Transportation	

5. Land Area Breakup:

Private land	
Government land/Forest Land	
Submergence area/Reservoir area	
Land required for project components	1474.45 ha

6. 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	Baisipalli RF, Central RF, Na shaghar RF
National Park		
Wildlife Sanctuary	Yes	Baisipalli Wildlife Sanctuary

Archaeological sites monuments/historical temples etc.	No	
Additional information (if any)	Yes	Buguda-Central Reserve Forest Elephant Corridor, Satkosi a Tiger Reserve.

Availability of Schedule-I species in study area:

Mammals: *Manis crassicaudata*, *Canis lupus pallipes*, *Elephas maximus*, *Melarsus ursinus*, *Mellivora capensis*, *Ratufa indica*, *Canis aureus*, *Hyaena hyaena*, *Cervus unicolor*, *Felis chaus*, *Herpestes edwardsi*, *Hystrix indica*.

Birds: *Pavo cristatus*, *Spilornix cheela*.

Reptiles: *Python molurus*, *Varanus bengalensis*, *Vipera ruselli*, *Ptyas mucosus*, *Xenochrophis piscator*, *Lissemys punctata*, *Chamelaeo zeylanicus*, *Varanus flavescens*, *Naja Kaouthia*.

7. Public Hearing (PH) details:

Advertisement for PH with date	
Date of PH	16.02.2024
Venue	
Chaired by	Sri Dilip Kumar Bal, ADM Nayagarh Er. Deepak Kumar Sahoo, RO SPCB
Main issues raised during PH	<ul style="list-style-type: none"> Identification and demarcation of allotted land to the beneficiaries. Permanent RoR should be issued to the displaced families of Kuanria Dam on priority basis. The Government shall pay proper compensation for the land proposed to be acquired. All the adult males and unmarried adult women shall be treated as separate families and accordingly compensation shall be paid to them. Government shall allocate homestead patta 1 and 5 to 10 acres agricultural land to each displaced person. The rehabilitation colony shall be located close to the National Highway with proper road connectivity with NH.
No. of people attended	

8. Brief of baseline Environment:

Particulars	
Period of baseline data collection/Sampling period.	March to May 2021 October to December 2021
Air	March to May 2021

Pre-Monsoon Post-Monsoon Noise Pre-Monsoon Monsoon Post-Monsoon Water Pre-Monsoon Monsoon Post-Monsoon Soil Pre-Monsoon Monsoon Post-Monsoon	October to December 2021 April & April 2021 July to July 2021 November & November 2021 March to May 2021 July 2021 October to December 2021 March to May 2021 July 2021 October to December 2021
flora and fauna of the project area,	
aquatic ecology, etc.	
Brief description on hydrology and water assessment as per the approved Pre-DPR:	The catchment area of Brutang near proposed dam at Manjari site is 725 sq. km. lies entirely in Odisha state. The yield series has been generated from the discharge data of Manjari and Banigochha gauge site for a period of 32 year i.e. 1964-1995. The 75% Dependable yield for the project site is 19196.00 Ham.
Additional detail (If any)	No

9. Court case details:

Court Case	No
Additional information (if any)	No

10. Status of other statutory clearances

Particulars	Letter no. and date
Status of Stage-I FC	F.No.8-23/2010-FC of MoEF&CC (Forest Division) dated 9 th September, 2010.
Approval of Central Water Commission	TEC for Brutang project was discussed in the 75 th meeting of CWC held on 18.12.2000 and accepted the project techno economically viable.
Approval of Central Electricity Authority	NA
Additional detail (If any)	---

Is FRA (2006) done for FC-I		Yes
Activities	Capital cost (Crores)	Recurring cost (Lakhs/annum)
Pre-Construction Stage	2.04	20.00
Construction Stage	0.99	9.00
Operation Stage	0.11	1.00

3.2.3. Deliberations by the committee in previous meetings

N/A

3.2.4. Deliberations by the EAC in current meetings

<p>The EAC during deliberations noted the following:</p> <ul style="list-style-type: none"> • The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of Environmental Clearance to the project for Brutang Irrigation Project located at village Manjari, 30 km away from Daspalla town in Nayagarh district of Odisha by Water Resources Department, Govt. of Odisha. • The project site is located within 10km radius of Baishipalli wildlife sanctuary. So, the General Conditions of the EIA Notification, 2006 as amended are applicable. • The project is listed at S.N.1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification, 2006 under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).

3.2.5. Recommendation of EAC

Recommended

3.2.6. Details of Environment Conditions

3.2.6.1. Specific

Socio-economic	
1.	Land acquired for the project shall be suitably compensated in accordance with the prevailing guidelines of the state government and provisions under Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013
2.	Solar panel be provided to the families living in rural areas within 10 km radius of project
3.	School up to 12 th Standard with smart classrooms shall be established to provide quality education for children from project affected villages/Tribal villages
4.	The compliance of above conditions shall be monitored by IRO, MoEF&CC and regularly site visit once in year. The compliance report of IRO shall be regularly submitted to MoEF&CC

5.	50 bed multi-speciality hospital shall be established to cater the need of tribal population/locals. The tribal population within 10 km radius of the project shall be given free of cost medical facility
6.	Skill development Centre shall be established within 10 km radius of the project and regular training programmes for development and promotion of traditional art/products of tribal/local population
Environmental management and Biodiversity conservation:	
1.	The water of rainfall yield of self-catchment of the reservoir shall be released to downstream through body of dam/ barrage/ embankment etc
2.	The water for filling of reservoir/ recoupment of evaporation and recirculation losses shall be met from a source other than the rainfall yield of catchment of non-perennial stream/ nallah
3.	The Environmental Management Plan (EMP) shall be strictly adhered to as submitted in the EIA/EMP reports. The budgetary provisions for implementation of EMP, shall be fully utilized and not to be diverted to any other purpose. In case of revision of the project cost or due to price level change, the cost of EMP shall also be updated proportionately
4.	The contract clause limiting the No. of vehicles used during excavation and transportation shall followed scrupulously and the same shall informed to the ministry
5.	Ambient Air Quality Monitoring Stations for real time data to be installed at project site before commencement of the construction, shall be displayed at project site and its report to be submitted to IRO, MoEF&CC
6.	No vehicle purchase shall be allowed from funds earmarked for implementation of Wildlife Conservation plan. Measures for minimizing the human–animal conflict specially for black bear and leopard be suitably incorporated in the wildlife conservation plan in consultation with State Forest Department
7.	10000 plants shall be planted around the muck disposal area and the survival of plants shall be submitted with the 6 monthly compliance report
8.	Watershed development plan prepared in consultation with ICAR/expert Govt. institute be implemented within 10 km radius of the project. Implementation status be submitted in the 6 monthly compliance report to the concerned regional office of the Ministry
9.	In view of proximity of the wildlife sanctuary proper path ways be constructed for safe movement of wildlife in the region. An action plan in this regard be prepared in consultation with State Forest and Wildlife Department
Disaster Management	
1.	Stabilization of muck disposal sites using biological and engineering measures shall be taken up immediately to ensure that muck does not roll down the slopes and does not pollute the natural streams and water bodies in surrounding area. The plantation on muck disposal site with local species for restoration of ecology and environment of the project site area
2.	Necessary control measures such as water sprinkling arrangements, and construction of paved roads leading to muck disposal sites etc. shall be taken up on priority to arrest fugitive dust at all the construction sites
3.	Solid waste generated, especially plastic waste, etc. should not be disposed of as landfill material. It

	should be treated with scientific approach and recycled. Use of single-use plastics may be discouraged
Miscellaneous:	
1.	After 5 years of the commissioning of the project, a study shall be undertaken regarding impact of the project on the environment. The study shall be undertaken by an independent agency
2.	Bio-Gas plant shall be installed in the Project affected villages @ per family for Utilizing Cattle waste (Cow Dung) into renewable source of fuel
3.	PP should establish in house (at project site) environment laboratory for measurement of environment parameter with respect to air quality and water (surface and ground). A dedicated team to oversee environment management shall be setup which should comprise of Environment Engineers, Laboratory chemist and staff for monitoring of air, water quality parameters on routine basis
4.	PP shall procure construction material only from those Organizations having all valid legal/statutory clearances/permissions or necessary permission to be obtained for quarrying construction materials for the project as per the EIA Notification, 2006 and as amended thereof
5.	An institutional mechanism to be developed to ensure the preference of jobs to PAFs and also a policy for preferential treatment for award of sundry works to the PAFs and their dependents

3.2.6.2. Standard

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

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

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

4.	Stabilization of muck disposal sites using biological and engineering measures shall be taken up to ensure that muck does not roll down the slopes and shall be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area. The engineering measures for the muck disposal arrangements be evolved after carrying out required slope stability analysis.
5.	Catchment area treatment plan shall be prepared and sufficient fund shall be provided for afforestation, rim plantation, pasture development, nursery development.
Corporate Environment Responsibility	
1.	The project proponent shall comply with the provisions contained in this Ministry's OM vide F.No. 22-65/2017-IA.III dated 30th September, 2020, as applicable, regarding Corporate Environment Responsibility.
2.	Skill mapping be undertaken for the youths of the affected project area and based on the skill mapping, necessary trainings to the youths be provided for their long time livelihood generation
3.	The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest / wildlife norms/ conditions. The company shall have defined system of reporting infringements / deviation/violation of the environmental / forest / wildlife norms/conditions and / or shareholders/ stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.
4.	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.
5.	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six Monthly Compliance Report.
6.	Post EIA and SIA be prepared for the project through a third party and evaluation report be submitted to the Ministry after five years of commissioning of the project.
7.	Multi Disciplinary Committee (MDC) be constituted with experts from Ecology. Forestry, Wildlife, Sociology. Soil Conservation, Fisheries, NGO, etc. to oversee implementation of various environmental safeguards proposed in EIA/EMP report during construction of the project. The monitoring report the Committee shall be uploaded in the website of the Company.
8.	Formation of Water User Association/Co-operative be made involment of the whole community be ensured for discipline use of available water for irrigation purposes
Miscellaneous	
1.	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.
2.	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.
3.	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.

4.	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.
5.	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.
6.	The project proponent shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.
7.	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
8.	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.
9.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).
10.	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.
11.	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.
12.	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.
13.	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.
14.	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.
15.	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

3.3. Agenda Item No 3:

3.3.1. Details of the proposal

Amalpada Pumped Storage Hydro Electric Project (300 MW) by GUJARAT STATE ELECTRICITY CORPORATION LIMITED located at TAPI, GUJARAT			
Proposal For		Fresh ToR	
Proposal No	File No	Submission Date	Activity (Schedule Item)

IA/GJ/RIV/483991/2024	J-12011/24/2024-IA_I(R)	03/08/2024	River Valley/Irrigation projects (1(c))
---------------------------------------	-------------------------	------------	---

3.3.2. Project Salient Features

14.3.1: The proposal is for grant of Terms of Reference (ToR) to the project for Amalpada Pumped Storage Hydro Electric Project (300 MW) in an area of 293.65ha in village Amalpada, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.

14.3.2: The Project Proponent and the accredited Consultant M/s Aarvee Associates, Architects, Engineers and Consultants Private Limited, made a detailed presentation on the salient features of the project and informed that:

- i. Amalpada Pumped Storage Project (SLPSP) is an Off-Stream Closed Loop Pumped Storage development, proposed with an installed capacity of 300MW/1812MWh.
- ii. The project is located near Amalpada village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°23'24.11"N and longitude 73°42'29.79"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°22'36.12"N and longitude 73°42'43.68"E.
- iii. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 10.51 MCM (0.0371 TMC) & 7.79 MCM (0.275 TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 82.00m (from deepest bed level) to create the desired storage capacity while the lower reservoir will have maximum height of 21.00 m (from bed level) constructed at the downhill.
- iv. The one-time filling of the PSP will be carried out from Ukai reservoir, which is about 3.00 Kms from the proposed lower reservoir. The scheme of operation for the project is with 6.04 Hours of peak hour generation per day and 7.05 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.
- v. **Alternative studies** carried out for various major components of the project and final choice of the project parameters.

A detailed alternative studies have been carried out to identify five numbers of potential PSP sites on the right bank of Ukai reservoir. Summary of the alternatives considered is as follows:

- ◆ In the current studies, a total of 21 reservoir locations were selected in the initial phase and 23 Alternatives with different combinations of these reservoirs were studied.
- ◆ Alternatives with different combinations of these reservoirs were studied.
- ◆ Reservoirs- 14 & 17 (R- 14 & R- 17) were observed with high R&R issues and hence the alternatives formed with these two reservoirs (Alternative- 16, 18, 19 & 20) were not considered for further studies.
- ◆ Alternatives- 2, 3, 4, 5, 7, 8, 10, 14, 15, & 23 were observed with very high L/H ratio and therefore were not considered for further studies.
- ◆ Alternatives- 1, 6, 11, 12, 13, 17, 21 & 22 were studied on their Techno- Commercial Feasibility and top 5 Alternatives were selected based on technical ranking.
- ◆ Final selected alternatives are- Alternative 1, 6, 13, 17 & 22

Further, on selected Alternative, two options of powerhouse have been studied.

v **Alternative-A:** Alternative-A with a surface powerhouse.

v **Alternative-B:** Alternative-B with an underground powerhouse.

Possibility of Surface powerhouse is studied and found not suitable due to negative pressures in the WCS in transient analysis.

Therefore, **Alternative-B** with Underground powerhouse is selected for further studies.

- vi. Total land required for the construction of proposed activities is approximately 293.65 ha. break up of land required for different components is given below. A major part of land is belonging to forest land. The whole land is free from any wildlife sanctuary and national park.

SL.N o.	Compon ent	Private Land (Ha)	Forest Land(Ha)	Total Area(Ha)
1	Upper Reservoir including intake and roads	-	89.87	89.87
2	Lower Reservoir including intake and roads	-	131.21	131.21
3	Penstock	-	2.53	2.53
4	Powerhouse	-	5.57	5.57
5	Tail Race Tunnel	-	6.52	6.52
6	Adits	-	4.75	4.75
7	Water filling	-	1.00	1.00
8	Muck disposal areas	49	-	49
9	Site office	3.2	-	3.2
10	Magazine area			
11	Labour camp and colony area			
	TOTAL	52.20	241.45	293.65

vii. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site.

viii. Cost and Benefits of the Scheme:

The total estimated cost of the project including direct and indirect charges excluding Interest during construction is Rs.1772.19 Cr. For the installed capacity of 300 MW, the cost per MW of installed capacity (excluding IDC) works out to be Rs. 5.91 Cr. The project would generate designed energy of 627.96 MU. Other benefit of this storage project can be in the form of spinning reserve with almost instantaneous start-up from zero to full power supply, supply of reactive energy, primary frequency regulation, voltage regulation etc.

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

Source:	Construction Camps/ Labour Camps	
Quantity (TPA):	365	
Mode of disposal:	Nearest Municipal Dumping yards operated and maintained by the respective Municipalities	
Mode of transport:	Road	

	Calculation of Solid Waste	
	Waste generated per person in kg/day =	0.5
	No. of labours =	450
	Total waste generated per day in kg =	225
	Total waste generated per day in Tonnes =	0.225
	Total waste generated per day in Tonnes per Annum	82.125
Quantity of muck =	42,20,205.97 Cum (for 3 years)	
density of muck =	1500 kg/m ³	
Quantity of muck in kg =	6,330,308,955 kg for 3 years	
	2,110,102,985 kg for 1 year	
	2,110,102.985 TPA	

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

• **Project details:**

Name of the Proposal	Amalpada Hydro-Electric Pumped Storage Project (300 MW)
Location (Including coordinates)	The project is located near Amalpada village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°23'24.11"N and longitude 73°42'29.79"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°22'36.12"N and longitude 73°42'43.68"E.
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project area lies in the seismic zone-III which falls in moderate zone.

• **Category details:**

Category of the project	Category A
Provisions	Pumped Storage Project
Capacity / Cultural command area (CCA)	300 MW

Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil
• Electricity generation capacity:	
Powerhouse Installed Capacity	300 MW
Generation of Electricity Annually	627.96 MU
No. of Units	2 (Each of 150 MW)
Additional information (if any)	Nil
• ToR/EC Details:	
Cost of project	Total Hard Cost of the project is Rs. Rs. 177219.00 Lakhs (1772.19 Cr).
	Total cost of the project including IDC is Rs 198304.00 Lakhs (1983.04 Cr)
Total area of Project	293.65 Ha
Height of Dam from Riverbed (EL)	82 m for Upper reservoir dam and 21 m for Lower reservoir dam
Length of Tunnel/Channel	2 nos; 6 m dia Main Pressure Shaft – 331.05 m (L) 2 nos; 8.2 m dia Main TRT – 619.45 m (L)
Details of Submergence area	The Submergence area of the proposed project area lies in forest area of 113.86 Ha.
Types of Waste and quantity of generation during construction/ Operation	Sewage and solid waste generated at the construction staff colony/ project colony shall be adequately treated/ disposed to avoid water pollution and associated public health problems. Adequate measures will be undertaken to dispose the sewage and waste generated from the labour camps. Appropriate management measures will be recommended as a part of the Comprehensive EIA study.
E-Flows for the Project	Stream flow is not disturbed by the project. The proposed project is an off-stream closed loop project with an installed capacity of 300MW/1812 MWH.
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	N/A

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)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 42.21 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 49 Ha has been earmarked for the Muck Dumping area.
Monitoring mechanism for Muck Disposal	The project authorities have identified suitable muck disposal sites which are not located near the riverbanks.

• **Land Area Breakup:**

Private land	52.20 Ha
Government land/Forest Land	0 Ha/241.45 Ha
Submergence area/Reservoir area	The Submergence area of the proposed project area lies in forest area of 113.86 Ha. The proposed project is an off stream closed loop project with an installed capacity of 300MW/1812 MWH. The land required for the proposed upper reservoir and upper intake is 89.87 ha and the land required for the proposed lower reservoir and lower intake is 131.21 ha.
Land required for project components	293.65 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	Yes	Under process
National Park	No	

Wildlife Sanctuary	No	
--------------------	----	--

• **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

• **Affidavit/Undertaking details:**

Affidavit/Undertaking	The undertaking by GSECL is provided along with this document.
Additional information (if any)	Nil

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

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	N/A
Status of Stage- I FC	Under process
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Under process

• **Miscellaneous**

Particulars	Details
Details of consultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad
Project Benefits	<p>The following benefits are anticipated from the project construction and operation phases:</p> <ul style="list-style-type: none"> • The availability of alternative resources provided by developer in the rural areas will reduce the dependence of the locals on natural resources such as forest. • A number of marginal activities and jobs would be available to the locals during construction phase. • Developer bringing large scale investment to the area will also invest in local area development and benefit will be reaped by locals.

	<p>Education, medical, transportation, road network and other infrastructure will improve.</p> <p>With increased availability of electricity, small-scale and cottage industries are likely to come up in the area.</p>
Status of other statutory clearances	N/A
R&R details	N/A
Additional detail (If any)	Nil

3.3.3. Deliberations by the committee in previous meetings

N/A

3.3.4. Deliberations by the EAC in current meetings

<p>14.3.4 The EAC during deliberations noted the following:</p> <p>The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of terms of reference to the project for Amalpada Pumped Storage Hydro Electric Project (300 MW) Off-Stream Closed Loop Pumped Storage in an area of 293.65ha in village Amalpada, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.</p> <p>The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.</p> <p>It was observed that one season data will not give the clear picture about the ecological and biological profile of the region, as after monsoon season there may be high biological activities being the project site located at the tip of Western Ghats. The EAC also assessed the need of study for worst case scenario and critical mineral assessment along with risk analysis.</p> <p>The total land requirement for the project is 293.65 ha hectares, of which 241 hectares are forest land and 52 hectares are non-forest land. The application for Stage-I forest clearance yet to be submitted. It was also noted that the Project Proponent has submitted a letter no. EPCD/0457/08/2024 dated 29.08.2024 issued by Under Secretary (Power) Energy & Petrochemicals Department, Govt. of Gujarat regarding in principle approval to setup Pumped Storage Project at Ukai, District Tapi, Gujarat.</p>

3.3.5. Recommendation of EAC

Recommended

3.3.6. Details of Terms of Reference

3.3.6.1. Specific

Environmental Management and Biodiversity Conservation
--

1.	Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 241 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 (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.	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.

1 6.	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.
1 7.	The project area should not come up on any critical mineral zone to be verified by GSI/NMDC.
1 8.	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.
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 7 th 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.

3.3.6.2. 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 Methodology	
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 from 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 from the entire state can be referred to. Once a listing of possible r.e.t. species from 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 from the entire state can be referred to. Once a listing of possible r.e.t. species from 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 (SO ₂) and Oxides of Nitrogen (NO _x) in the study area at 5-6 Locations.
12.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
13.	null
14.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
15.	null
16.	(i) Generation of thematic maps viz, slope map, drainage map, soil map, land use and land cover map, etc. Based on these, thematic maps, an erosion intensity map should be prepared.
17.	null
18.	History of the ground water table fluctuation in the study area.
19.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO ₂ , PO ₄ , Cl, SO ₄ , Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN,

	Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
20.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
21.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
22.	Run off, discharge, water availability for the project, sedimentation rate, etc.
23.	Basin characteristics
24.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
25.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km ² 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, Pteridophytes, Bryophytes (all groups).

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

5 5.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
5 6.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplanktons, benthos etc.
5 7.	Fish and fisheries, their migration and breeding grounds.
5 8.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
5 9.	Conservation status of aquatic fauna.
6 0.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.
6 1.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.
6 2.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
6 3.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
6 4.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
6 5.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
6 6.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
6 7.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
6 8.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other property, possession of cattle, type of house etc.
6 9.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any ethnic/indigenous groups that are getting affected by the project.
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 4.	Impact on breeding and nesting grounds of animals and fish.
2 5.	Impact on local community including demographic profile.
2 6.	Impact on socio-economic status
2 7.	Impact on economic status.
2 8.	Impact on human health due to water / vector borne disease
2 9.	Impact on increase traffic
3 0.	Impact on Holy Places and Tourism
3 1.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
3 2.	Positive and negative impacts likely to be accrued due to the project are listed.
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. Detailed muck transportation plan delineating the path ways, number of trucks, quantity of muck to be transported along with monitoring mechanism using latest technology, shall be prepared.
12.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
13.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio- economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
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 Panchayats. 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.
1	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.

7.	
1 8.	Energy Conservation Measures for the work force during construction with physical and financial details. Alternatives will be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use is curbed.
1 9.	Environmental safeguards during construction activities including Road Construction.
2 0.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
2 1.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

3.4. Agenda Item No 4:

3.4.1. Details of the proposal

Juni Kayaliwel Pumped Storage Hydro Electric Project (300 MW) by GUJARAT STATE ELECTRICITY CORPORATION LIMITED located at TAPI, GUJARAT			
Proposal For		Fresh ToR	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/GJ/RIV/484025/2024	J-12011/22/2024-IA-I(R)	05/08/2024	River Valley/Irrigation projects (1(c))

3.4.2. Project Salient Features

14.4.1: The proposal is for grant of Terms of References (ToR) to the project for Juni Kayaliwel Pumped Storage Hydro Electric Project (300 MW) in an area of 308.77 ha in village Kayaliwel, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.

14.4.2: The Project Proponent and the accredited Consultant M/s. Aarvee Associates, Architects, Engineers and Consultants Private Limited, made a detailed presentation on the salient features of the project and informed that:

- i. Juni Kayaliwel Pumped Storage Project (JKPSP) is an Off-Stream Closed Loop Pumped Storage development, proposed with an installed capacity of 300MW/1854.91 MWh.
- ii. The project is located in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°18'33.36"N and longitude 73°37'36.21"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°17'35.18"N and longitude 73°36'40.19"E.
- iii. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 5.656 MCM (0.200 TMC) & 6.792 MCM (0.240 TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 57 m (from foundation level) to create the desired storage capacity while the lower reservoir will have maximum height of 44 m (from foundation) constructed at the downhill.

- iv. The one-time filling of the PSP reservoir will be carried out from Ukai reservoir, which is about 4.0 Kms from the proposed lower reservoir. The scheme of operation for the project is with 6.18 Hours of peak hour generation per day and 7.48 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.
- v. Alternative studies carried out for various major components of the project and final choice of the project parameters.

A detailed alternative studies have been carried out to identify five numbers of potential PSP sites on the right bank of Ukai reservoir. Summary of the alternatives considered is as follows:

- In the current studies, a total of 21 reservoir locations were selected in the initial phase and 23 Alternatives with different combinations of these reservoirs were studied.
- Alternatives with different combinations of these reservoirs were studied.
- Reservoirs- 14 & 17 (R- 14 & R- 17) were observed with high R&R issues and hence the alternatives formed with these two reservoirs (Alternative- 16, 18, 19 & 20) were not considered for further studies.
- Alternatives- 2, 3, 4, 5, 7, 8, 10, 14, 15, & 23 were observed with very high L/H ratio and therefore were not considered for further studies.
- Alternatives- 1, 6, 11, 12, 13, 17, 21 & 22 were studied on their Techno- Commercial Feasibility and top 5 Alternatives were selected based on technical ranking.
- Final selected alternatives are- Alternative 1, 6, 13, 17 & 22.

Further, on selected Alternative, three options of powerhouse have been studied.

Ø **Alternative-A:** with a surface powerhouse.

Ø **Alternative-B:** with an underground powerhouse including surge chamber.

Ø **Alternative -C: With an Underground powerhouse without surge chamber.**

Possibility of Alternative -A -Surface powerhouse is studied and found not suitable due to negative pressures in the WCS in transient analysis. Also Alternative -B is not suitable because of requirement of costly surge chamber.

Therefore, Alternative-C i.e. Underground powerhouse without surge chamber is selected.

- vi. Total land required for the construction of proposed activities is approximately 308.77 ha. break up of land required for different components is given below:

SL.N o.	Component	Private Land(Ha)	Forest Land (Ha)	Total Area(Ha)
1	Upper Reservoir	-	100.30	100.30
2	Penstocks	-	1.19	1.19
3	Power House	-	3.92	3.92
4	Tail Race Tunnel	-	7.42	7.42
5	Lower Reservoir	-	145.55	145.5

				5
6	ADITS + pothead yard	-	5.24	5.24
7	Water Filling	-	1.00	1.00
8	Site Office	3.15	-	3.15
9	Magazine Area			
10	Labour Camp			
11	Colony Area			
12	Muck Disposal	41	-	41
	TOTAL	44.15	264.62	308.77

vii. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site.

viii. **Cost and Benefits of the Scheme:** The total estimated cost of the project including direct and indirect charges excluding Interest during construction is Rs.1806.40 Cr. For the installed capacity of 300 MW, the cost per MW of installed capacity (excluding IDC) works out to be Rs. 6.02 Cr. The project would generate designed energy of 643.19 MU. Other benefit of this storage project can be in the form of spinning reserve with almost instantaneous start-up from zero to full power supply, supply of reactive energy, primary frequency regulation, voltage regulation etc.

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

Source:	Construction Camps/ Labour Camps	
Quantity (TPA):	365	
Mode of disposal:	Nearest Municipal Dumping yards operated and maintained by the respective Municipalities	
Mode of transport:	Road	
	Calculation of Solid Waste	
	Waste generated per person in kg/day	0.5
	No. of labours=	450
	Total waste generated per day in kg	225

	Total waste generated per day in Tonnes	0.225
	Total waste generated per day in Tonnes per An num	82.125
Quantity of muck =	1873819.43 Cum (for 4 years)	
density of muck =	1500 kg/m^3	
Quantity of muck in kg =	2810729145 kg for 4 years	
	936909715 kg for 1 year	
	936909.715 TPA	

x. Status of Litigation Pending against the proposal, if any.

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

• **EAC Meeting Details:**

EAC meeting/s	14th Meeting of the Expert Appraisal Committee
Date of Meeting/s	30.08.2024
Date of earlier EAC meetings	No

• **Project details:**

Name of the Proposal	Juni Kayaliwel Hydro-Electric Pumped Storage Project (300 MW)
Location (Including coordinates)	The project is located in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°18'33.36"N and longitude 73°37'36.21" E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°17'35.18"N and longitude 73°36'40.19"E.
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project area lies in the seismic zone-III which falls in moderate zone.

• **Category details:**

Category of the project	Category A
Provisions	Pumped Storage Project

Capacity / Cultural command area (CCA)	300 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil
• Electricity generation capacity:	
Powerhouse Installed Capacity	300 MW
Generation of Electricity Annually	643.19 MU
No. of Units	2 (Each of 150 MW)
Additional information (if any)	Nil
• ToR/EC Details:	
Cost of project	Total Hard Cost of the project is Rs. Rs. 180640.00 Lakhs (1806.40 Cr).
	Total cost of the project including IDC is Rs. 202202.00 Lakhs (2022.02 Cr)
Total area of Project	308.77 Ha
Height of Dam from Riverbed (EL)	57 m for Upper reservoir dam and 44 m for Lower reservoir dam
Length of Tunnel/Channel	2 nos; 5.2 m dia Main Pressure Shaft – 550 m (L) 2 nos; 7.4 m dia Main TRT – 710.23 m (L)
Details of Submergence area	The Submergence area of the proposed project area lies in forest area of 74.67 Ha.
Types of Waste and quantity of generation during construction/ Operation	Sewage and solid waste generated at the construction staff colony/ project colony shall be adequately treated/ disposed to avoid water pollution and associated public health problems. Adequate measures will be undertaken to dispose the sewage and waste generated from the labour camps. Appropriate management measures will be recommended as a part of the Comprehensive EIA study.
E-Flows for the Project	Stream flow is not disturbed by the project. The proposed project is an off-stream closed loop project with an installed capacity of 300MW/1854.91 MWH.
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity	N/A

city studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. 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)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 18.75 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 41 Ha has been earmarked for the Muck Dumping area.
Monitoring mechanism for Muck Disposal	The project authorities have identified suitable muck disposal sites which are not located near the riverbanks.

• **Land Area Breakup:**

Private land	44.65 Ha
Government land/Forest Land	0 Ha/264.62 Ha
Submergence area/Reservoir area	The Submergence area of the proposed project area lies in forest area of 74.65 Ha. The proposed project is an off stream closed loop project with an installed capacity of 300MW/1854.91 MWH. The land required for the proposed upper reservoir and upper intake is 100.3 ha and the land required for the proposed lower reservoir and lower intake is 145.55 ha.
Land required for project components	308.77 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	Yes	Under process

National Park	No	
Wildlife Sanctuary	No	

• **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

• **Affidavit/Undertaking details:**

Affidavit/Undertaking	The undertaking by GSECL is provided along with this document.
Additional information (if any)	Nil

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

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	N/A
Status of Stage- I FC	Under process
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Under process

• **Miscellaneous**

Particulars	Details
Details of consultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad
Project Benefits	<p>The following benefits are anticipated from the project construction and operation phases:</p> <ul style="list-style-type: none"> • The availability of alternative resources provided by developer in the rural areas will reduce the dependence of the locals on natural resources such as forest. • A number of marginal activities and jobs would be available to the locals during construction phase. • Developer bringing large scale investment to the area will also invest in local area development and benefit will be reaped by locals. • Education, medical, transportation, road network and other infrastructure will improve. • With increased availability of electricity, small-scale and cottage industries are likely to come up in the area.

Status of other statutory clearances	N/A
R&R details	N/A
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

<p>14.4.3 The EAC during deliberations noted the following:</p> <p>The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of terms of reference to the project for Juni Kayaliwel Off-Stream Closed Loop Pumped Storage Hydro Electric Project (300 MW) in an area of 308.77 ha in village Kayaliwel, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.</p> <p>The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.</p> <p>It was observed that one season data will not give the clear picture about the ecological and biological profile of the region, as after monsoon season there may be high biological activities being the project site located at the tip of Western Ghats. The EAC also assessed the need of study for worst case scenario and critical mineral assessment along with risk analysis.</p> <p>The total land requirement for the project is 308.77 ha hectares, of which 264.62 hectares are forest land and 44.15 hectares are non-forest land. The application for Stage-I forest clearance has yet to be obtained. It was also noted that the Project Proponent has submitted a letter no. EPCD/0457/08/2024 dated 29.08.2024 issued by Under Secretary (Power) Energy & Petrochemicals Department, Govt. of Gujarat regarding in principle approval to setup Pumped Storage Project at Ukai, District Tapi, Gujarat.</p>

3.4.5. Recommendation of EAC

Recommended

3.4.6. Details of Terms of Reference

3.4.6.1. Specific

Environmental Management and Biodiversity Conservation	
1.	Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 264.62 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 (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.	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.
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 7 th 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.

3.4.6.2. 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 Methodology	
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 from 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 from the entire state can be referred to. Once a listing of possible r.e.t. species from 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 from the entire state can be referred to. Once a listing of possible r.e.t. species from 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 follows:	
1.	null
2.	null
3.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.

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

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

9.	
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, phytoplanktons, benthos etc.
5	Fish and fisheries, their migration and breeding grounds.

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

2 6.	Impact on socio-economic status
2 7.	Impact on economic status.
2 8.	Impact on human health due to water / vector borne disease
2 9.	Impact on increase traffic
3 0.	Impact on Holy Places and Tourism
3 1.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
3 2.	Positive and negative impacts likely to be accrued due to the project are listed.
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. Detailed muck transportation plan delineating the path ways, number of trucks, quantity of muck to be transported along with monitoring mechanism using latest technology, shall be prepared.
12.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
13.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio- economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
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 Panchayats. 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.

3.5. Agenda Item No 5:

3.5.1. Details of the proposal

Serula Pumped Storage Hydro Electric Project (960 MW) by GUJARAT STATE ELECTRICITY CORPORATION LIMITED located at TAPI, GUJARAT			
Proposal For		Fresh ToR	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/GJ/RIV/484067/2024	J-12011/20/2024-IA-I(R)	05/08/2024	River Valley/Irrigation projects (1(c))

3.5.2. Project Salient Features

14.5.1: The proposal is for grant of Terms of References (TOR) to Serula Pumped Storage Hydro Electric Project (960 MW) in an area of 542.54Ha in village Serula, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.

14.5.2: The Project Proponent and the accredited Consultant M/s Aarvee Associates, Architects, Engineers and Consultants Private Limited, made a detailed presentation on the salient features of the project and informed that:

- i. Serula Pumped Storage Project (SLPSP) is an Off-Stream Closed Loop Pumped Storage development, proposed with an installed capacity of 960MW/6211.2 MWh.
- ii. The project is located near Serula village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°20'28.72"N and longitude 73°34'7.00"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°18'52.68"N and longitude 73°34'19.15"E.
- iii. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 21.67 MCM (0.765 TMC) & 25.38 MCM (0.896 TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 55.00m (from deepest bed level) to create the desired storage capacity while the lower reservoir will have maximum height of 46.00 m (from bed level) constructed at the downhill.
- iv. The one-time filling of the PSP will be carried out from Ukai reservoir, which is about 6.00 Kms from the proposed lower reservoir. The scheme of operation for the project is with 6.47 Hours of peak hour generation per day and 7.63 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.
- v. Alternative studies carried out for various major components of the project and final choice of the project parameters.
A detailed alternative studies have been carried out to identify five numbers of potential PSP sites on the right bank of Ukai reservoir. Summary of the alternatives considered is as follows:
 - In the current studies, a total of 21 reservoir locations were selected in the initial phase and 23

- Alternatives with different combinations of these reservoirs were studied.
- Alternatives with different combinations of these reservoirs were studied.
- Reservoirs- 14 & 17 (R- 14 & R- 17) were observed with high R&R issues and hence the alternatives formed with these two reservoirs (Alternative- 16, 18, 19 & 20) were not considered for further studies.
- Alternatives- 2, 3, 4, 5, 7, 8, 10, 14, 15, & 23 were observed with very high L/H ratio and therefore were not considered for further studies.
- Alternatives- 1, 6, 11, 12, 13, 17, 21 & 22 were studied on their Techno- Commercial Feasibility and top 5 Alternatives were selected based on technical ranking.
- Final selected alternatives are- Alternative 1, 6, 13, 17 & 22

Further, on selected Alternative, four options of powerhouse have been studied.

- Alternative- A: with a surface powerhouse with capacity 6×160 MW with 3 units of Upper intakes
- Alternative- B: with a surface powerhouse with capacity 6 x 160 MW with 6 units of intakes
- Alternative- C: with an underground powerhouse with capacity 6 x 160 MW With 3 units of upper intakes.
- Alternative- D: with a with Surface power house capacity 8 x 120 MW with 4 units of intakes.
- Possibility of Alternative A, B & D are studied and found not suitable due to negative pressures in the WCS in transient analysis. So finally Alternative -C is selected.

vi. Total land required for the construction of proposed activities is approximately 542.54 ha. break up of land required for different components is given below. The bifurcation of land is given in table below.

S.No	Component	Forest Land (Ha)	Private Land (Ha)	Total Area (Ha)
1	Upper Reservoir Including Intake	192.10		192.10
2	Penstocks	17.53		17.53
3	Tail Race Tunnel	7.71		7.71
4	Power House	10.88		10.88
5	Lower Reservoir Including Intake	227.78		227.78
6	ADITS	8.04		8.04
7	Water Filling	1.00		1.00
8	Site Office	-	3	3
9	Magazine Area			
10	Labour Camp			
11	Colony Area			

12	Muck Disposal	-	74.5	74.5
Total		465.04	77.50	542.54

vii. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site.

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

Source:	Construction Camps/ Labour Camps	
Quantity (TPA):	365	
Mode of disposal:	Nearest Municipal Dumping yards operated and maintained by the respective Municipalities	
Mode of transport:	Road	
Calculation of Solid Waste		
	Waste generated per person in kg/day	0.5
	No. of labours=	1400
	Total waste generated per day in kg	700
	Total waste generated per day in Tonnes	0.7
	Total waste generated per day in Tonnes per Ann um	255.5
Quantity of muck =	7445000Cum (for 3 years)	
density of muck =	1500 kg/m ³	
Quantity of muck in kg =	1167500000 kg for 3 years	
	3722500000 kg for 1 year	
	3722500 TPA	

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

- Project details:**

Name of the Proposal	Serula Hydro-Electric Pumped Storage Project (960 MW)
Location (Including coordinates)	The project is located near Serula village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°20'28.72"N and longitude 73°34'7.00"E. Similarly, the geographical coordinate

	e of lower reservoir is at latitude 21°18'52.68"N and longitude 73°34'19.15"E.
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project are a lies in the seismic zone-III which falls in moderate zone.

• **Category details:**

Category of the project	Category A
Provisions	Pumped Storage Project
Capacity / Cultural command area (CCA)	960 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

• **Electricity generation capacity:**

Powerhouse Installed Capacity	960 MW
Generation of Electricity Annually	2153.84 MU
No. of Units	6 (Each of 160 MW)
Additional information (if any)	Nil

• **ToR/EC Details:**

Cost of project	Total Hard Cost of the project is Rs. Rs. 429775.00 Lakhs (4297.75 Cr).
	Total cost of the project including IDC is Rs 497523.00 Lakhs (4975.23 Cr)
Total area of Project	542.54 Ha
Height of Dam from Riverbed (EL)	55 m for Upper reservoir dam and 46 m for Lower reservoir dam
Length of Tunnel/Channel	3 nos;10 m dia HRT – 745.22 m (L) 6 nos;7.8 m dia Main TRT – 418.5 m (L) 6 nos; 5.6 m dia Main Pressure Shaft – 312.36 m (L) 6 nos; 7.8 m dia Draft Tube Tunnel – 22.10 m (L)

Details of Submergence area	The Submergence area of the proposed project area lies in forest area of 255.94 Ha.
Types of Waste and quantity of generation during construction/ Operation	Sewage and solid waste generated at the construction staff colony/ project colony shall be adequately treated/ disposed to avoid water pollution and associated public health problems. Adequate measures will be undertaken to dispose of the sewage and waste generated from the labour camps. Appropriate management measures will be recommended as a part of the Comprehensive EIA study.
E-Flows for the Project	Stream flow is not disturbed by the project. The proposed project is an off-stream closed loop project with an installed capacity of 960MW/6211.2 MWH.
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then i. 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.	N/A

• **Muck Management Details:**

No. of proposed disposal area/(type of land-Forest/Pvt. land)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 74.45 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 74.5 Ha has been earmarked for the Muck Dumping area.
Monitoring mechanism for Muck Disposal	The project authorities have identified suitable muck disposal sites which are not located near the riverbanks.

• **Land Area Breakup:**

Private land	77.50 Ha
Government land/Forest Land	0 Ha/465.04 Ha
Submergence area/Reservoir area	The Submergence area of the proposed project area lies in forest area of 255.94 Ha. The proposed project is an off stream closed loop project with an installed capacity of 960MW/

	6211.2 MWH. The land required for the proposed upper reservoir and upper intake is 192.10 ha and the land required for the proposed lower reservoir and intake is 227.78 ha.
Land required for project components	542.54 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	Yes	Under process
National Park	No	
Wildlife Sanctuary	No	

• **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

• **Affidavit/Undertaking details:**

Affidavit/Undertaking	The undertaking by GSECL is provided along with this document.
Additional information (if any)	Nil

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

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	N/A
Status of Stage- I FC	Under process
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Under process

• **Miscellaneous**

Particulars	Details
-------------	---------

Details of consultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad
Project Benefits	<p>The following benefits are anticipated from the project construction and operation phases:</p> <ul style="list-style-type: none"> ❖ The availability of alternative resources provided by developer in the rural areas will reduce the dependence of the locals on natural resources such as forest. ❖ A number of marginal activities and jobs would be available to the locals during construction phase. ❖ Developer bringing large scale investment to the area will also invest in local area development and benefit will be reaped by locals. ❖ Education, medical, transportation, road network and other infrastructure will improve. ❖ With increased availability of electricity, small-scale and cottage industries are likely to come up in the area.
Status of other statutory clearances	N/A
R&R details	N/A
Additional detail (If any)	Nil

3.5.3. Deliberations by the committee in previous meetings

N/A

3.5.4. Deliberations by the EAC in current meetings

14.5.4 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 and observed that the proposal is for grant of terms of reference to the project for Serula Off-Stream Closed Loop Pumped Storage Hydro Electric Project (960 MW) in an area of 542.54Ha in village Serula, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

It was observed that one season data will not give the clear picture about the ecological and biological profile of the region, as after monsoon season there may be high biological activities being the project site located at the tip of Western Ghats. The EAC also assessed the need of study for worst case scenario and critical mineral assessment along with risk analysis.

The total land requirement for the project is 542.54 ha hectares, of which 465.04 hectares are forest land and 77.50 hectares are non-forest land. The application for Stage-I forest clearance has yet to be obtained. It was also noted that the Project Proponent has submitted a letter no. EPCD/0457/08/2024 dated 29.08.2024 issued by Under Secretary (Power) Energy & Petrochemicals Department, Govt. of Gujarat regarding in principle approval to setup Pumped Storage Project at Ukai, District Tapi, Gujarat.

3.5.5. Recommendation of EAC

3.5.6. Details of Terms of Reference

3.5.6.1. Specific

Environmental Management and Biodiversity Conservation	
1.	Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 465.04 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 (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.	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.

1 4.	A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.
1 5.	Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
1 6.	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.
1 7.	The project area should not come up on any critical mineral zone to be verified by GSI/NMDC.
1 8.	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.
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 7 th 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.

3.5.6.2. 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 Methodology	
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 from 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 follows:	
1.	null
2.	null
3.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
4.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
5.	Landslide zone or area prone to landslide existing in the study area should be examined.
6.	Presence of important economic mineral deposit, if any.
7.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
8.	Impact of project on geological environment.
9.	null
10.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
11.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO ₂) and Oxides of Nitrogen (NO _x) 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.

1 7.	null
1 8.	History of the ground water table fluctuation in the study area.
1 9.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO ₂ , PO ₄ , Cl, SO ₄ , Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
2 0.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
2 1.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
2 2.	Run off, discharge, water availability for the project, sedimentation rate, etc.
2 3.	Basin characteristics
2 4.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
2 5.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km ² year ⁻¹ .
2 6.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
2 7.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
2 8.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
2 9.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
3 0.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
3 1.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.
3 2.	A minimum of 1 km distance from the tip of the reservoir to the tail race tunnel should be maintained between upstream and downstream projects.
3 3.	Besides primary studies, review of secondary data/literature published for project area on flora & fauna including RET species shall be reported in EIA/EMP report.

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

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

9.	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

2 1.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
2 2.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
2 3.	Impact on fish migration and habitat degradation due to decreased flow of water
2 4.	Impact on breeding and nesting grounds of animals and fish.
2 5.	Impact on local community including demographic profile.
2 6.	Impact on socio-economic status
2 7.	Impact on economic status.
2 8.	Impact on human health due to water / vector borne disease
2 9.	Impact on increase traffic
3 0.	Impact on Holy Places and Tourism
3 1.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
3 2.	Positive and negative impacts likely to be accrued due to the project are listed.
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. Detailed muck transportation plan delineating the path ways, number of trucks, quantity of muck to be transported along with monitoring mechanism using latest technology, shall be prepared.
12.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
13.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio- economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
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.

1 5.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Panchayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
1 6.	Labour Management Plan for their Health and Safety.
1 7.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
1 8.	Energy Conservation Measures for the work force during construction with physical and financial details. Alternatives will be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use is curbed.
1 9.	Environmental safeguards during construction activities including Road Construction.
2 0.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
2 1.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

Day 2 -31/08/2024

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

ATTAPPADY IRRIGATION PROJECT by Department of Irrigation located at THIRUVANANTHAPURAM,KERALA			
Proposal For		Fresh EC	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/KL/RIV/462955/2024	J-12011/10/2016-IA-I (R)	31/07/2024	River Valley/Irrigation projects (1(c))

3.1.2. Project Salient Features

<p>14.6.1: The proposal is for grant of Terms of Reference (ToR) to the project for Attappady Irrigation Project (CCA 4,255 ha) in an area of 302.0005 ha in village Agali and Sholayur, Sub District Mannarkkad, District Palakkad, Kerala by M/s Department of Irrigation, Kerala.</p> <p>14.6.2: The Project Proponent and the accredited Consultant M/s Mantec & Consultants Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:</p> <p>i. The Irrigation Research & Design Board, Kerala proposed to design a medium irrigation project, envisages the construction of a Concrete gravity dam across Siruvani river, a tributary of Bhavani river at Chittur in Agali Village of Mannarkkad Taluk in Palakkad district of Kerala state. The dam will impound 65 Mm³ (2.29 TMC) of water. Awarded share of water from Bhavani river basin for Attappady Irrigation Project (A.I.P.) is 2.87 TMC as per the Final A w a r d o f Cauvery Water Dispute Tribunal (CWDT) as modified by judgment dated 16.02.2018 of Hon. Supreme Court. No power generation is proposed.</p> <p>ii. The AIP dam at Chittur is located in between longitude 76039'8.218"E and latitude 11003'9.501"N and</p>

longitude 76039'22.797"E and latitude 11003'12.649"N in Chittur of Mannarkkad taluk in Palakkad district. The geodetic location of the proposed AIP is 11°02' & 11°11' N latitude and 76°34' & 76°43'E longitudes. It is bounded by Bhavani River in North, Kodungarapallam River in East and Kanjirapuzha Irrigation Project catchment in west.

- iii. The investigation for the AIP started way back in 1970. The investigations for location of the dam were carried out from 1975 to 1982 with the assistance of geologists from the Geological Survey of India (GSI). After the finalization of the dam alignment, necessary steps for speedy completion of the project were carried out from 1976 onwards. The land acquisition for the project was carried out by a Special Land Acquisition Tahsildar, AIP and acquisition procedure was initiated for the land for the submergible area of the dam, canals, office and quarters etc.
- iv. The basic infrastructure facilities like office buildings, inspection bungalows and quarters for supervising staff etc were constructed. In the absence of a final order from the CWDT, the approval of the Central Water Commission (CWC) was not taken for the project. Due to non-clearance by CWC and paucity of funds, the works relating to AIP was held up since 1989. The Final Order of CWDT was released on 05.02.2007 and gazette notification was published by the Government of India vide extraordinary gazette notification dated 19.02.2013, from which date the Final Order of CWDT came into force. In the Final Order of CWDT, Kerala was awarded 6 TMC from the Bhavani river basin as modified by judgment dated 16.02.2018 of Hon. Supreme Court.
- v. This project falls under Category 'B2' as per EIA notification 2006 & its amendment dated 14th August, 2018, as CCA >2000 and < 10,000 Ha. But as per the Gazette Notification dated 20th April 2022, Irrigation projects involving Inter-State issues shall be appraised at Central level without change in category.
- vi. Attappady region in Palakkad district of Kerala state is one of the most drought prone areas in the State of Kerala. The district is having the most backward tribals in the State, majority of them living below poverty line and occupies a lowest position in socioeconomic development. Being a rain shadow region, rain is scarce in Attappady region. Due to non-availability of water for agricultural purpose, vast fertile area of Attappady area is slowly turning into wastelands.
- vii. There are no major/medium irrigation works in the Command area of the project except for three small diversion weirs. Since there is practically no storage for the above weirs, crops cannot be irrigated in summer season. Most of the irrigation facilities available are private owned lift irrigation systems and is confined to small patches near the river banks. Hence, majority of the farmers rely on rainfed agriculture only. Also, there is shortage of water for domestic use during the summer season.
- viii. Land requirement: The land acquisitions for the project area which includes land for road, dam site, submergence area, quarters and office buildings etc were started from 1976 onwards under Special Land Acquisition Tahsildar, AIP.

Details of Land Requirement for the Dam

Type of Land	Forest Land (ha)	Private Land (ha)	Total (ha)
Required	91.7925	210.208	302
Already Acquired	17.5255	210.208	227.7335
Balance to be acquired	74.267	Nil	74.267

Land acquired for various components of Project

Sl No	Details of land acquired	Area (ha)
-------	--------------------------	-----------

1	Submergible area due to dam	210.208
2	Goolikkadavu-Chittoor road	10.8903
3	Canals	16.9805
3	Service road to dam site	4.1125
4	Link road to Valley View colony	0.5475
5	AIP Colony road	0.194
6	Site for dumping earth excavated from dam site	2.6531
7	Quarters at Chittur dam site and Division Office & Camp Quarters at Agali	25.4016

For the construction of Goolikkadavu-Chittoor road and dam, 3.081 ha and 28.2285 ha of Vested forest land was transferred to Irrigation department under Kerala Private Forests (Vesting and Assignment) Act 1971. An additional area of 74.267 ha. of Vested Forest land is required for submergence area of the dam. Necessary application is submitted to the Divisional Forest Officer, Mannarkkad for diversion of 74.267 Ha. of forest land, under Forest Conservation Act 1980.

ix. Tribal families affected:

At present there are no tribal settlements in the submergence area of 302 Ha of the dam. Till date 51 adivasi families have been rehabilitated from the reservoir area and resettled by Irrigation department at Vengakkadavu Ooru. For the displaced Adivasi families from the submergence area, accommodation was provided by the Irrigation department at Vengakkadavu Ooru, by construction of houses.

Demographically, 40 % of the population in Attappady is tribals, who are generally backward, living below poverty line and dependable on cultivation and cattle rearing. The Attappady area is classified as an Integrated Tribal Development Block (ITDP).

x. Water requirement: Adequate water for construction purpose can be taken from Siruvani River.

xi. Project cost: The total capital cost of the proposed project will be approximately Rs 497 Crores.

xii. Project benefit:

❖ The proposed project will irrigate 4255 ha of land.

❖ Cropping area will increase from existing 1387.8 ha to 8418.00 ha for various food and cash crops due to implementation of the project.

❖ It is estimated that the project would require 6,29,000 number of man-days including both skilled and non-skilled category.

xiii. Environmental Sensitive area: There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc., within 10 km distance from the project site. River Siruvani river, in Chittur, Agali & Sholayur Villages is adjacent to the project site.(Project is to be constructed across Siruvani River).

xiv. Resettlement and rehabilitation: 51 tribal families who were residing in the area of submergence of the proposed project, has already been rehabilitated and resettled by the Irrigation department.

xv. Alternative Studies:

Alternate site studies –

The alignment of the dam proposed during 1975, (AA') was along N880E- S880W. This alignment was analyzed by bore holes considering the rock level and geological characteristics. During 1976- 77, another two alignments were also investigated. I. Alignment (BB') at 25 m upstream of alignment AA' II. Alignment (CC') at 25 m downstream of

alignment AA'. On analysis, the centre alignment AA', was found cost effective. Again during 1977-78, another two alignments were investigated, to avoid the E-W lineament at the dam site. I. Alignment DD', connecting, 25m upstream of left bank of BB and 17m downstream of right bank of BB', along N820E- S820W. II. Alignment EE', at 175 m upstream of alignment DD', along N820E- S820W. On analyzing the 5 alignments, it was found that the intensity and thickness of shear zones are less at alignment EE' than other lower alignments. The construction of dam along the alignment EE' was found economical relative to lower sites, as rock occurs at higher levels. Considering the advantages of the alignment EE', this alignment was finalized and blasting for foundation was started along EE', at the right flank of the dam.

xvi. Details of Solid waste/ hazardous waste generation /Muck and its management: A considerable part of the muck generated from the construction activities shall be used as aggregate for construction to the maximum possible extent, if found suitable from laboratory tests. Some of the muck shall be reused for construction of roads and land development of low-lying areas. The balance muck will be dumped in a proper manner with due compaction in layers in the designated dumping areas. Muck dumping sites will be reclaimed with proper vegetative measures.

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

Project details:

Name of the Proposal	Attappady Irrigation Project(AIP)
Location (Including coordinates)	(a) State : Kerala (b) District : Palakkad (c) Taluk : Mannarkkad GPS coordinates: Latitude : 11° 3' 9.501" N & 11° 3' 12.649" N Longitude : 76° 39' 8.218" E & 76° 39' 22.797" E
Inter- state issue involved	Yes
Seismic zone	III

Category details:

Category of the project	B2 category
Provisions	1 (c)
Capacity / Cultural command area (CCA)	CCA – 4255 Ha
Attracts the General Conditions (Yes/No)	Yes

Electricity generation capacity:

Powerhouse Installed Capacity	NA
Generation of Electricity Annually	NA
No. of Units	NA
Additional information (if any)	--

ToR Details:

Cost of project	Rs. 497 Crores
Total area of Project	GIA-8418 ha
Height of Dam from River Bed (EL)	53.10 m
Length of Tunnel/Channel	
Details of Submergence area	Submergence area – 302 Ha
Types of Waste and quantity of generation during construction/ Operation	
E-Flows for the Project	<p>E-flow is 20% of Average of 4 lean months (Feb, March, April and May) = 0.36 Mm³</p> <p>E-flow is 30% of average monsoon months (June, July, August and September) = 3.26 Mm³</p>
<p>Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then</p> <p>a. E-flow with TOR /Recommendation by EA C as per CIA&CC study of River Basin.</p> <p>If not the E-Flows maintain criteria for sustaining river ecosystem.</p>	NA

♣Muck Management Details:

No. of proposed disposal area/(type of land-Forest/Pvt. land)	The required land was acquired for dumping earth excavated from the site
Muck Management Plan	A considerable part of the muck generated from the construction activities shall be used as aggregate for construction to the maximum possible extent, if found suitable from laboratory tests. Some of the muck shall be reused for construction of roads and land development of low-lying areas. The balance muck will be dumped in a proper manner with due compaction in layers in the designated dumping areas. Muck dumping sites will be reclaimed with proper vegetative measures.
Monitoring mechanism for Muck Disposal	--

♣Land Area Breakup:

Private land	210.208 ha
--------------	------------

Government land/Forest Land	91.7925 ha of forest land required. Out of this 17.5255 Ha of forest land already acquired. 74.267 Ha forest land to be acquired
Submergence area/Reservoir area	302 Ha
Land required for project components	<div>1. Submersible area due to dam - 210.208</div> <div>2. Goolikkadavu-Chittoor road -10.8903 ha</div> <div>3. Canals - 16.9805 ha</div> <div>4. Service road to dam site - 4.1125 ha</div> <div>5. Link road to Valley View colony -0.5475ha</div> <div>6. AIP Colony road -0.194 ha</div> <div>7. Site for dumping earth excavated from dam site -2.6531 ha</div> <div>Quarters at Chittur dam site and Division Office & Camp Quarters at Agali - 25.4016 ha</div>

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	Attappady reserve forest is 0.18 km from project site
National Park	No	--

3.1.3. Deliberations by the committee in previous meetings

N/A

3.1.4. Deliberations by the EAC in current meetings

<p>14.6.3 The EAC during deliberations noted the following</p> <p>This project falls under Category 'B2' as per EIA notification 2006 & its amendment dated 14th August, 2018, as CCA >2000 and < 10,000 Ha. However, as per the MoEF&CC Gazette Notification dated 20th April 2022, irrigation projects involving Inter-State issues shall be appraised at Central level without change in category.</p> <p>The EAC noted that as per information submitted by the PP on Parivesh Portal the implementation for the project was in a standstill position for want of Final Order of Cauvery Water Disputes Tribunal (CWDT) and paucity of funds since 1989. Based on the Final Order of CWDT, this medium irrigation project can be implemented for the benefit of drought affected tribal areas of Attappady Valley. The project was submitted to SEAC Kerala for obtaining Terms of Reference (ToR) for EIA studies but the SEIAA Kerala vide its letter No 764/EC1/2015/SEIAA dated 19.10.2015 has approved to delist the proposal in State and asked the project proponent to move to MoEF&CC for obtaining ToR due to presence of Ecologically Sensitive Area (ESA) of Western Ghats. Attappady Irrigation Project (AIP) was placed before the Expert</p>
--

Appraisal Committee (EAC) for appraising the request of Terms of Reference. EAC, in its meeting held on August 11-12, 2016 has recommended issuance of TOR subject to certain conditions. However, in between, Government of Tamil Nadu has raised serious objections against this project. It was informed that this project is a part of Cauvery River Basin.

14.6.4 The EAC based on the information submitted was of the view that the project proposal involves inter-state issues with Tamil Nadu and the PP has not submitted any information regarding settlement of the inter-state issues. The EAC suggested the PP to submit the inter-state clearance from the CWDT & CWC prior to consideration of proposal for grant of Terms of Reference (TOR). The EAC decided to return the proposal in present form.

3.1.5. Recommendation of EAC

Returned in present form

3.2. Agenda Item No 2:

3.2.1. Details of the proposal

Bhivpuri Off-Stream Open Loop Pumped Storage Project (1000 MW) by The Tata Power Co. Ltd. located at RAI GAD, MAHARASHTRA			
Proposal For		Fresh EC	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/MH/RIV/490456/2024	J-12011/39/2023-IA.I (R)	14/08/2024	River Valley/Irrigation projects (1(c))

3.2.2. Project Salient Features

14.7.1 The proposal is for grant of Environmental Clearance (EC) to the project for Bhivpuri Open Loop Pumped Storage Project (1000 MW) in an area of 117.41Ha in Village Sawale, Khand and Bhivpuri (camp), Sub District Mawal and Karjat, District Pune and Raigarh, Maharashtra by M/s The Tata Power Co. Ltd..

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

- The proposal is for Environmental Clearance to the project for Bhivpuri Off-Stream Open Loop Pumped Storage Project (1000 MW) in an area of 117.41 ha in Village Sawale, Khand and Bhivpuri (camp), Sub District Mawal and Karjat, District Pune and Raigarh, Maharashtra by M/s The Tata Power Co. Ltd.
- The project proposal was considered by the Expert Appraisal Committee (River Valley and Hydropower Projects) in its 50th meeting held on 11.08.2023 and recommended for grant of Terms of Reference (ToRs) for the project. The ToR has been issued by Ministry vide letter No. J-12011/39/2023-IA.I (R); dated 23.09.2023.
- The geographical co-ordinate of the project are Latitude: 18° 56' 9.34" N Longitude: 73° 29' 14.59" E.
- Bhivpuri Off-Stream Open Loop Pumped Storage Project (1000 MW) envisages the construction of temporary cofferdam, upper Intake system, water conducting systems, surge shaft, pit powerhouse, lower Intake system, and lower reservoir (equipped with bottom outlet).
- The Bhivpuri Off-stream Open Loop Pumped Storage Hydro Project (Bhivpuri PSP) located in Pune and Raigad Districts of Maharashtra envisages the construction of temporary cofferdam, upper Intake system, water conducting systems, surge shaft, pit powerhouse, lower Intake system, and lower

reservoir (equipped with bottom outlet). Lower reservoir and powerhouse and part of water conductor system are located near Bhivpuri town, Karjat Taluka in Raigad District of Maharashtra State. Existing Thokarwadi reservoir (upper reservoir) falls in Pune district, therefore, upper intake and HRT falls in Pune district. The scheme will involve the usage of the existing Thokarwadi reservoir as an upper reservoir with 12.485 TMC gross storage capacity and will involve construction of 1899.0 m long Geomembrane faced rockfill embankment dam for creation of lower reservoir with 0.163 TMC gross capacity. The complete scheme envisages utilization of design discharge of 216.7 cumec for generation of 1000 MW (4X200+2X100). A rated net head of 520.40 m with design discharge of 173.20 cumec shall be used for generation of 800 MW (4 units of 200 MW each) and a rated head of 516.60 m with design discharge of 43.60 cumec shall be used for generation of 200MW (2 units of 100 MW each).

vi. Land requirement:

The total land requirement for Bhivpuri Pumped Storage Project works out to approximately 117.41 ha of which 20.15 ha is forest land while 97.26 ha is non-forest land. Out of 97.26 ha Non-Forest Land, 93.82 ha land belongs to Tata Power and 3.44 ha land is private land required for Road and HRT.

vii. Demographic details in 10 km radius of project area: The entire study area falls under two districts, namely Pune and Raigad. The project covers a total of 91 villages in the study area. Among the 91 villages, 67 are located in Karjat tehsil of Raigad district, and the remaining 24 are in Pune district (5 villages in Khed tehsil and 19 villages in Mawal tehsil). The total population of the study area is 69068, with 35214 (50.98%) males and 33854 (49.01%) females. The number of households is 13981, with an average occupancy of 4-5 persons per household. The child population below 6 years old was found to be 8585, which is 12.42% of the total population. The sex ratio was found to be 961 females per 1000 males.

There are 2844 scheduled castes in the study area, accounting for 4.11% of the total population, with 1434 scheduled caste males and 1410 scheduled caste females. There are 22446 scheduled tribes in total, accounting for 32.49% of the total population, with 11224 scheduled tribe males and 11222 scheduled tribe females. The literacy rate in the villages is 75.13% (above the 6-year-old population), with males and females having rates of 82.91% and 67.04%, respectively, creating a gender gap of 15.87%. The workers coming under the main and marginal workers categories are those involved in activities such as cultivation, agriculture, livestock, fishing, plantation, manufacturing, servicing, and repair in the household industry, construction, trade and commerce, transportation, and other services. In the study area, there are total of 31584 workers, and 68.4% of them are involved in agriculture and related activities. Out of this group, 35.35% are cultivators, and 33.05% are agricultural laborers. Additionally, 3.49% of the population is engaged in household industries, while 28.09% are in various other services such as trade, commerce, business, transport, government, and private jobs.

viii. Water requirement: Approximately 4.5 MCM will be required to meet generation of 1,000 MW for 6.02 hours. The storage capacity of existing upper Thokarwadi reservoir is 352.52 MCM and of planned lower reservoir is 4.54 MCM. Annual losses due to the evaporation from the lower reservoir work out to 0.43 MCM. It will be recouped periodically from Upper Reservoir.

ix. Project Cost: The estimated project cost is Rs 4743.59 crore. Total capital cost earmarked towards Environment Management Plan/environmental pollution control measures is Rs. 7995.62 lakh and the Recurring cost (operation and maintenance) will be about Rs. 2819.91 lakh about i.e. Rs 633.85 lakh per annum.

x. Project Benefit: Total Employment will be 1200 persons as direct & 300 persons indirect after expansion. Industry proposes to allocate Rs. 1172.00 Lakh @ of 0.25% towards CER (as per Ministry's OM dated 30th Sep 2020).

xi. Environmental Sensitive area: Nearest Protected Area to the Project Components is Bhimashankar Wildlife Sanctuary which is at a distance of around 10.70 km from existing Thokarwadi Reservoir (upper reservoir). There are no wildlife corridors within 10 Km of the project area. Project partly falls within the Western Ghat Ecologically Sensitive Area as per draft notification issued by MoEF&CC on 31st July 2024.

xii. MoU / any other clearance/ permission signed with State government: MoU was signed with the Govt. of Maharashtra on 09th August 2023 for development of 1000 MW Bhivpuri off-stream open

loop Pumped Storage Project. Further, as per the PSP policy issued by the GoM in December 2023, a fresh MoU was signed with WRD, GoM on 12th August 2024

xiii. **Resettlement and rehabilitation:** The total land requirement works out to approximately 117.41 ha of which 20.15 ha is forest land while 97.26 ha is non-forest land. Out of 97.26 ha Non-Forest Land, 93.82 ha land belongs to Tata Power and 3.44 ha land is private land required for Road and HRT. The Tata Power land was acquired around 100 years back for a specific purpose of 'generation of electricity & associated activities' and is under right, title, interest & possession of Tata Power till today for the same purpose. Two revenue villages namely Khand and Sawale villages of Mawal Tehsil of Pune District of Maharashtra are affected and Private land identified for the project belongs to 4 land owner families.

xiv. **Scheduled – I species:** Among the mammals, 10 species are categorised as schedule I species. Rest of the mammalian species are listed under schedule II category of WPAA, 2022). As per the IUCN Red List of Threatened Species, Version 2023-1, Leopard, Sloth Bear, Sambar Deer, Indian Bison and Bonnet Macaque under Vulnerable (VU) category and Striped Hyaena is listed under Near Threatened (NT) category.

As per the IUCN Red List of Threatened Species version 2023-1, all birds have been listed under Least Concern (LC) category. As per the WPAA 2022, Indian Peafowl (*Pavo cristatus*) is listed as Schedule I species. All other bird species are listed as Schedule II category.

In case of herpetofauna, all species are listed under Least Concern (LC) category as per the IUCN Red List of Threatened Species version 2023-1. As per the WPAA, 2022, Asian Chameleon, Indian rat Snake, Indian Cobra and Russel's Viper are categorised as schedule I species. Among the butterflies, Danaid Eggfly (*Hypolimnas misippus*) is listed under Least Concern (LC) category of IUCN Red List categories (Ver. 2023-1). No species of butterfly is categorised as a schedule species as per the WPAA 2022.

xv. **Alternative Studies:** 7 alternatives have been studied for Bhivpuri pumped storage project.

- ♣Alternative-1 (120 MW)-Independent PSP
- ♣Alternative-2 (24 MW)-One PSP unit using existing HRT
- ♣Alternative-3 (48 MW)- One PSP unit using existing HRT
- ♣Alternative 4 (360 MW)- (Independent PSP by utilizing of existing upper reservoir).
- ♣Alternative 5 (2200 MW)- (Independent PSP by utilizing of existing upper reservoir).
- ♣Alternative 6 (1000 MW)- (Independent PSP by utilizing of existing upper reservoir).
- ♣Alternative 7 (900 MW)- (Independent PSP by utilizing of existing upper reservoir).
- ♣After carefully considering the merits and drawbacks of all the alternatives, Alternative 6 has been selected as the final layout.

xvi. The capital and recurring costs involved for implementation of the Environmental Management Plan for Bhivpuri Pumped Storage Project is Rs 7995.62 Lakh

S. No.	Component of EMP	Capital Cost (Rs. In lakh)	Recurring Cost (Rs. In lakh)							Total Cost (Rs. In Lakh)
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	
1	Catchment Area Treatment Plan	121.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	121.25

2	Compensator y Afforestation Plan & NP V*	490.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	490.99
3	Biodiversity Conservation & Wildlife Management Plan	210.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
4	Fisheries Conservation and Management Plan	50.00	14.75	14.75	14.75	14.75	0.00	0.00	0.00	109
5	Muck Dumping and Management Plan	86.50	508.00	900.20	925.17	925.00	18.25	18.25	18.25	3399.62
6	Landscaping, Restoration of Quarry, and Construction Sites	20.00	15.00	20.00	30.25	25.75	20.25	10.25	10.00	151.5
7	Green Belt Development Plan	0.00	3.40	6.40	10.00	5.00	5.00	5.00	5.00	39.8
8	Sanitation and Solid Waste Management Plan	142.00	25.25	25.25	25.25	25.25	0.00	0.00	0.00	243
9	Public Health Delivery System	110.00	34.75	34.75	34.75	34.75	0.00	0.00	0.00	249
10	Energy Conservation Measures	40.00	65.50	65.50	65.50	65.50	0.00	0.00	0.00	302
11	Labour Management Plan	30.00	13.00	13.00	13.00	13.00	0.00	0.00	0.00	82
12	Disaster Management Plan	275.00	31.25	31.25	31.25	31.25	0.00	0.00	0.00	400
13	Control of Air, Noise and	0.00	15.00	15.00	15.00	15.00	0.00	0.00	0.00	60

	Water Pollution									
14	Environmental Monitoring Programme	0.00	38.44	38.44	38.44	38.44	0.00	0.00	0.00	153.76
15	Rehabilitation and Resettlement Plan**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
16	Local Area Development Plan	1172.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1172.06
17	Watershed Development Plan	811.6386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	811.64
	Total	3558.70	764.34	1164.54	1203.36	1193.69	43.50	33.50	33.25	7995.62

xvii. The salient features of the project are as under:

1. EAC Meeting Details:

EAC meeting/s	14 th meeting
Date of Meeting/s	31.08.2024
Date of each	11.08.20

ri er E A C m ee ti n gs	23 (5 0 th h m ee ti ng fo r T O R)
---	--

2. Project details:

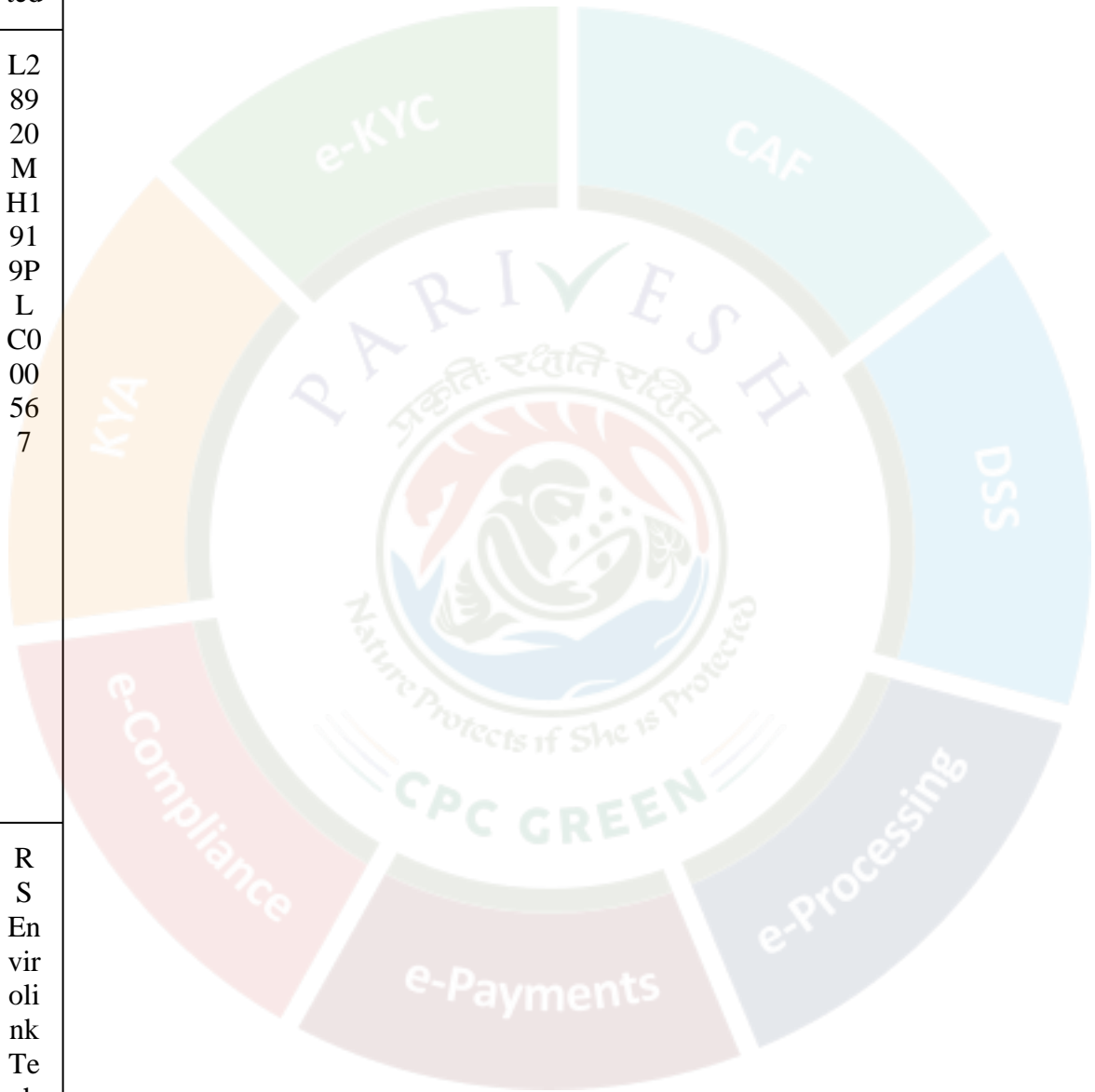
N a m e of th e P ro p o s al	Bh iv pu ri Of f-S tre am Op en Lo op Pu m pe d St ora ge Pr oje ct (1 00 0 M W)
P ro p o s al N o.	I A/ M H/ RI V/ 49 04 5 6/



	20 24
L o c a t i o n (I n c l u d i n g C o o r d i n a t e s)	Ne ar Bh iv pu ri t ow n, Ka rja t T alu ka in Ra iga d Di str ict of M ah ara sht ra St ate La t: 18 05 6' 9.3 4" N Lo n g: 73 02 9' 14. 5 9" E
C o m	Th e Ta



p a n y' s N a m e	ta Po we r C o m pa ny Li mi ted
C I N n o. of C o m p a n y/ u s e r a g e n c y	L2 89 20 M H1 91 9P L C0 00 56 7
A c c r e d i t e d C o n s u l t a n t a n d c	R S En vir oli nk Te ch no lo gie s P vt Lt d; N A B



er ti fi c at e n o.	E T/ EI A/ 22 2 5/ R A 02 74
P ro je ct lo c at ion (C o or di n at es / R iv er/ R es er v oi r)	Ex isti ng Th ok ar wa di res erv oir An dra Ri ve r, a tri bu tar y o f I nd ray ani riv er La t: 18 05 6' 9.3 4" N Lo n g: 73 02 9' 14.



	5 9” E
In te r- st at e is s u e in v ol v e d	N o; Int ers tat e r ela ted wa ter all oc ati on cle ara nc es wa s a cc or de d b y C W C vi de the ir f ile no. Fil e N o. T- 89 01 7/ 1/ 20 1 9-I S M 1



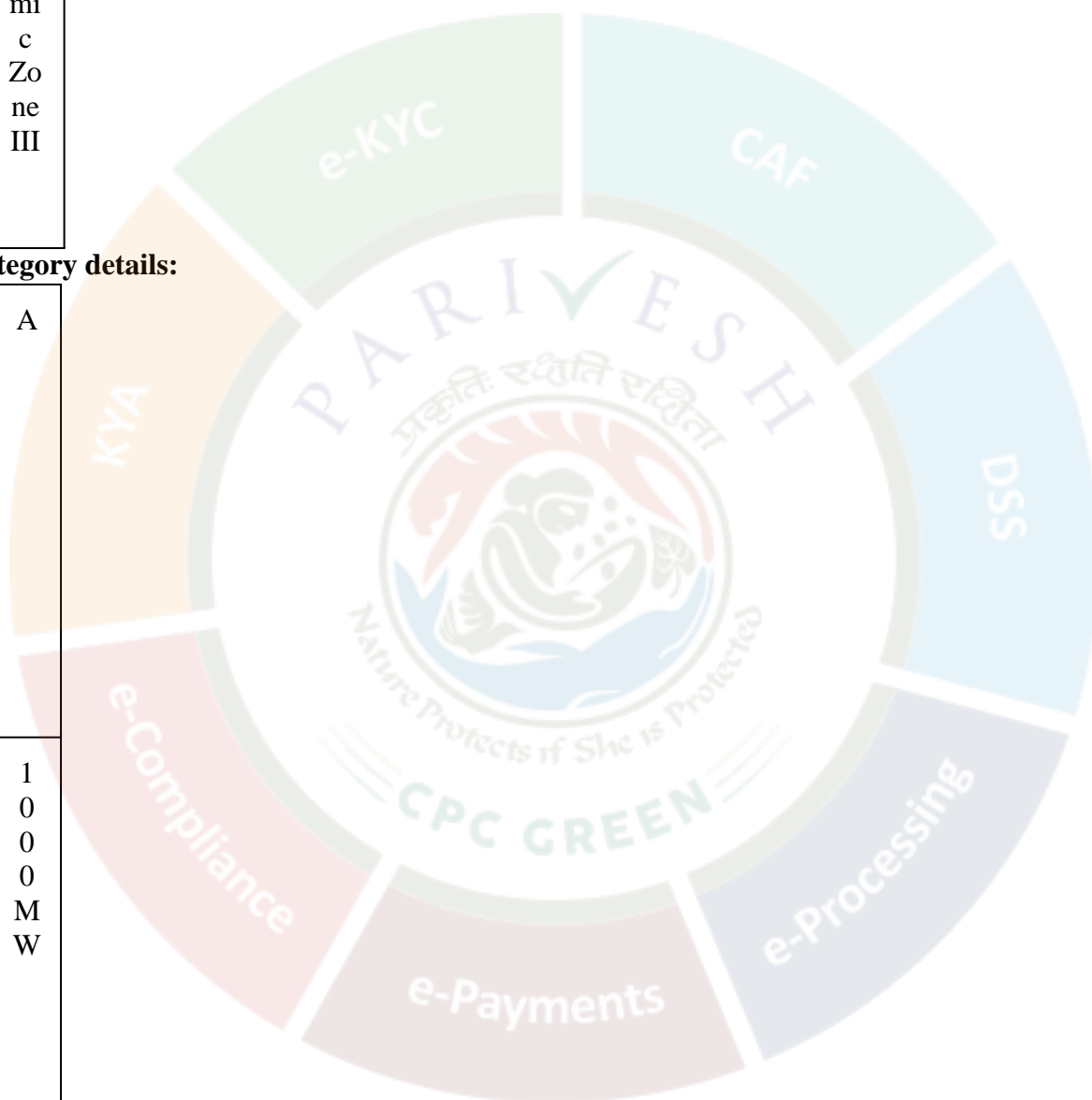
	D T E- Pa rt(1), dat ed 2 4/ 0 4/ 20 24
P ro p o s e d o n R iv e r/ R es er v oi r	Ex isti ng Th ok ar wa di res erv oir An dra Ri ve r, a tri bu tar y o f I nd ray ani riv er
T y p e of H y dr o- el e	Pu m pe d St ora ge Pr oje ct



ct ri c pr oj e ct	
S ei s m ic z o n e	Se is mi c Zo ne III

3. Category details:

C at eg or y of th e pr oj ec t	A
C ap ac it y/ C ul tu ral co m m an d ar ea (C C A)	1 0 0 0 M W

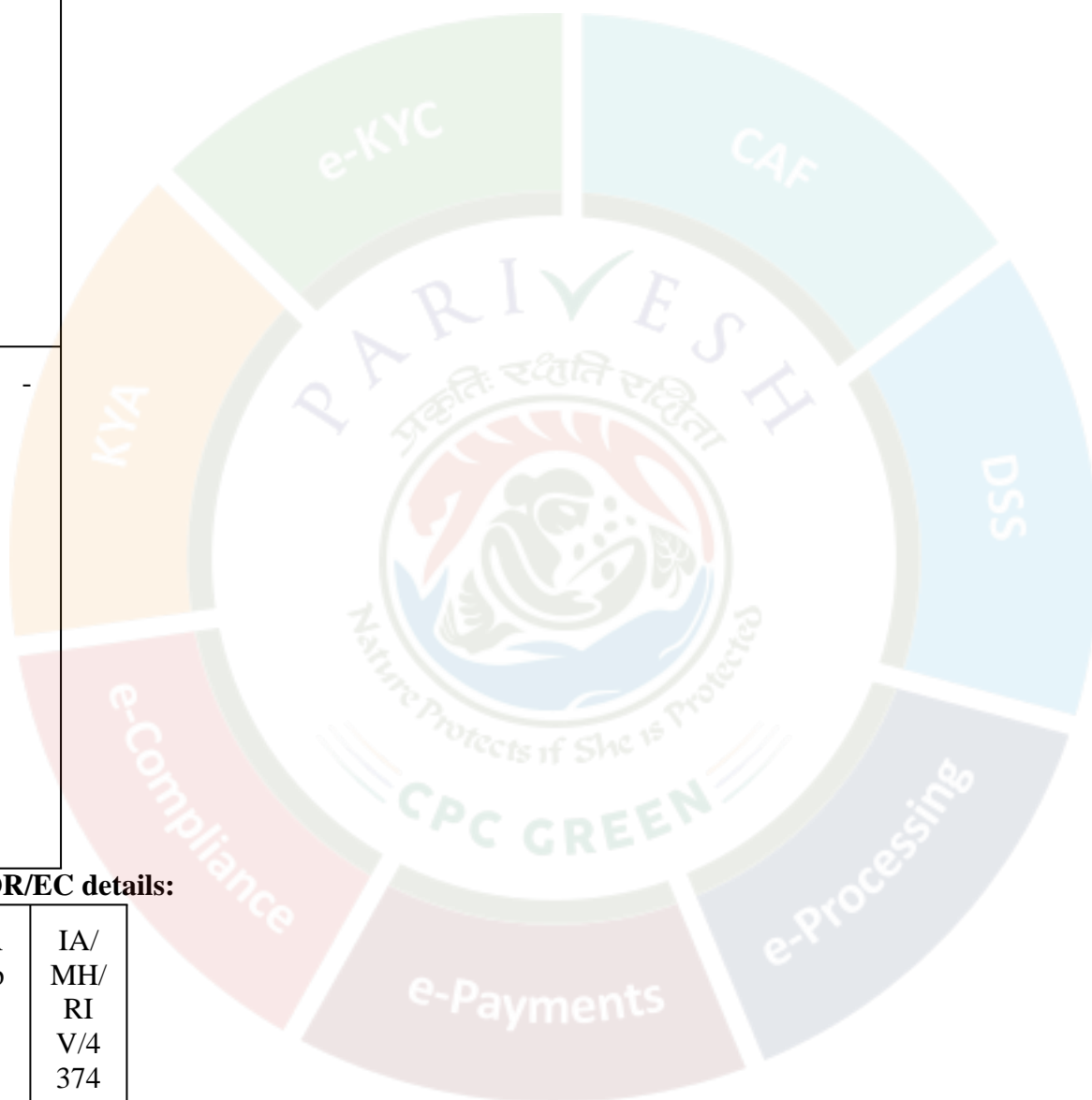


At tract st he G en er al C on di ti on s (Y e s/ N o)	N o
---	--------

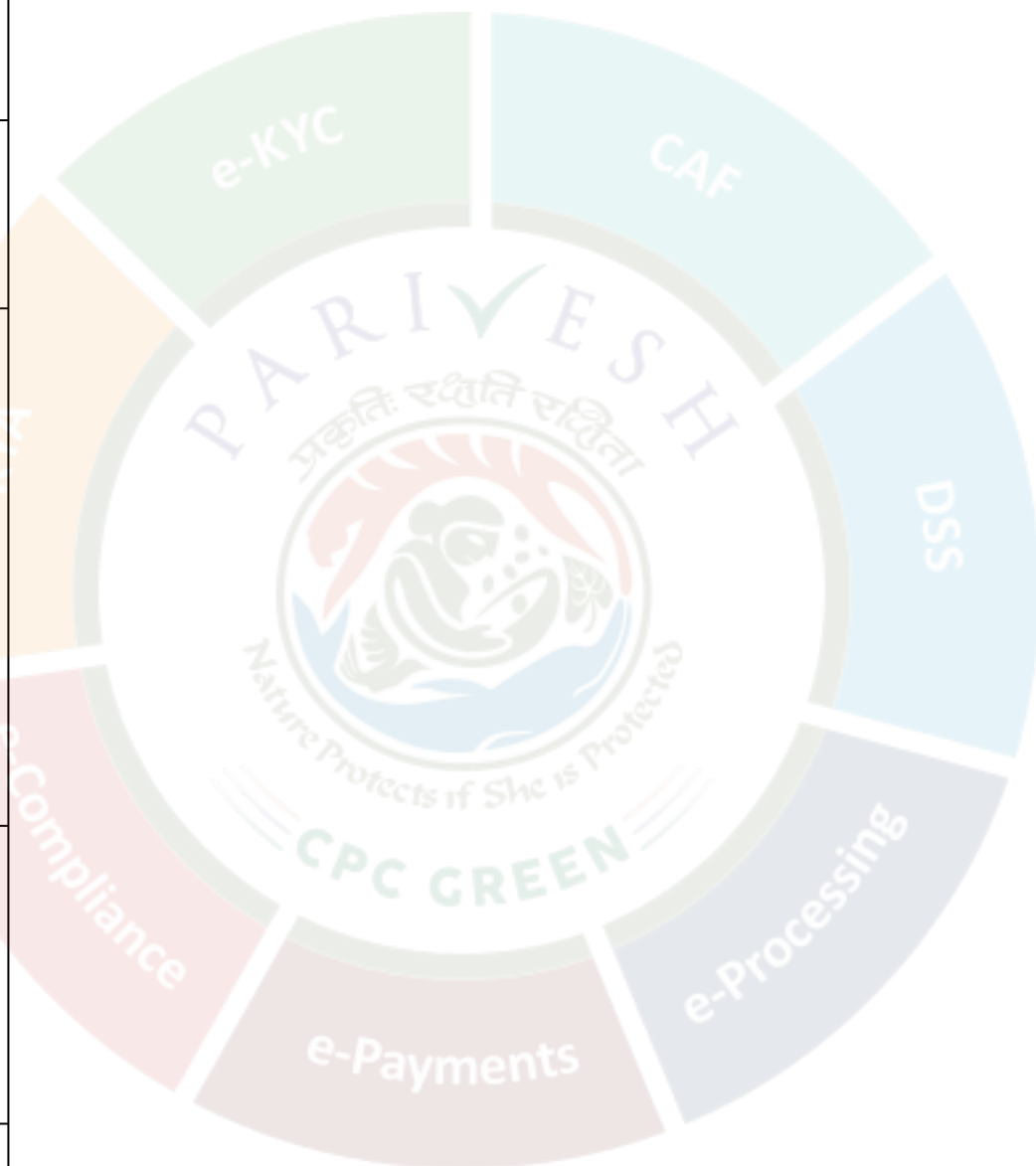
A dd iti on al in fo r m ati on (if an y)	-
--	---

4. TOR/EC details:

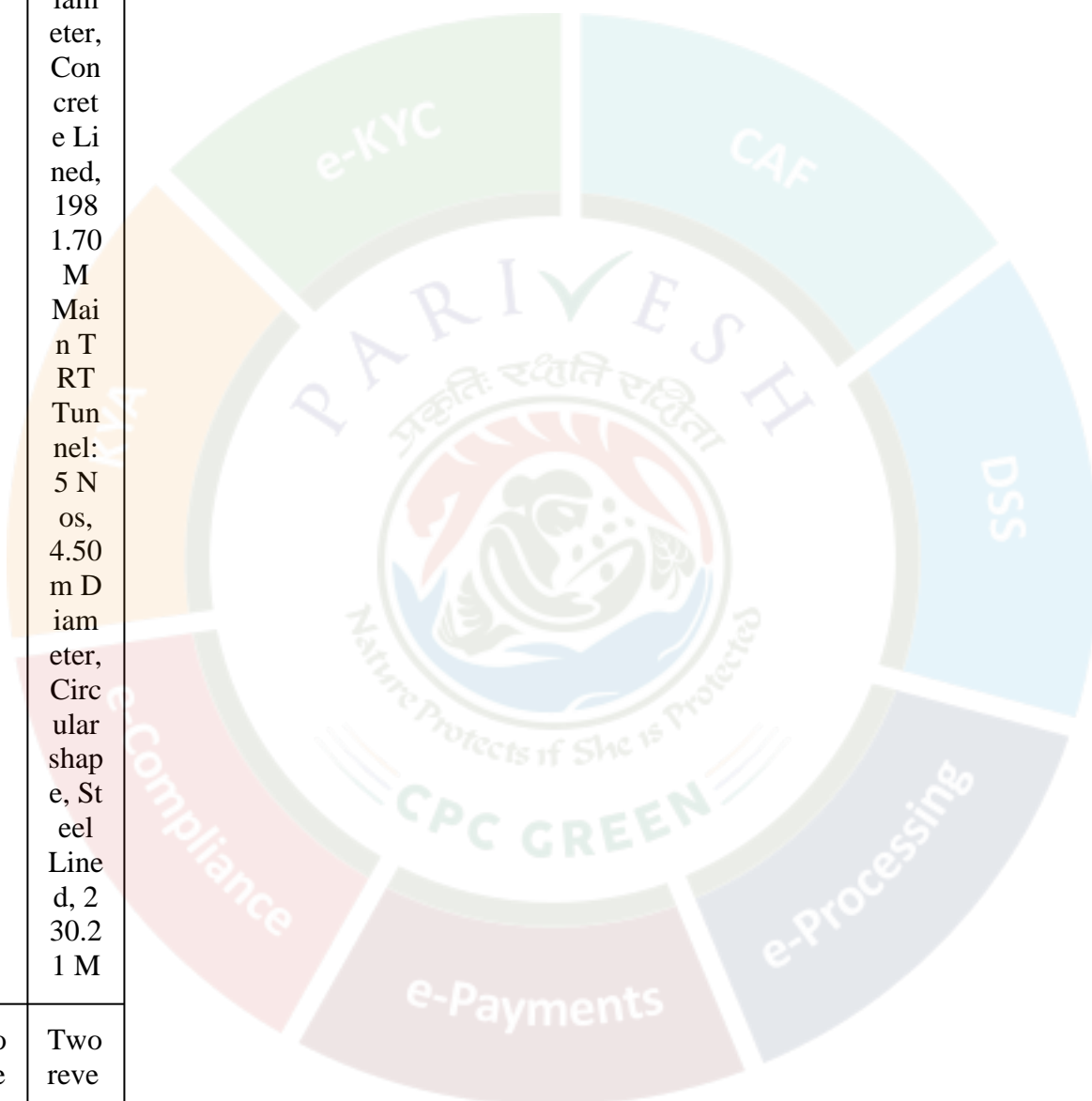
ToR Prop osal No.	IA/ MH/ RI V/4 374 64/2 023
EAC meeti ng da te	11.0 8.20 23
ToR Lette	J-12 011/



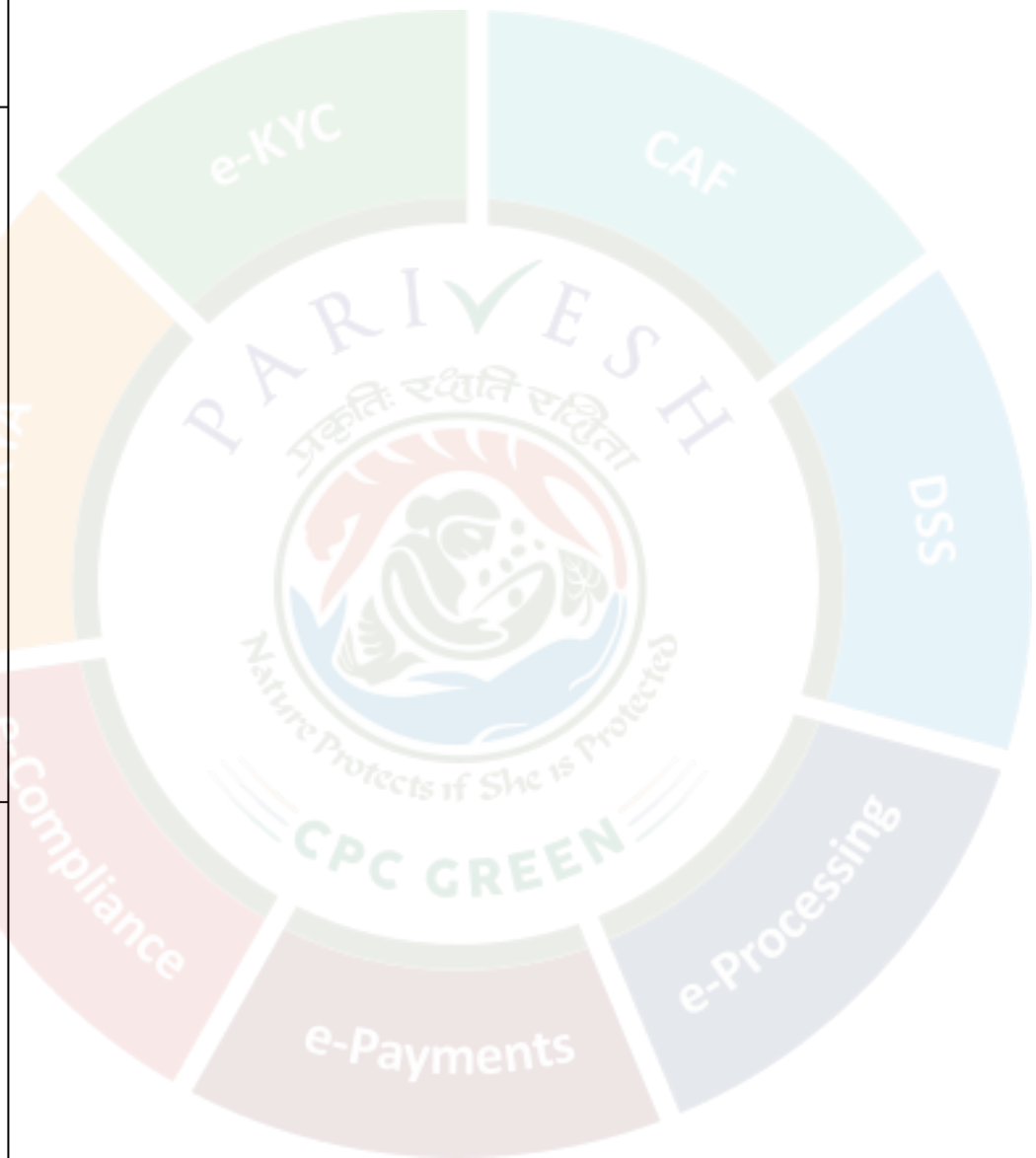
r No.	39/2 023- IA.I (R)
ToR grant Date	23.0 9.20 23
Cost of pr oject	Rs 4 743. 59 c rore
Total area of Pr oject	117. 41 h a
Heig ht of Dam from River Bed (EL)	Max imu m h eigh t of GF RD emb ank men t is 28 m
Detail s of subm ergen ce ar ea	29.2 4 ha of lo wer rese rvoi r
Distri ct to provi de irr igatio n faci lity (i f app licabl e)	NA



Details of tunnel sections on upper level & lower level and length of canal (if applicable)	HR Tunnel: Circular Finish - 8.3 m Diameter, Concrete Lined, 1981.70 M Main RT Tunnel: 5 Nos, 4.50 m Diameter, Circular shape, Steel Lined, 230.21 M
No. of affected Village	Two revenue villages namely Khanda and Sawale village



	s of Ma wal Teh sil o f Pu ne Dist rict of Mah aras htra
No. o f Aff ected Fami lies	Priv ate l and iden tifie d fo r the proj ect belo ngs to 0 4 la nd o wne r fa mili es
Proje ct Be nefits	Eco nom ical and soci al b enef its li ke p eaki ng p owe r ge nera tion by u sing chea p so lar/



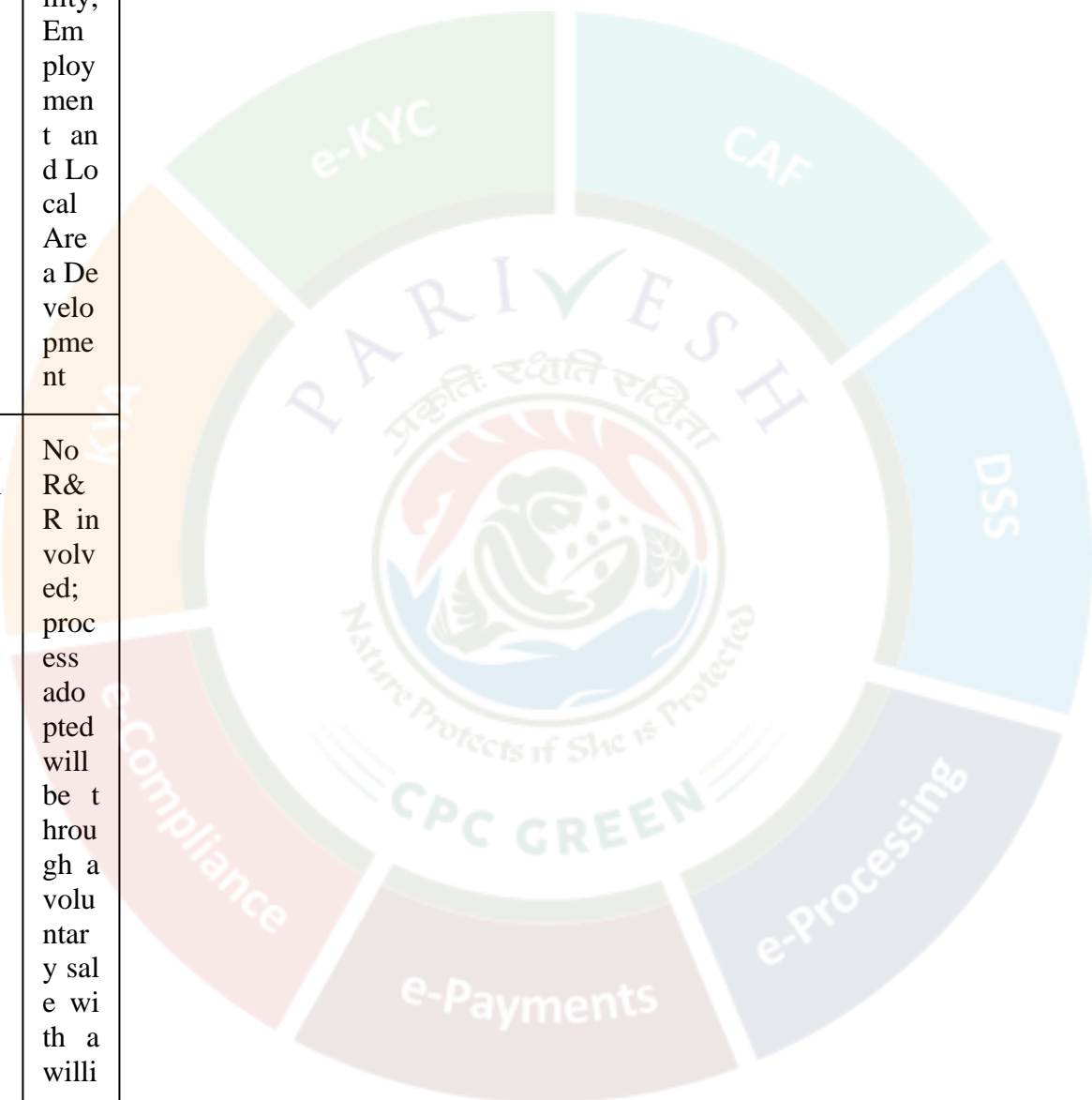
win
d tar
iff d
urin
g of
f-pe
ak ti
me,
grid
stab
ility,
Em
ploy
men
t an
d Lo
cal
Are
a De
velo
pme
nt

R&R
detail
s

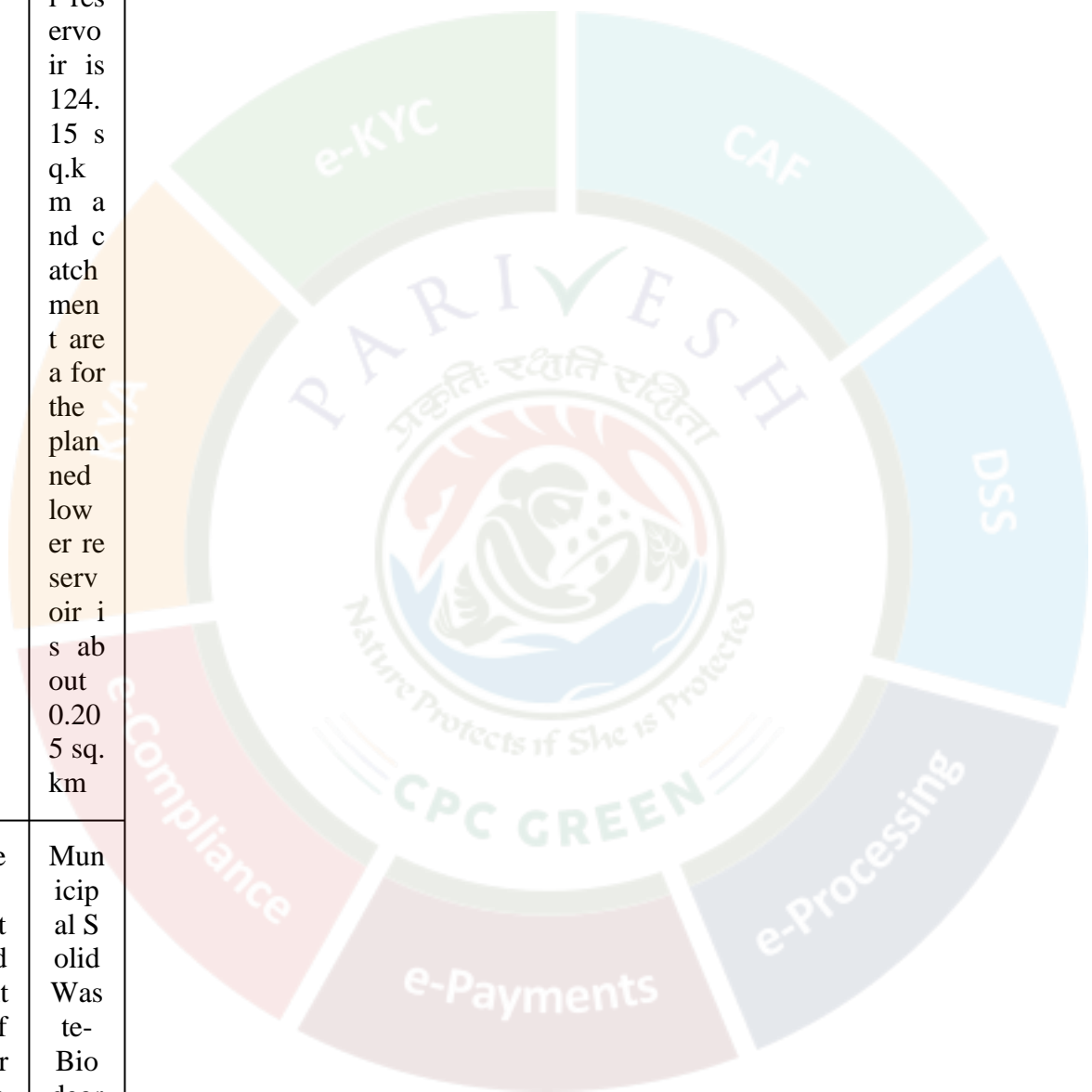
No
R&
R in
volv
ed;
proc
ess
ado
pted
will
be t
hrou
gh a
volu
ntar
y sal
e wi
th a
willi
ng s
eller
and
willi
ng b
uyer
basi
s

Catc
hmen

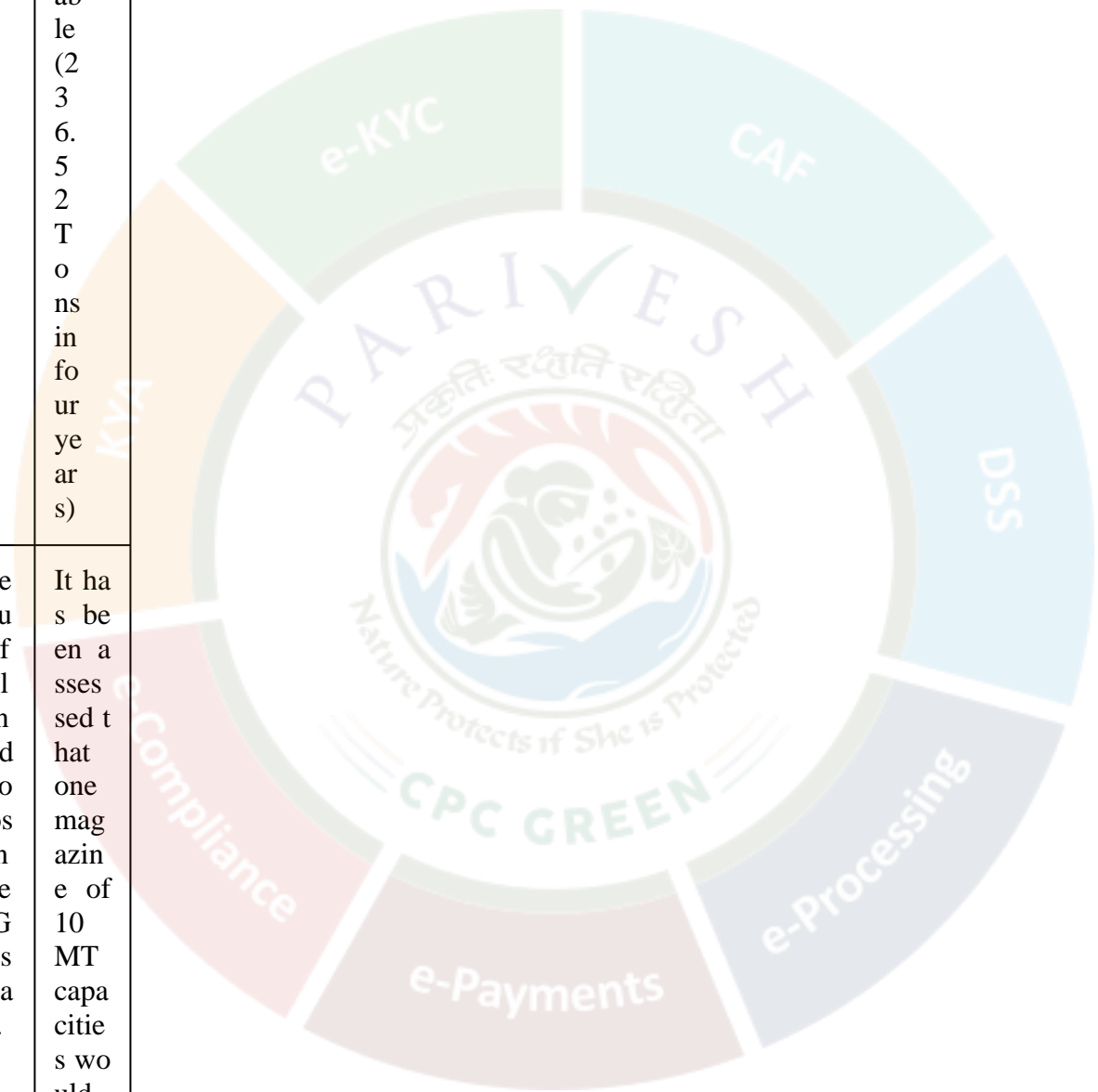
Tota
l cat



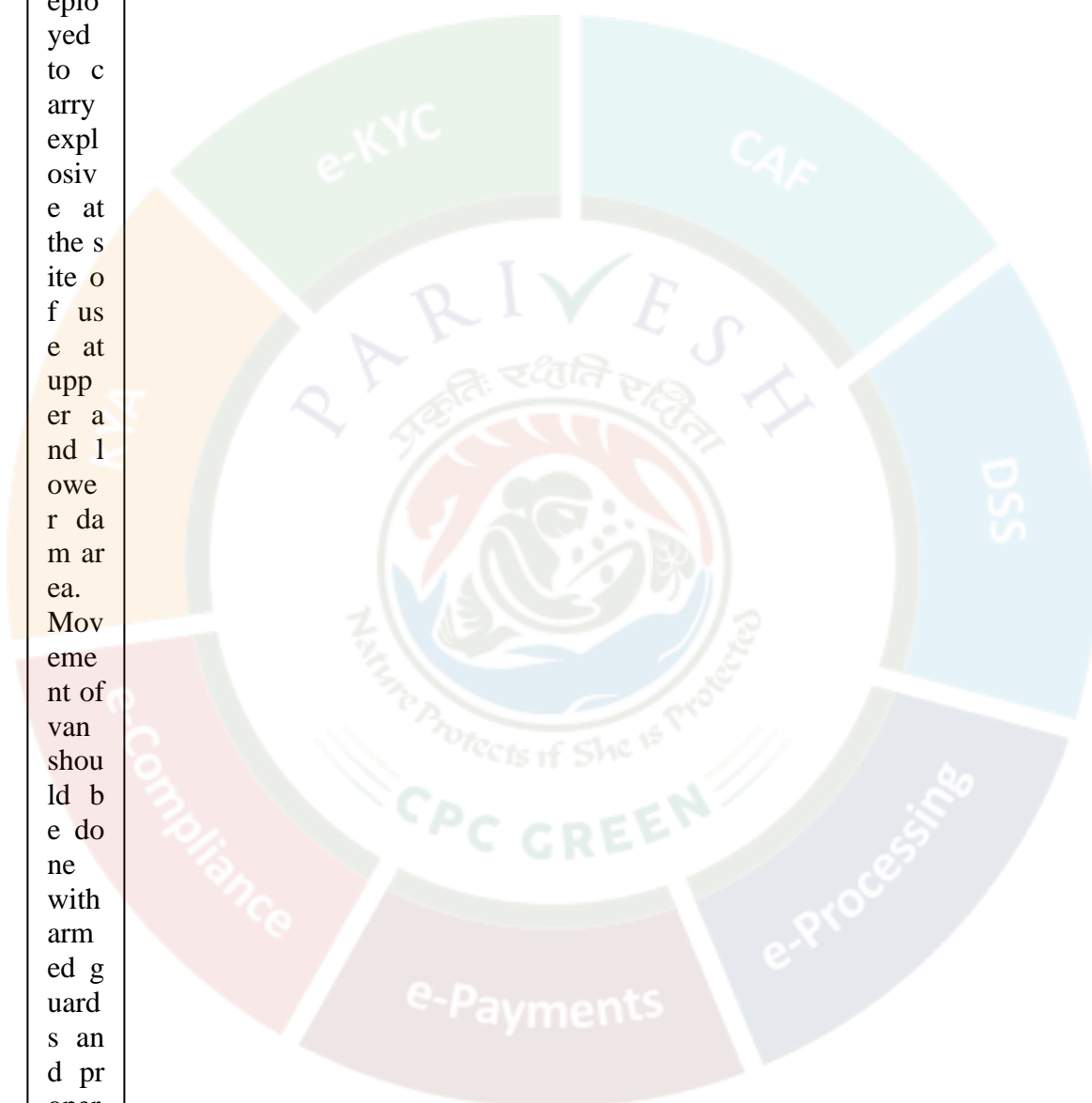
<p>t are a/ Co mma nd ar ea</p>	<p>chm ent area of e xisti ng u pper Tho kar wad i res ervo ir is 124. 15 s q.k m a nd c atch men t are a for the plan ned low er re serv oir i s ab out 0.20 5 sq. km</p>
<p>Type s of Wast e and quant ity of gener ation durin g con struct ion/O perati on</p>	<p>Mun icip al S olid Was te- Bio degr adab le (5 1 2 T o ns in fo</p>



	<p>ur ye ar s), N o n de gr ad ab le (2 3 6. 5 2 T o ns in fo ur ye ar s)</p>
<p>Material used for blasting and its composition as per DGMS standards.</p>	<p>It has been assessed that one magazine of 10 MT capacities would be sufficient to meet the requirement of th</p>



e project. A mobile explosive van shall be deployed to carry explosive at the site of use at upper and lower dam area. Movement of van should be done with armed guards and proper documentation recommended by PESO.

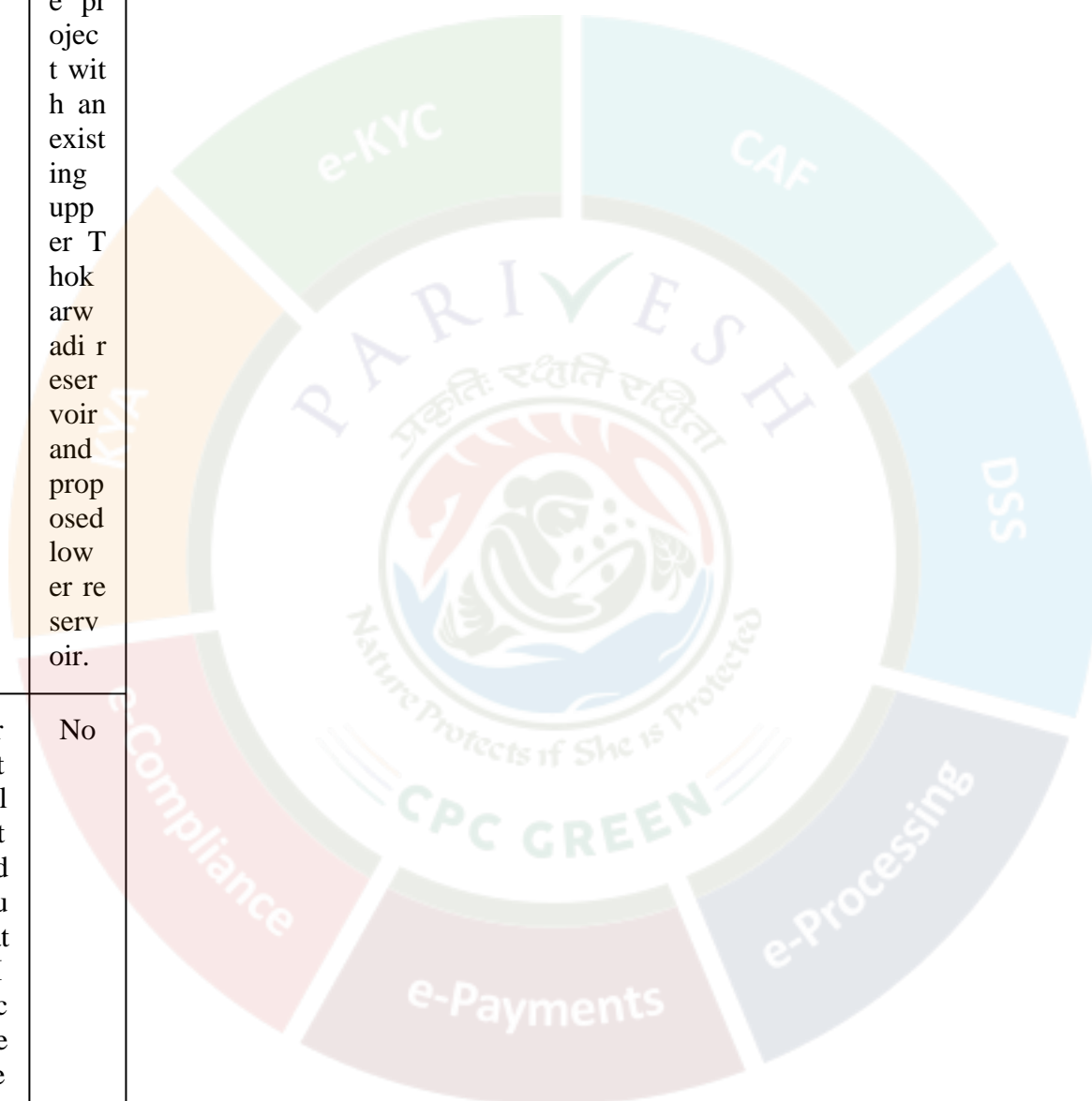


E-Flo
ws fo
r the
Proje
ct

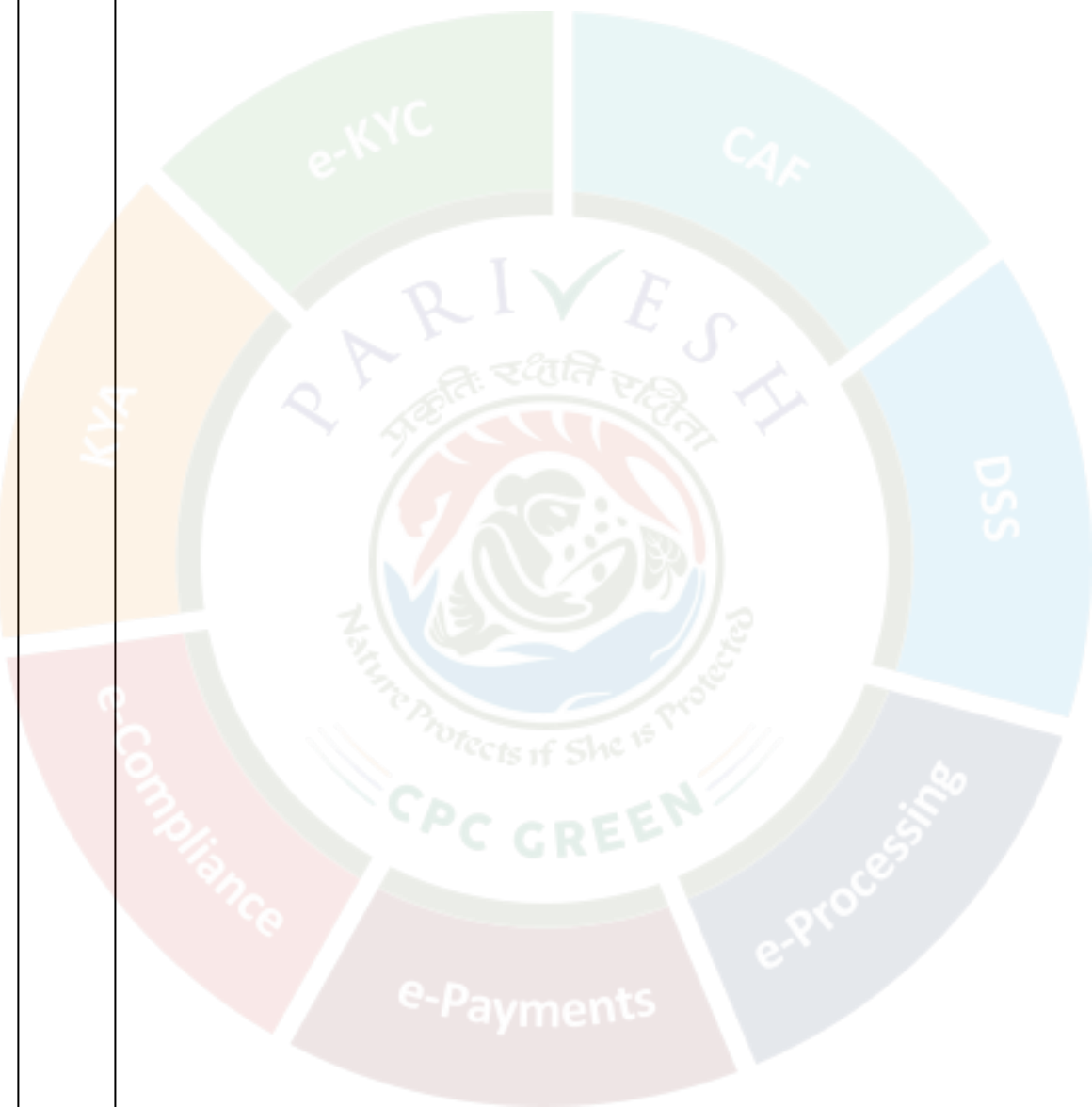
Not appl
icab
le si
nce
it's
a pu
mpe
d st
orag
e pr
ojec
t wit
h an
exist
ing
upp
er T
hok
arw
adi r
eser
voir
and
prop
osed
low
er re
serv
oir.

Is Pr
ojec
ts ear
lier st
udied
in Cu
mulat
ive I
mpac
t asse
ssme
nt &
Carry
ing C
apaci
ty stu
dies(
CI
A&C
C) fo
r Riv
er in

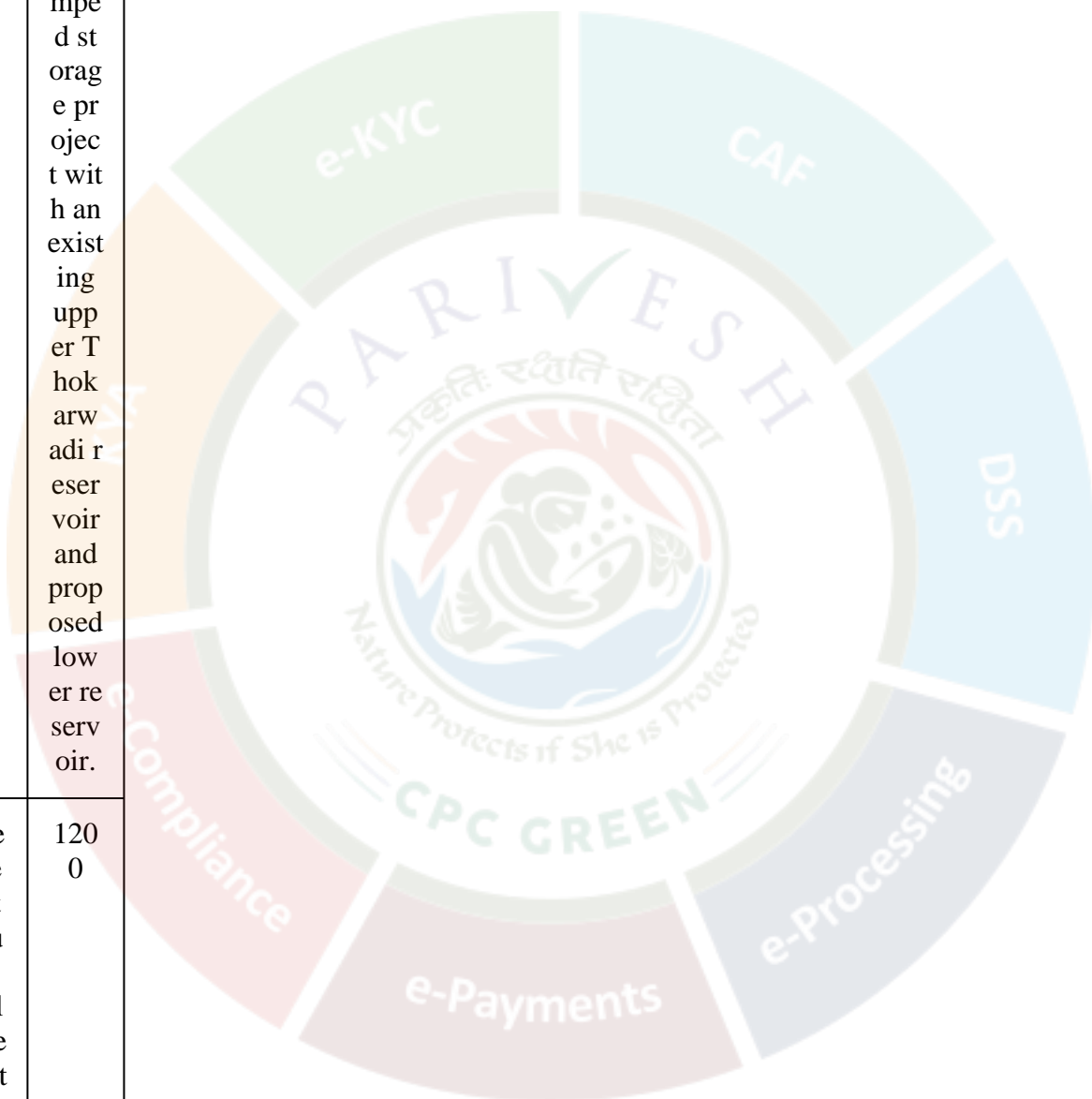
No



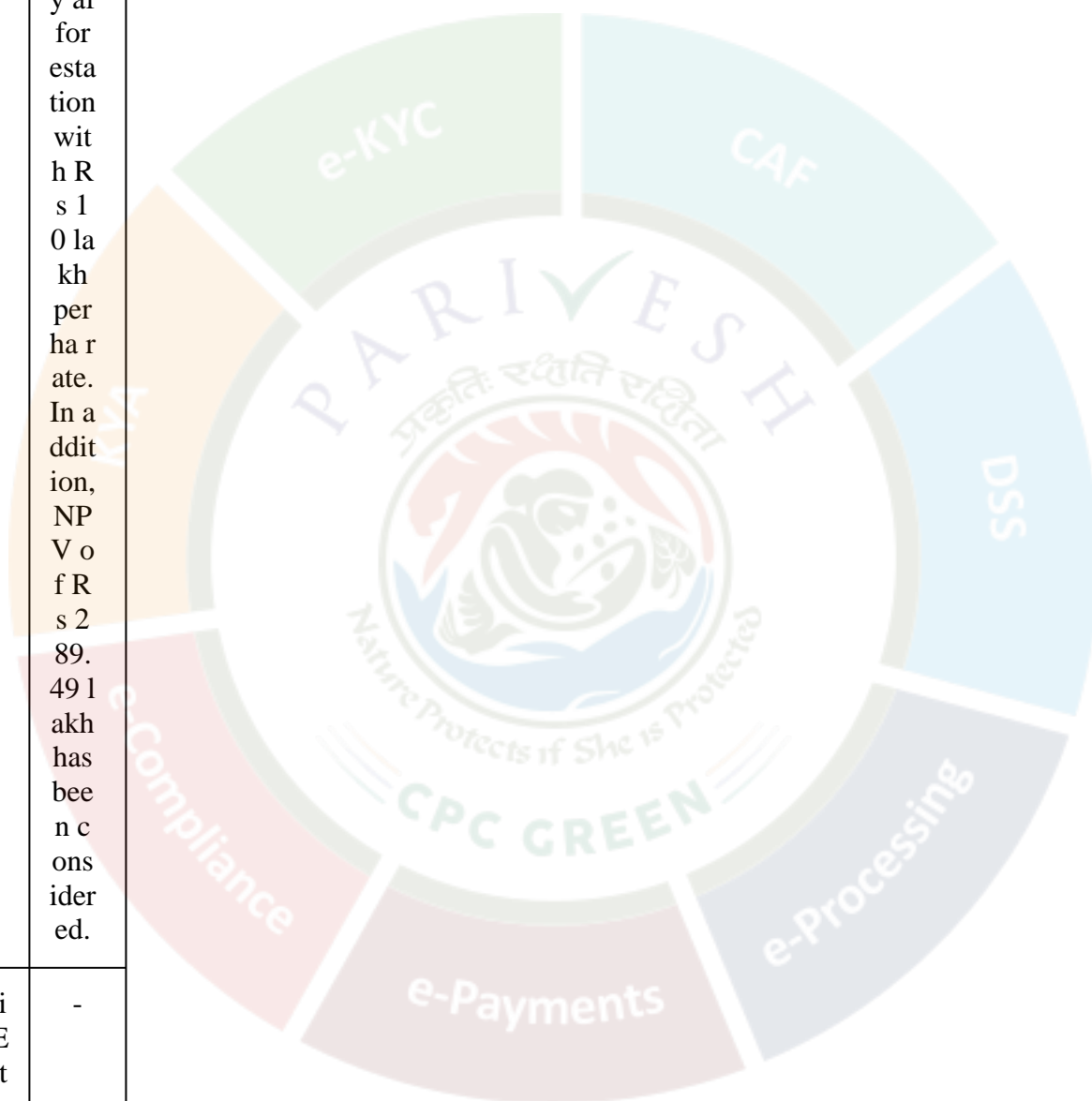
which project located. If yes then c) E-flow with the TOR/ Recommendation by EAC as per CIA&CC study of River Basin. d) If not the E-F flows maintain criteria for sustaining river ecosystems



System.	
Details on provision of fish passes	Not applicable since it's a pumped storage project with an existing upper Thokarwadi reservoir and proposed lower reservoir.
Project benefit including employment details (no of employee)	1200
Area of Compensation	20.15 ha; Rs 2201.5

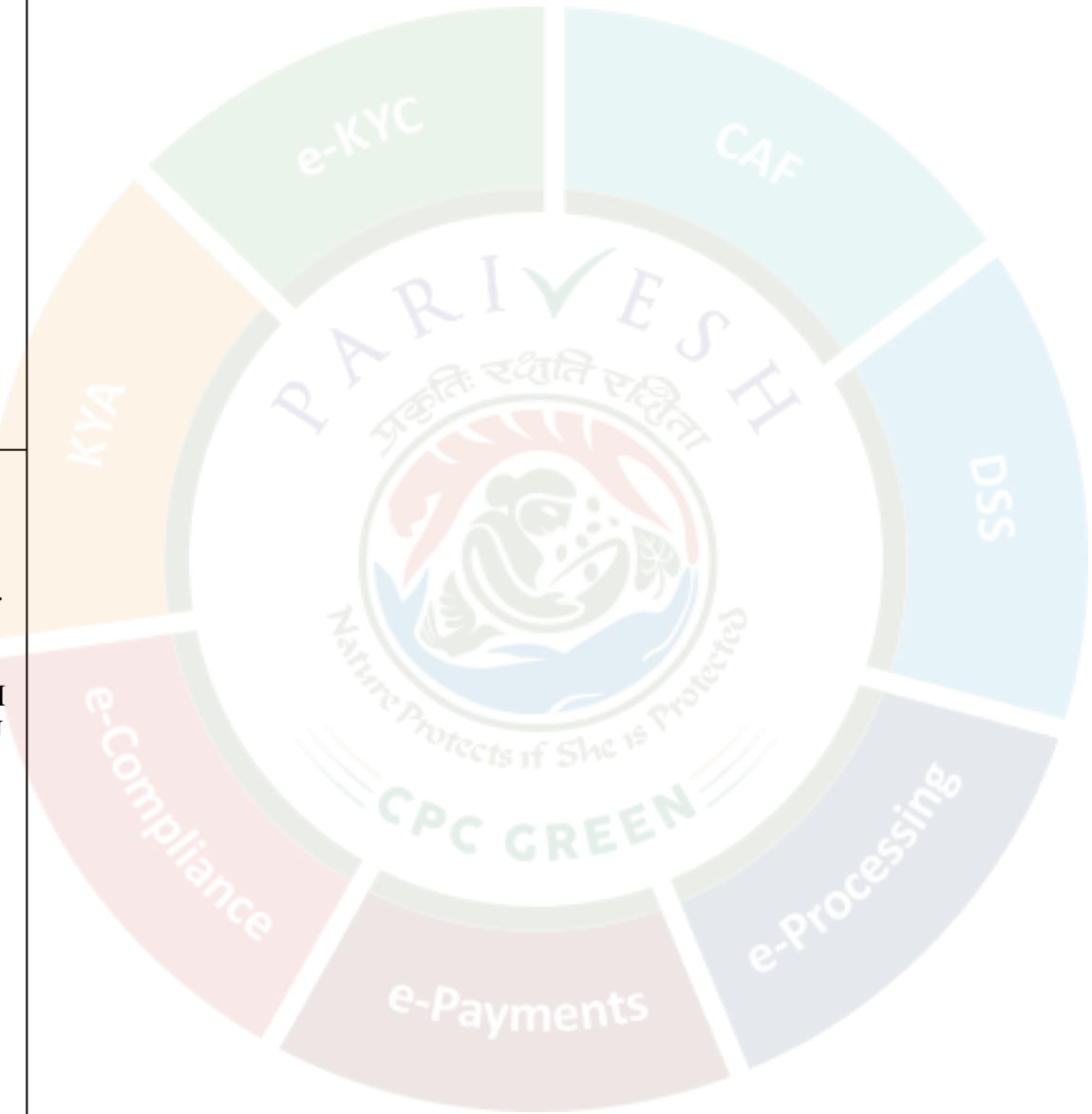


Afforestation (CA) with tentative no of plantation.	0 lakh Total Cost for compensation for afforestation with Rs 10 lakh per hectare. In addition, NPV of Rs 289.49 lakh has been considered.
Previous EC details	-
EC Compliance Report by R.O,	-



5. Electricity generation capacity:

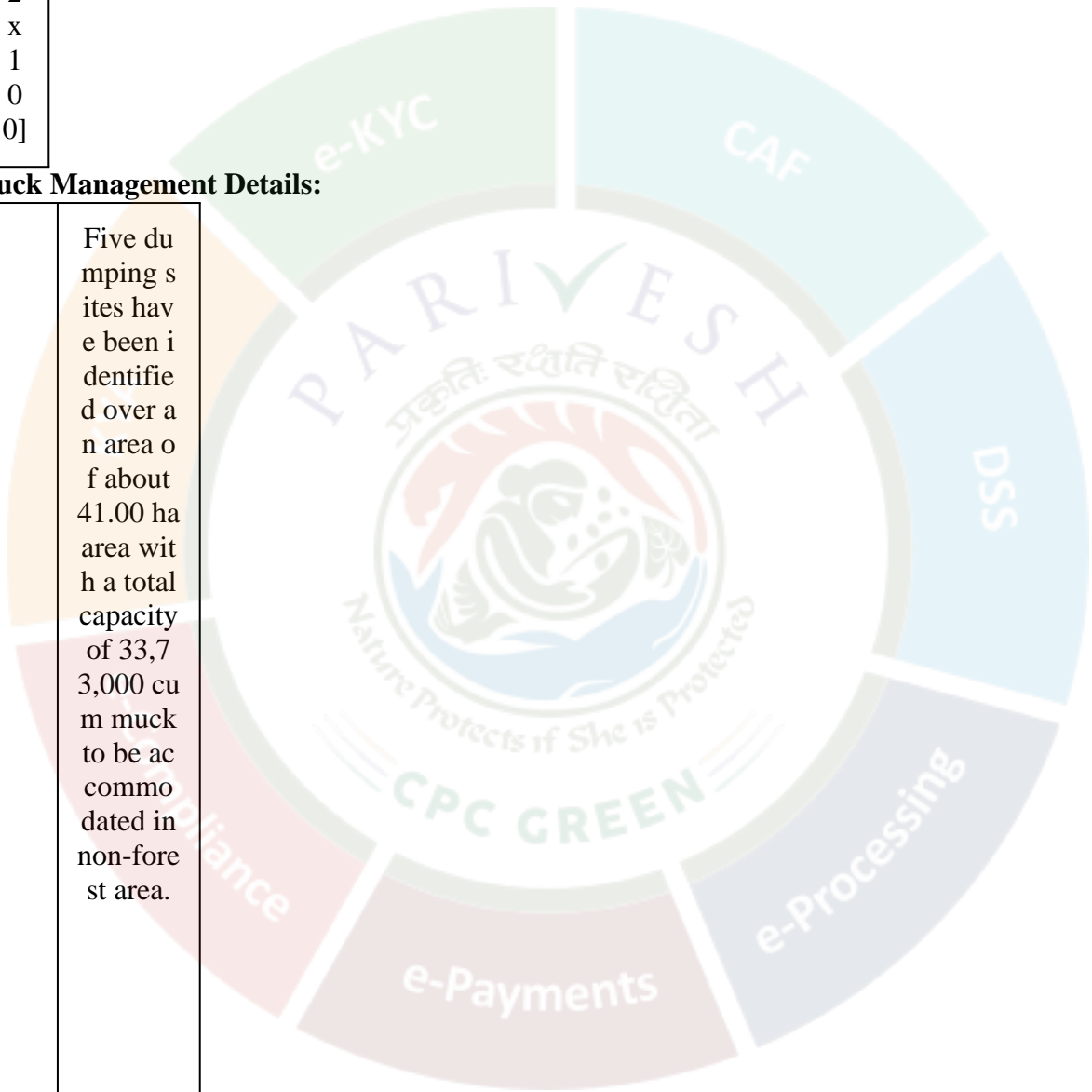
P o w e r h o u s e I n s t a l l e d C a p a c i t y	1 0 0 0 M W
G e n e r a t i o n o f E l e c t r i c i t y A n n u a l l y	2 0 7 9. 4 2 M U
N o. o	6; 1 0



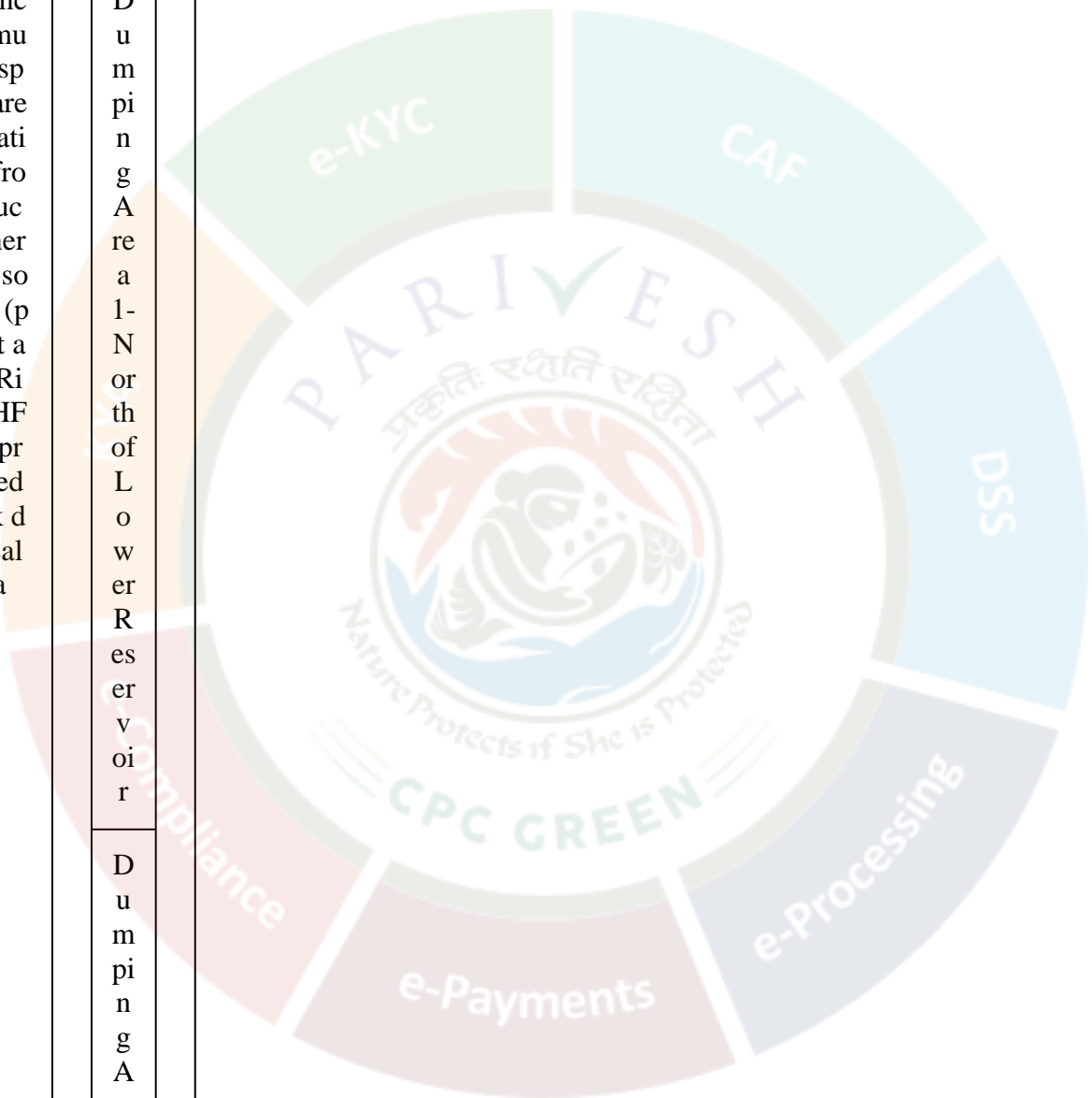
f	0
U	0
n	M
it	W
s	[4
	x
	2
	0
	0
	+
	2
	x
	1
	0
	0]

6. Muck Management Details:

N o. of pr o p o se d di s p o sa l ar e a/ (t y p e of la n d- F or es t/ P vt la n d)	Five du mping s ites hav e been i dentifie d over a n area o f about 41.00 ha area wit h a total capacity of 33,7 3,000 cu m muck to be ac commo dated in non-fore st area.
---	--



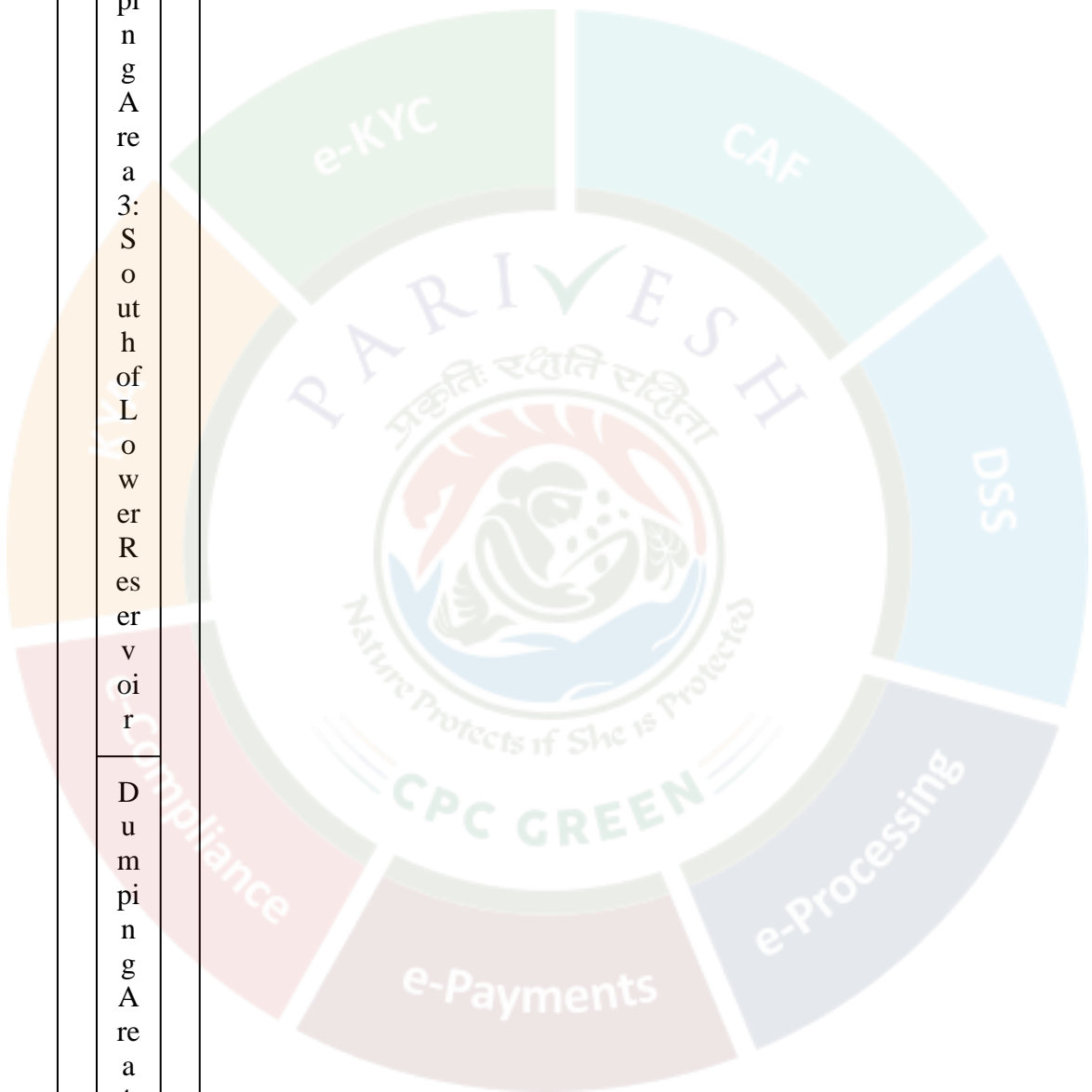
Cross section of proposed muck area, Height of muck with slope.	Enclosed as Annexure		
Distance of muck disposal area (location), from muck generation sources (project area)/River, HFL of proposed muck disposal area		Dumping Area 1: North of Lower Reservoir	
		Dumping Area 2: East of Lower	



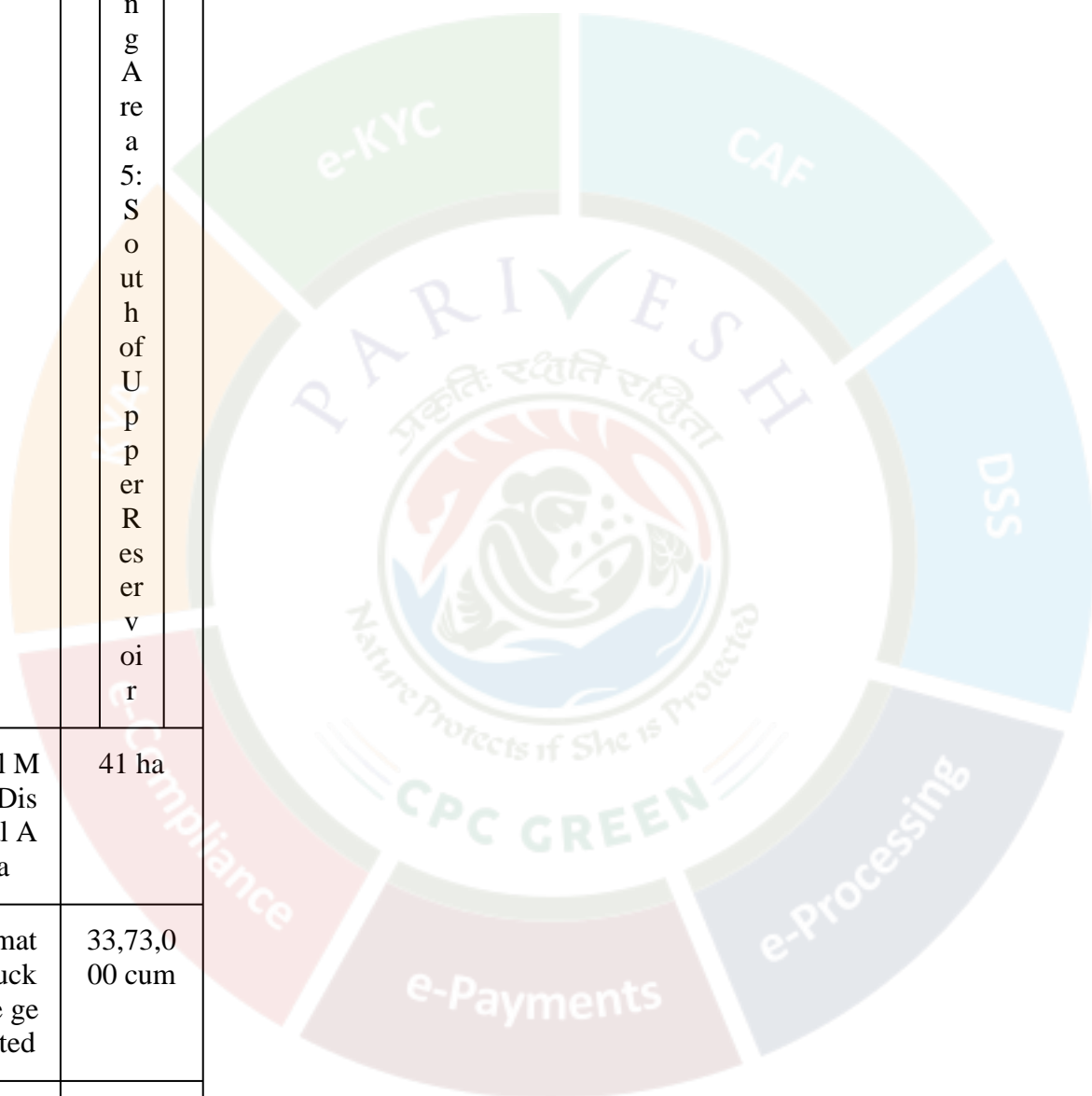
R
e
s
e
r
v
o
i
r

D
u
m
p
i
n
g
A
r
e
a
3:
S
o
u
t
h
o
f
L
o
w
e
r
R
e
s
e
r
v
o
i
r

D
u
m
p
i
n
g
A
r
e
a
4:
S
o
u
t
h
o
f
L
o
w
e
r
R



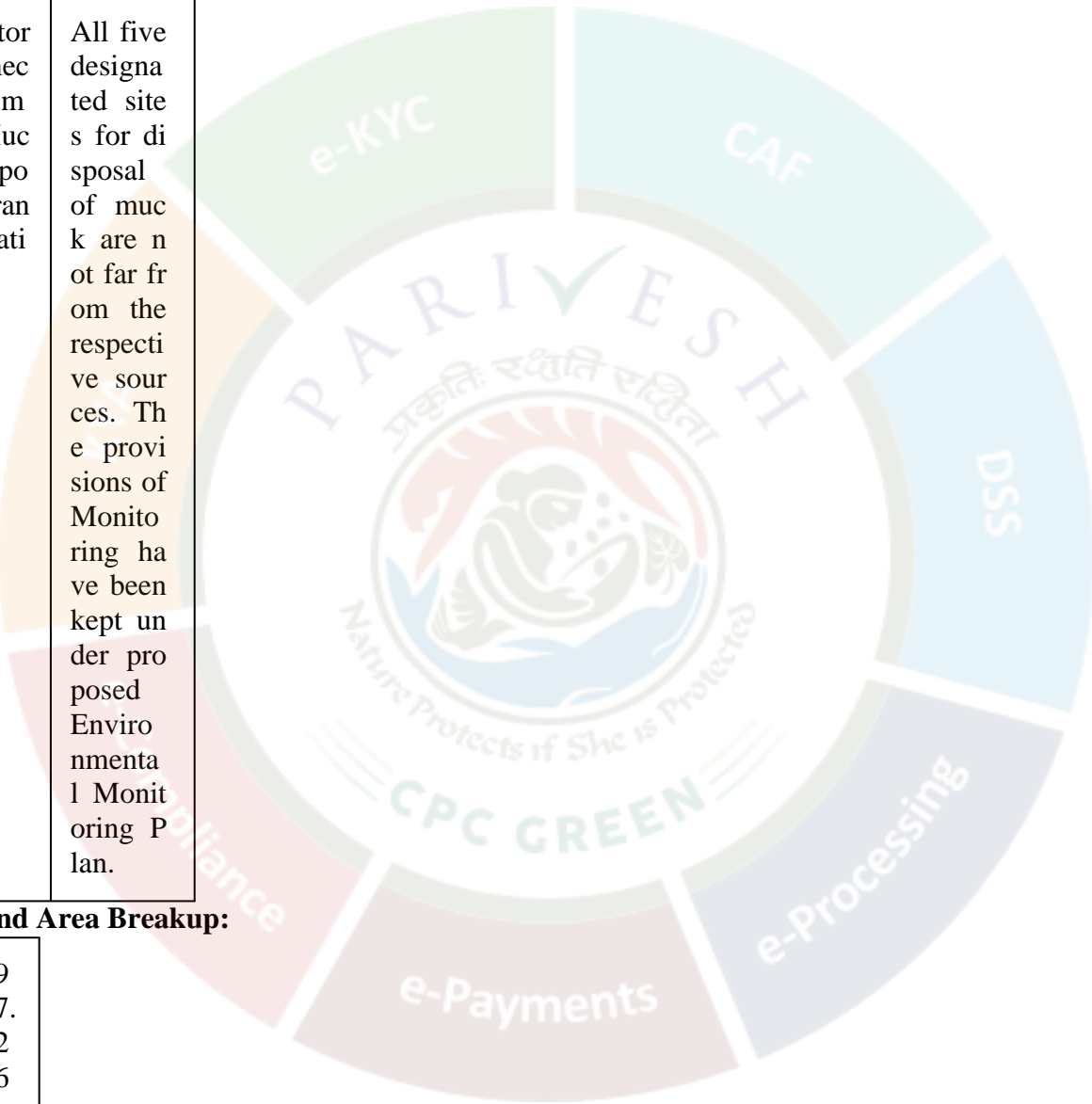
		es er v oi r	
		D u m p i n g A r e a 5: S o u t h o f U p p e r R e s e r v o i r	
Total M uck Dis posal A rea	41 ha		
Estimat e Muck to be ge nerated	33,73,0 00 cum		
Transpo rtation	Generat ed muck will be c arried in dumper trucks c overed with hea vy duty tarpauli		



	n properly tied to the vehicle in accordance with best international practices
Monitoring mechanism for Muck Disposal Transportation	All five designated sites for disposal of muck are not far from the respective sources. The provisions of Monitoring have been kept under proposed Environmental Monitoring Plan.

7. Land Area Breakup:

P	9
r	7.
i	2
v	6
a	h
t	a
e	N
l	o
a	n-
n	F
d	or
	es
	t
	L
	a



and is involved, 93.82% has a land belief on going to Tata Power and 3.44% has a land is private land req



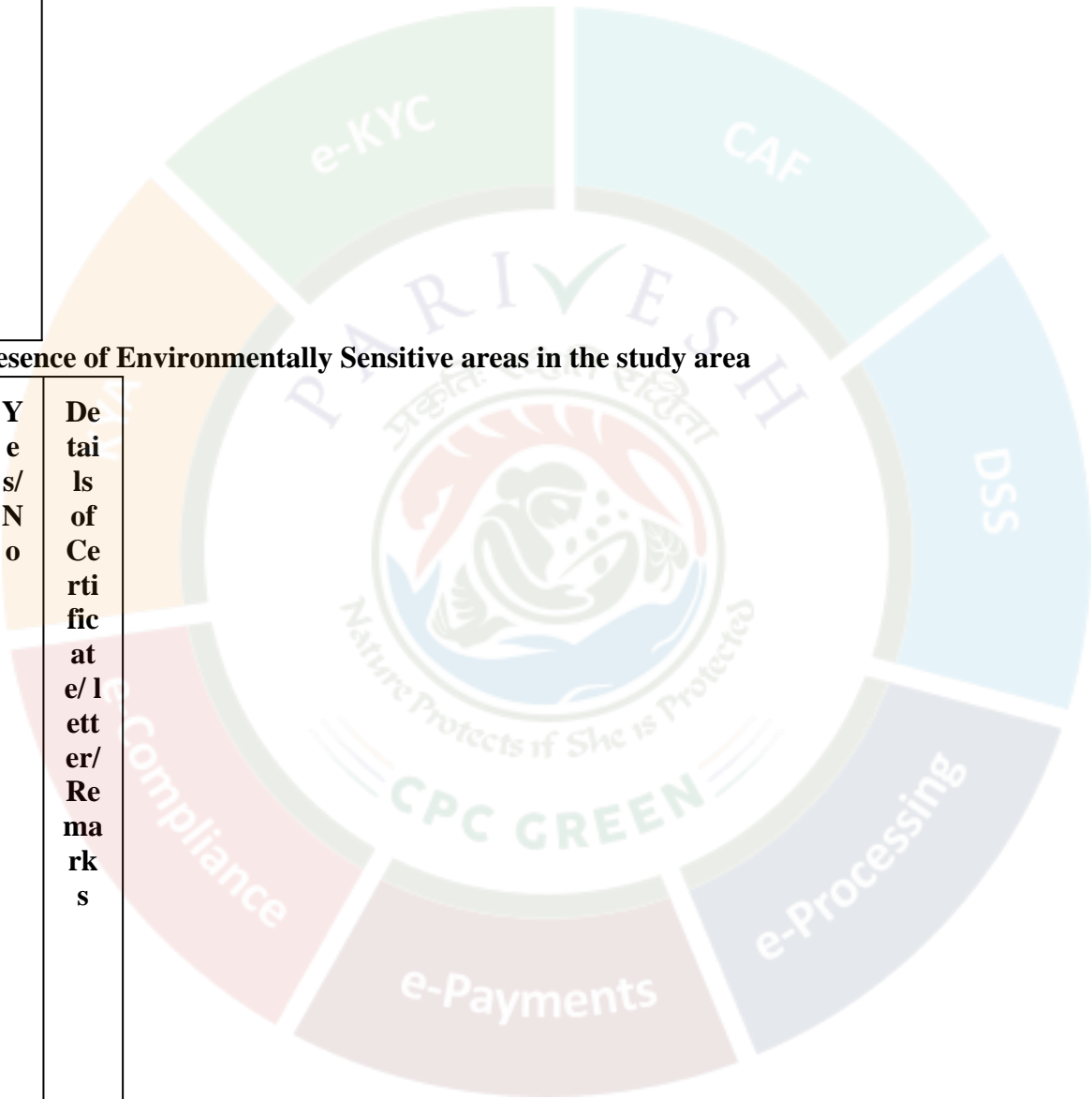
	ui re d fo r R o a d a n d H R T
F o r e s t l a n d	2 0. 1 5 h a
S u b m e r g e n c e a r e a/ r e s e r v o i r a r e a	2 9. 2 4 h a l o w e r r e s e r v o i r
L a n d r e q	1 1 7. 4 1 h



ui re d f o r p r o j e c t c o m p o n e n t s	a
---	---

8. Presence of Environmentally Sensitive areas in the study area

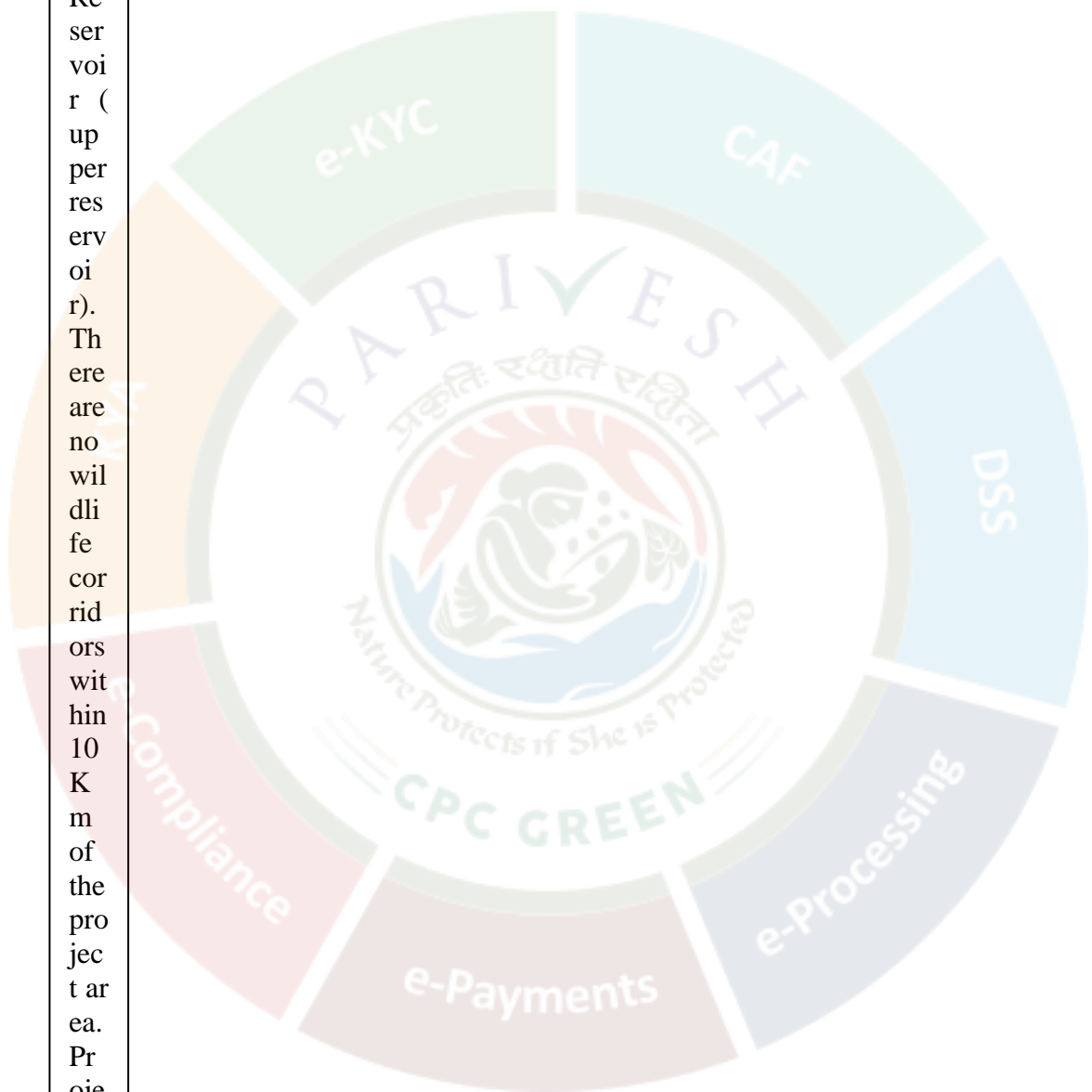
F o r e s t L a n d/ P r o t e c t e d A r e a/ E n v i r o n m e n t a l S e n s i t i	Y e s/ N o	D e t a i l s o f C e r t i f i c a t e /l e t t e r/ R e m a r k s
---	------------------------	---



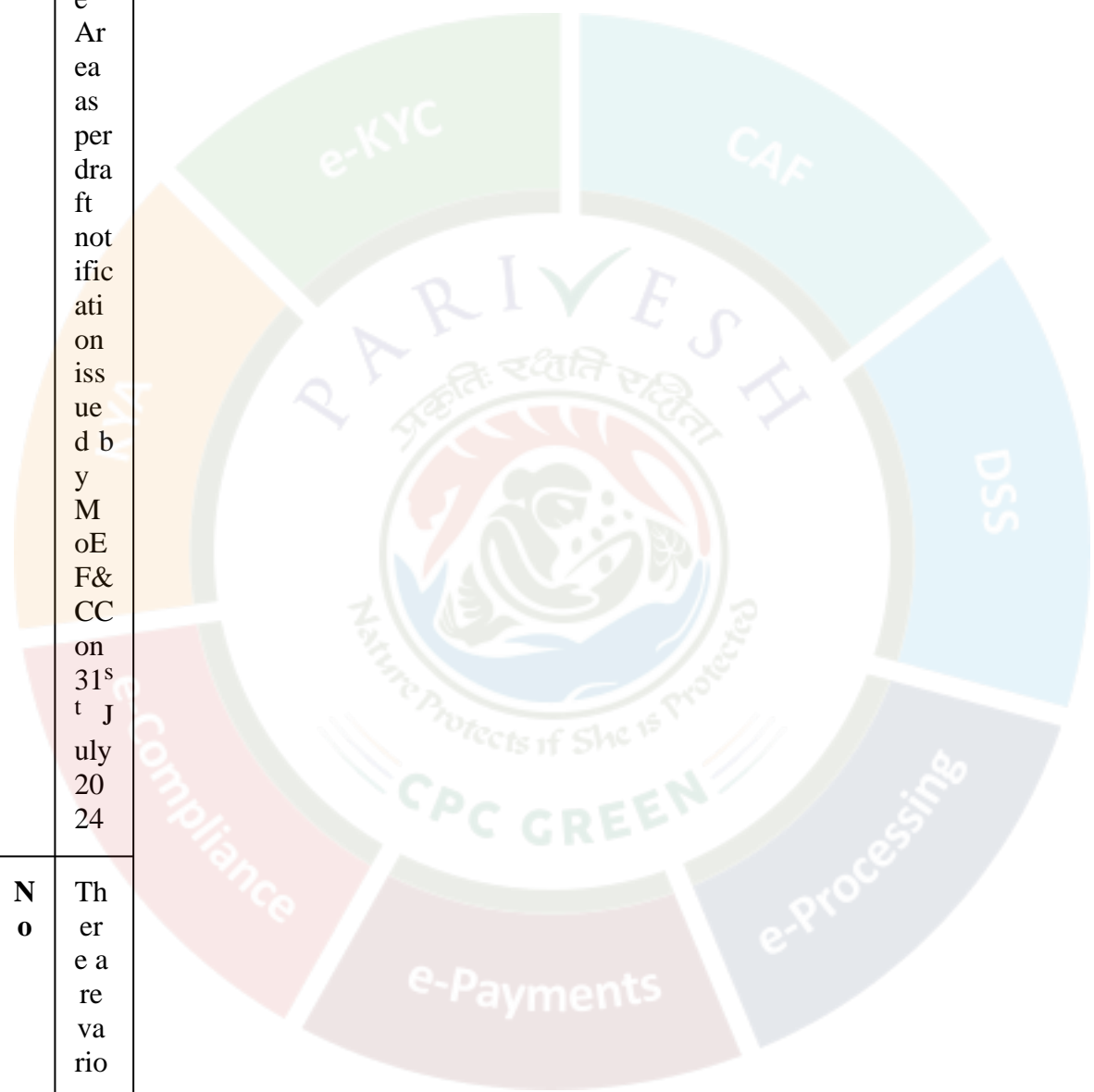
vi ty Z o n e		
R es er ve F or es t/ Pr ot ec te d F or es t L an d	N o	Ne are st Pr ote cte d Ar ea to t he Pr oje ct Co mp on ent s is Bh im
N at io na l P ar k	N o	ash an kar Wi ldli fe Sa nct uar
W il dl if e S an ct ua ry	N o	y wh ich is at a d ist an ce of aro un d 1 0.7 0 k m



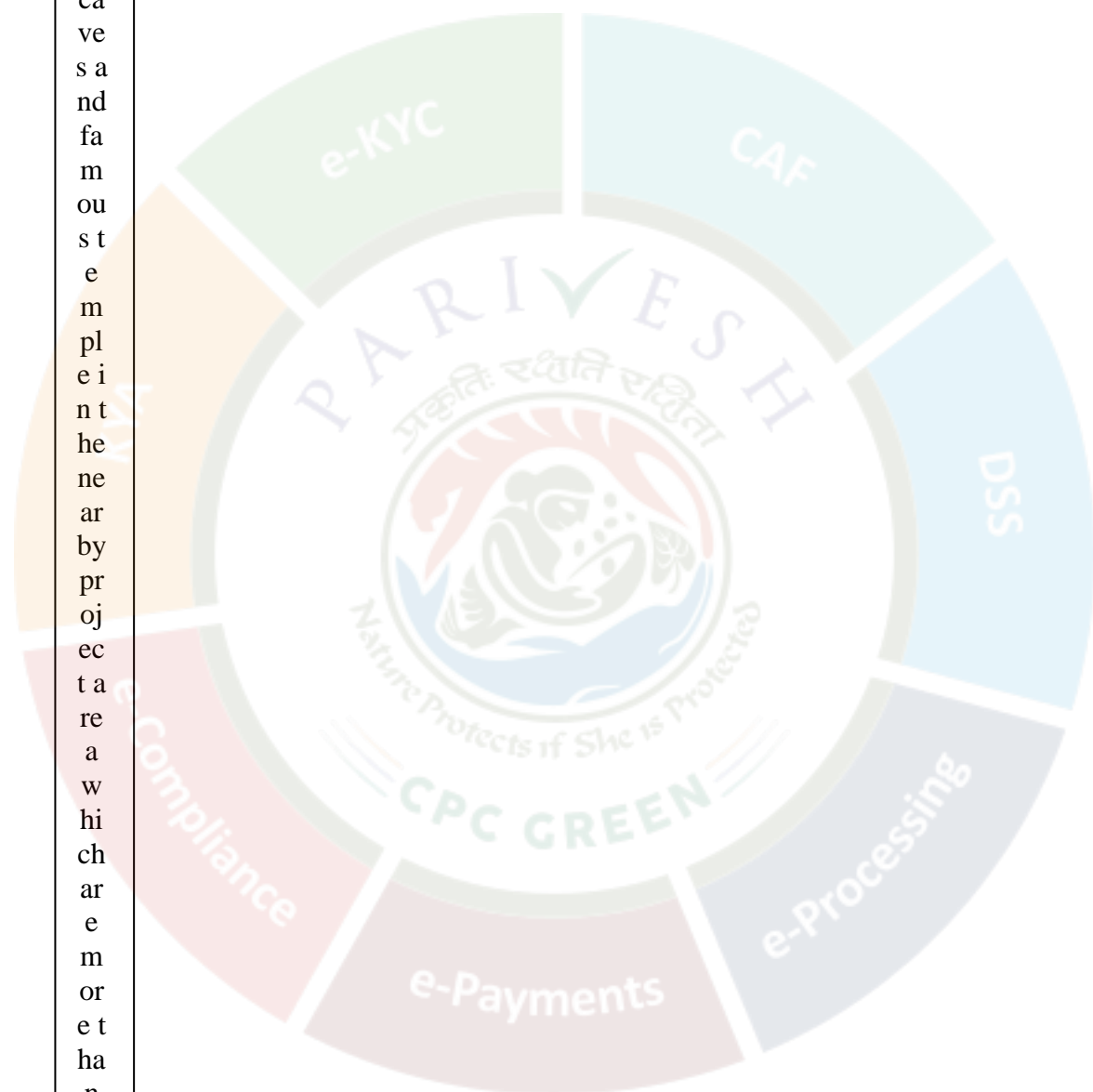
from existing Thokarwadi Reservoir (upper reservoir). There are no wildlife corridors within 10 Km of the project area. Project partly falls within the West



		ern Gh at Ec olo gic all y S ens itiv e Ar ea as per dra ft not ific ati on iss ue d b y M oE F& CC on 31 ^s t J uly 20 24
Ar cha eo lo gi cal sit es mon u ment	No	Th ere are var ious tour ism, rel igi ous, and



s/ hi st or ic al te m pl es et c		hi st ori cal site s such as cave s and famous ste mple in the near by project area which are more than 5 km away from th
--	--	---



		e pr oj ec t c o m po ne nt s
A d di ti o na l i nf or m at io n (if an y)	-	

Conservation Status of Fauna

Among the mammals, 10 species are categorised as schedule I species. Rest of the mammalian species are listed under schedule II category of WPAA, 2022). As per the IUCN Red List of Threatened Species, Version 2023-1, Leopard, Sloth Bear, Sambar Deer, Indian Bison and Bonnet Macaque under Vulnerable (VU) category and Striped Hyaena is listed under Near Threatened (NT) category.

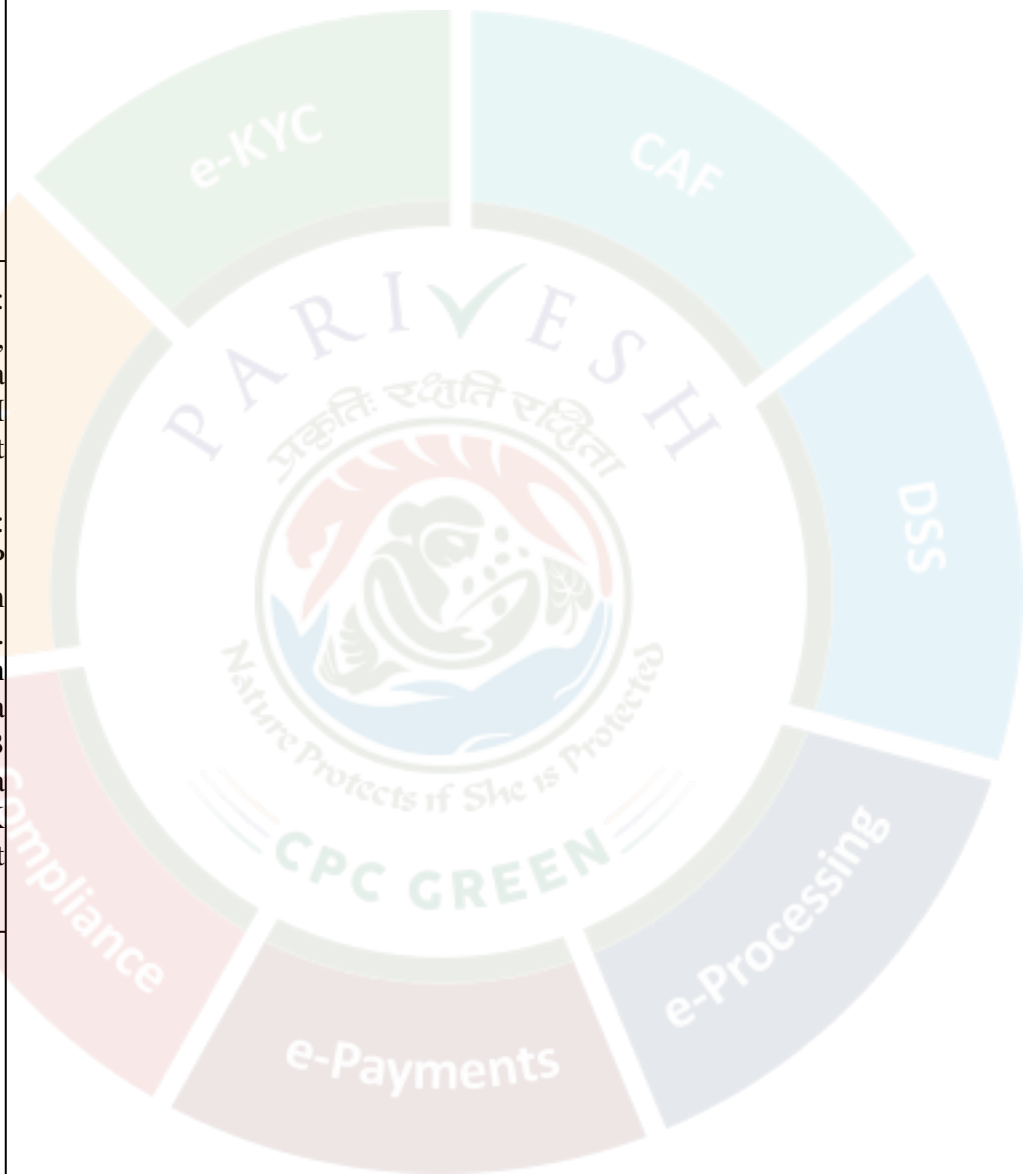
As per the IUCN Red List of Threatened Species version 2023-1, all birds have been listed under Least Concern (LC) category. As per the WPAA 2022, Indian Peafowl (*Pavo cristatus*) is listed as Schedule I species. All other bird species are listed as Schedule II category .

In case of herpetofauna, all species are listed under Least Concern (LC) category as per the IUCN Red List of Threatened Species version 2023-1. As per the WPAA, 2022, Asian Chameleon, Indian rat Snake, Indian Cobra and Russel's Viper are categorised as schedule I species. Among the butterflies, Danaid Eggfly (*Hypolimnas misippus*) is listed under Least Concern (LC) category of IUCN Red List categories (Ver. 2023-1). No species of butterfly is categorised as a schedule species as per the WPAA 2022.

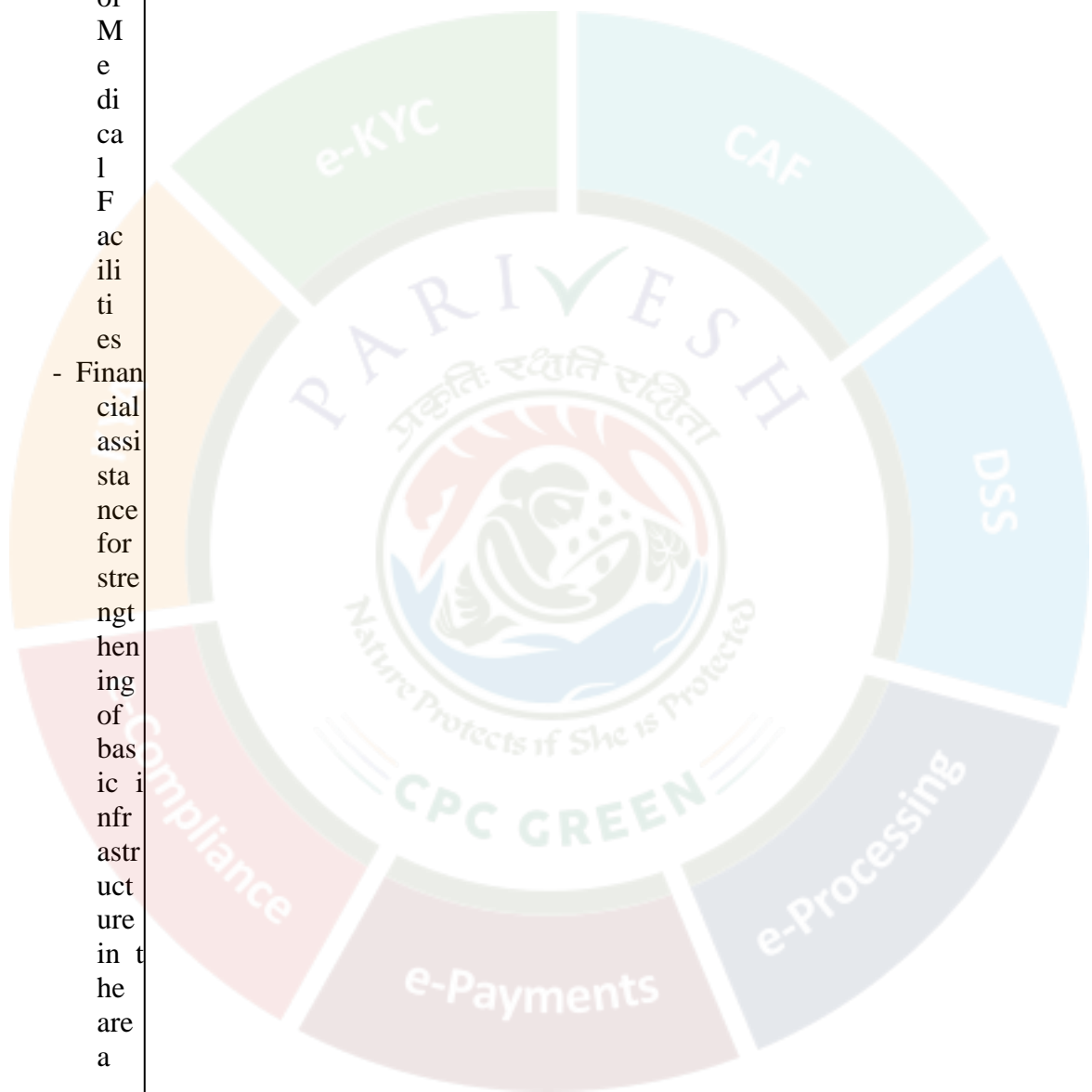
9. Public Hearing (PH) Details

A d v er ti se m e nt	30 days ad vance publ ic notice w as publishe d in the Lo cal Marath i Newspap er Daily Kr ushival an
---	---

for r P H w it h d at e	d Daily Raigad Times and in English newspaper National Newspaper Indian Express.
D at e of P H	5 th April 2024 & 12 th April 2024
V e n u e	5 th April: Tata camp, Mouje khanda, Tal: Maval, Dist Pune 12 th April: The Tata Power Company Ltd. Hydro Generating Station, PO Bhivpuri camp, Tal: Karjat, Dist Raigad
C h a i r e d b y	Additonal District Magistrate, Pune Additonal District Magistrate, Raigad
M a i n i s s u e s	- Provision of Employment



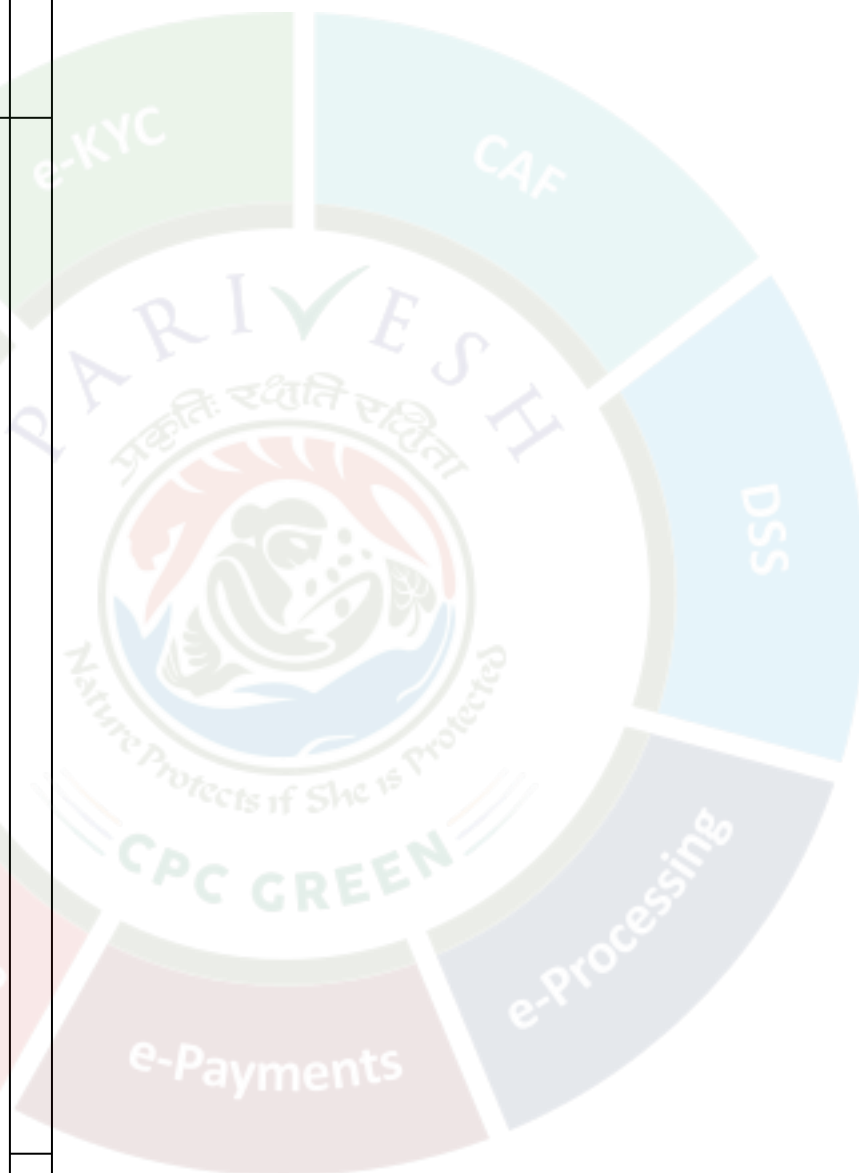
<p>ra is e d d ur in g P H</p>	<p>ent of l oca l Y out h - Prov is io n of M e di ca l F ac ili ti es - Finan cial assi sta nce for stre ngt hen ing of bas ic i nfr astr uct ure in t he are a</p>
<p>N o of p e o pl e at te</p>	<p>Pune (Kh and) – 27 9 Raigad (Bhivpuri) – 323</p>



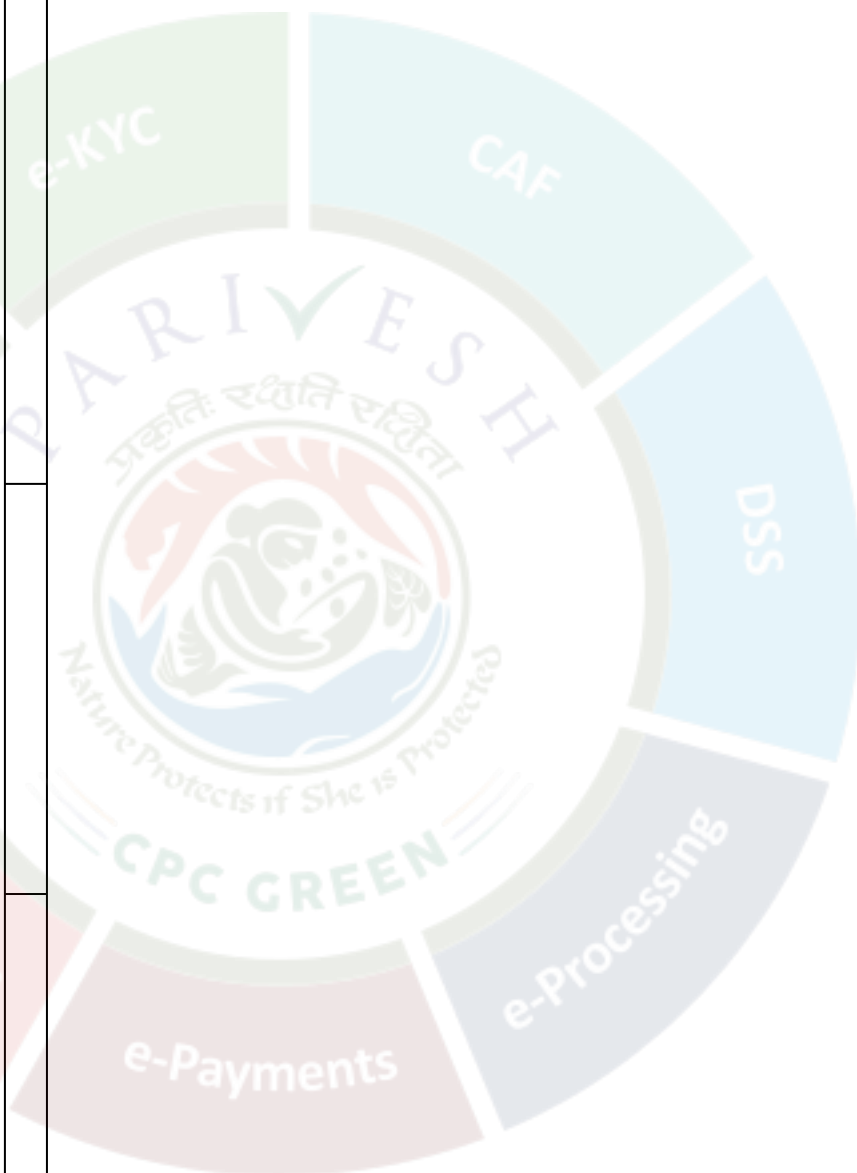
n d e d	
------------------	--

10. Brief of base line Environment:

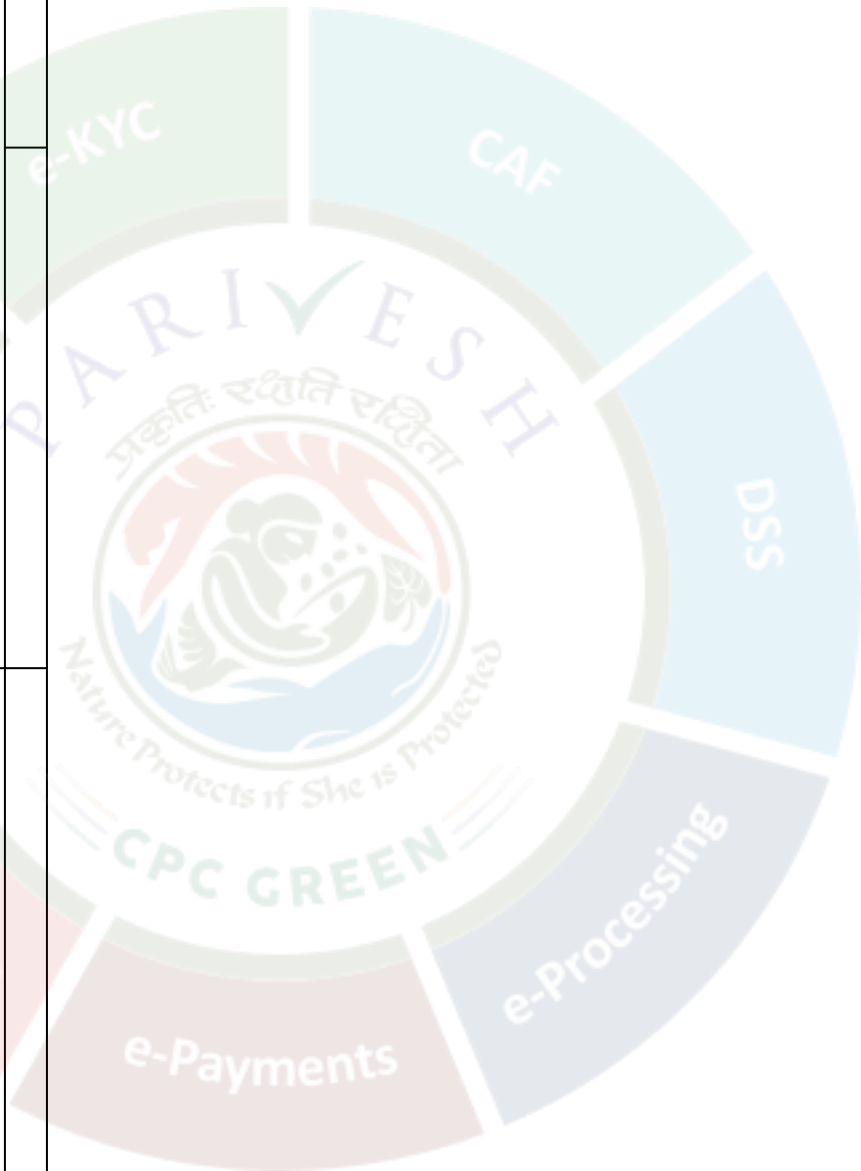
P a r t i c u l a r s	Details				
P e r i o d o f b a s e l i n e d a t a c o l l e c t i o n/ S a m p l i n g p e r i o d.		P r e-M o n i t o r i n g S u m m e r	W i n t e r		
(A i r, n o i s e, w a t e r	S o i l	A p r i l- M a y, 20 23	D e c e m b e r, 20 23		



r, la n d)						
fl or a an d fa u na of th e pr oj ec t ar e a,						
aqu ua ti c ec ol o g y, et c.	A ir E n vi ro n m en t	Ap ril- M ay, 20 23	De ce mb er, 20 23			
	N oi se & Tr af fi c	Ap ril- M ay, 20 23	De ce mb er, 20 23			
	W at er Q ua lit y	Ap ril- M ay, 20 23	De ce mb er, 20 23			



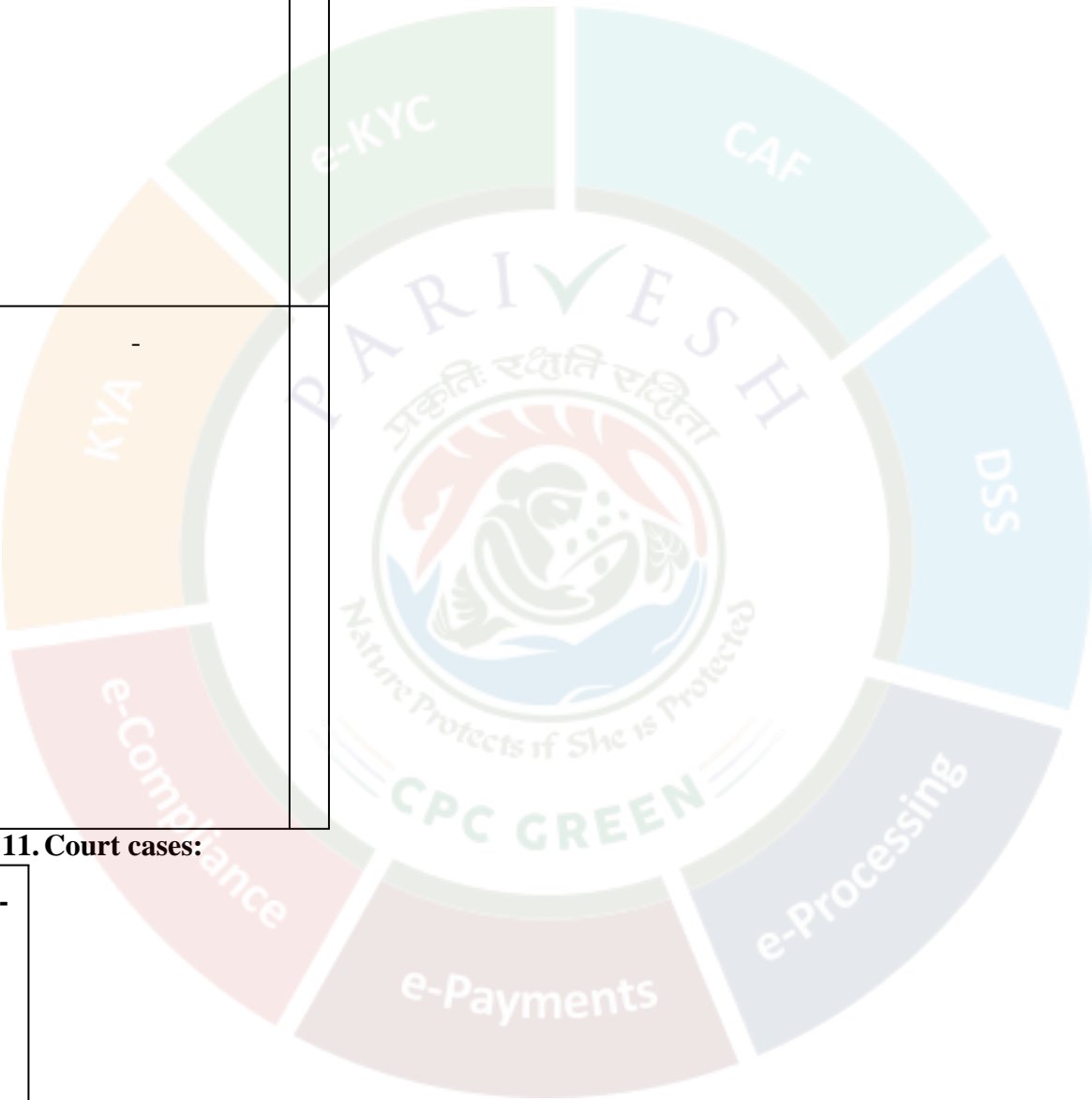
		V eg et at io n	Ap ril- M ay, 20 23	De ce mb er, 20 23		
		F au na su rv ey s	Ap ril- M ay, 20 23	De ce mb er, 20 23		
		S oc i o- ec o n o m ic su rv ey	Decemb er, 2023			
B ri ef de sc ri pt io n o n h y dr ol o g y an d w at er as	Approximately 4.5 MCM will suffice to meet generation of 1,000 MW for 6.02 hours. The storage capacity of existing upper Thokarwadi reservoir is 352.52 MC M and of planned lower reservoir is 4.54 MCM. Annual losses due to the evaporation from the lower reservoir work out to 0.43 MCM. It will be recouped periodically from Upper Reservoir.					



se ss m en t as pe r t he ap pr o ve d Pr e- D P R:		
A d di ti o na l de ta il (I f an y)	-	

11. Court cases:

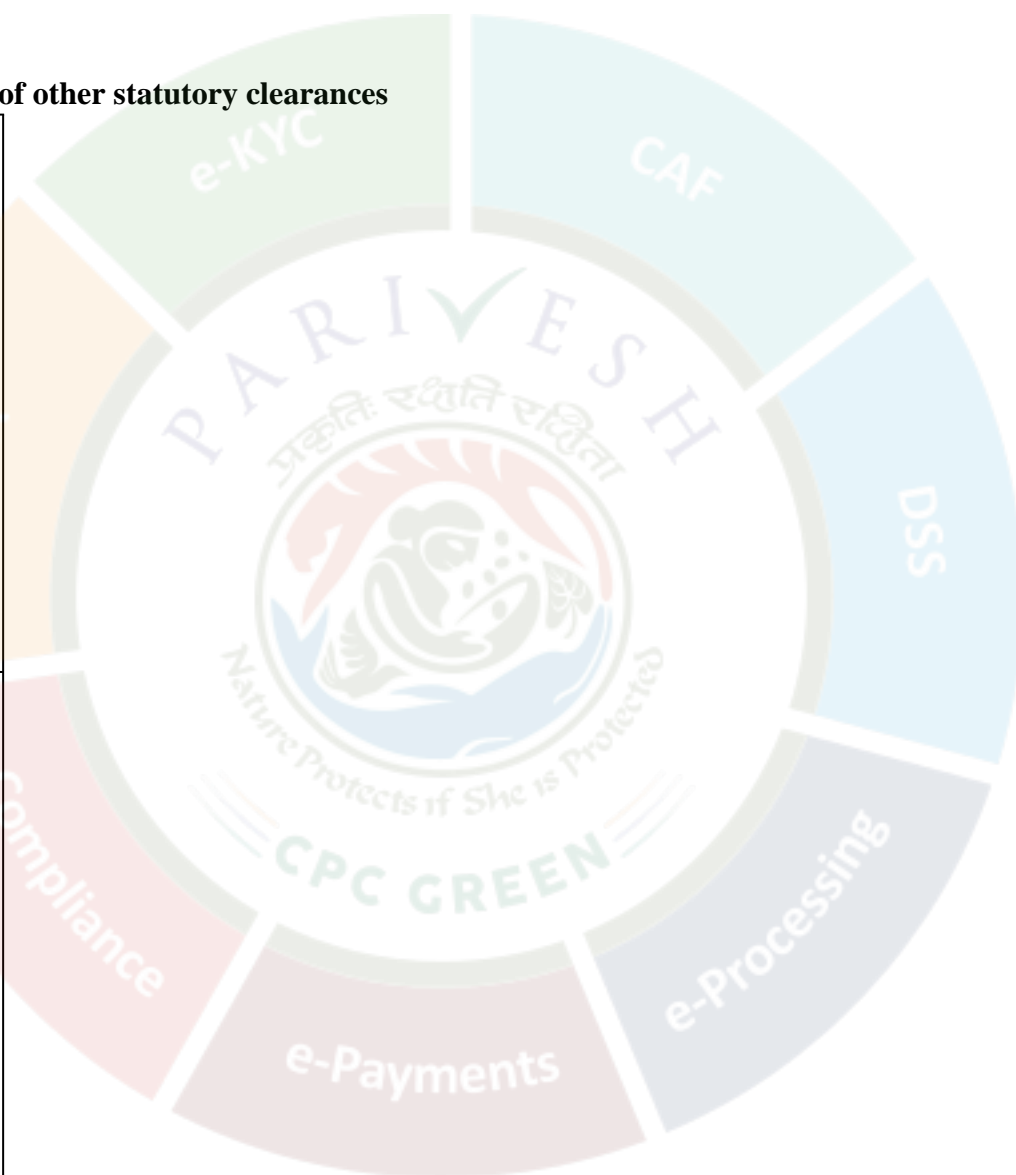
C o u r t C a s e	-
A d d i t i o n a l i	-



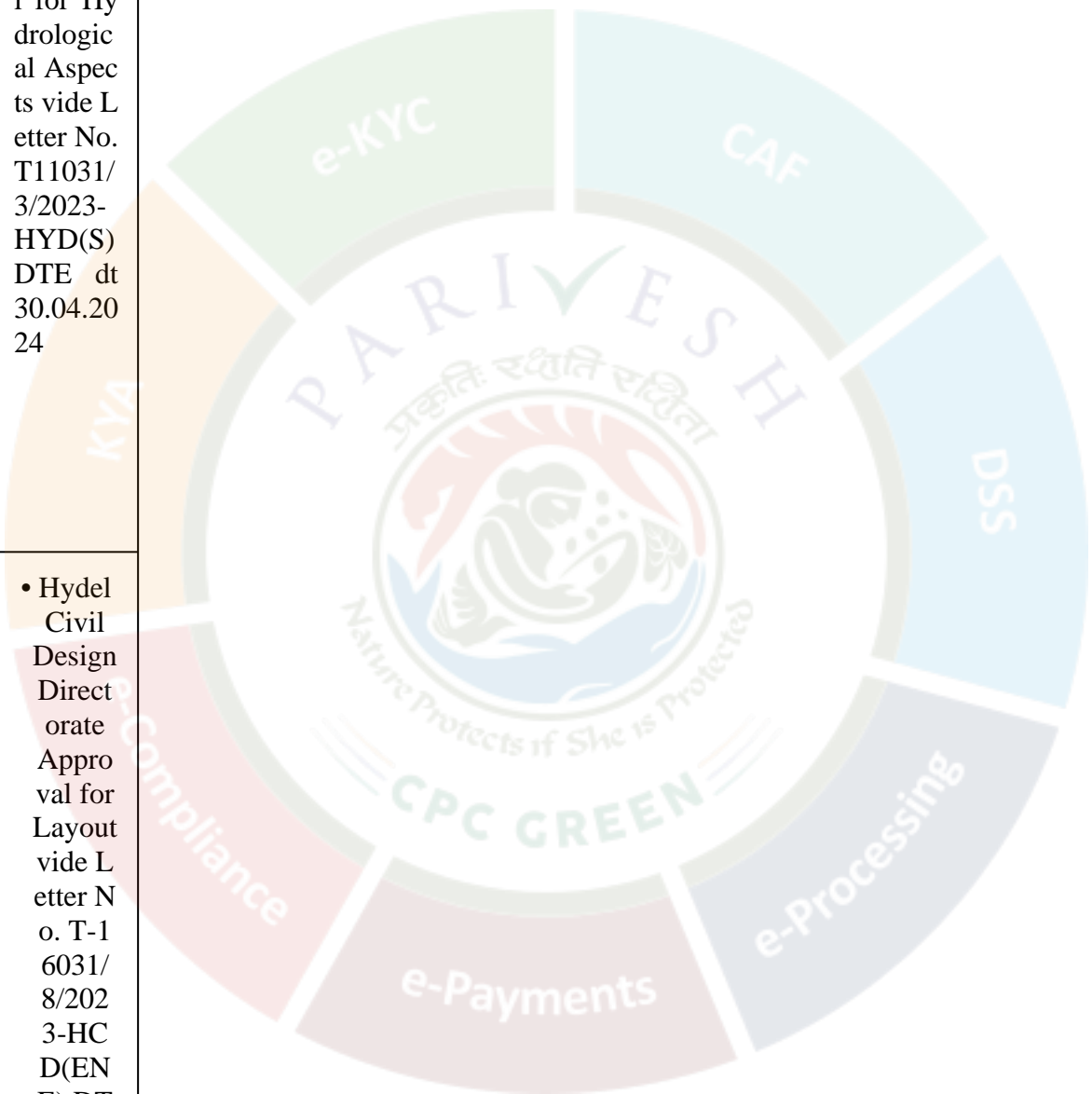
n
fo
r
m
a
t
i
o
n
(i
f
a
n
y)

12. Status of other statutory clearances

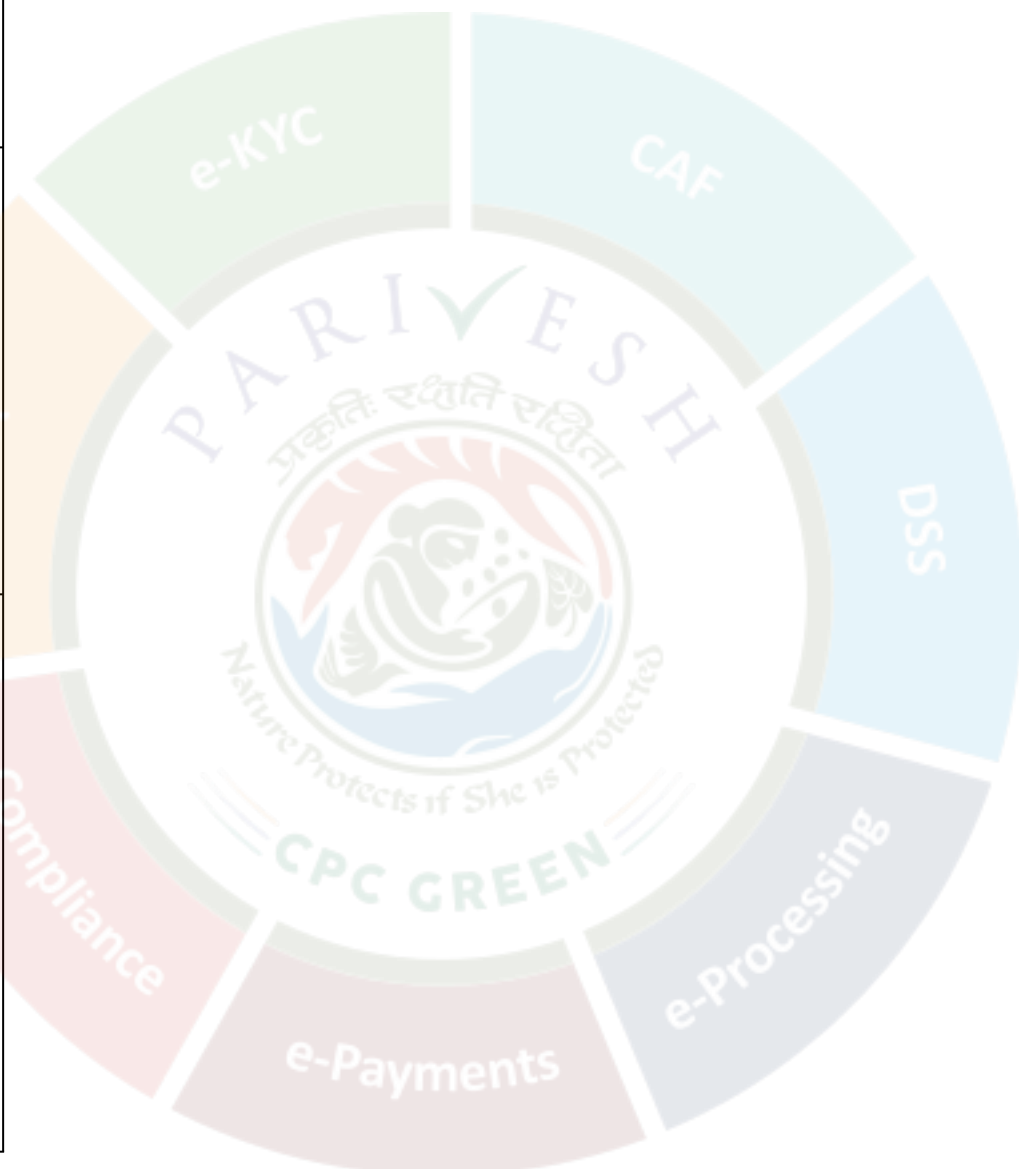
P a r t i c u l a r s	L e t t e r n o. a n d d a t e
St a t u s o f S t a g e- I F C	Applicati on No. FP/MH/ HYD/IR RIG/447 097/202 3 for For est Clear ance don e in Pari vesh on 17/10/23 Nodal Of ficer Nag pur reco mmende d the pro posal in PSC-II meeting held on 0 9.08.202 4. Forma l commu



	<p>nication to State Forest Secretary awaited.</p>
<p>Approval of Central Water Commission</p>	<ul style="list-style-type: none"> Hydrology Directorate Approval for Hydrological Aspects vide Letter No. T11031/3/2023-HYD(S) DTE dt 30.04.2024
	<ul style="list-style-type: none"> Hydel Civil Design Directorate Approval for Layout vide Letter No. T-16031/8/2023-HCD(EN E) DTE dt 25.06.2024
<p>Approval of</p>	<p>Hydro Project Appraisal Division Approval for Power</p>



C en tr al El ec tri city A ut ho rit y	Potential Studies v ide Lette r No.- C EA-HY- 12-12/7/ 2023-HP A dt 20.0 3.2024
A dd iti on al de tai l (If any)	Final DP R submit ted to C EA and under ap proval.
Is F R A (2 00 6) do ne fo r F C- I	FRA Let ter No. R B/LND/ A03/VA NHAKK A/18598 30/06/20 24 issued by Raiga d District Collector ate on 2 8.05.202 4.



3.2.3. Deliberations by the committee in previous meetings

N/A

3.2.4. Deliberations by the EAC in current meetings

14.7.3 The EAC during deliberations noted the following:

- The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of Environmental Clearance to the project for Bhivpuri Open Loop Pumped

Storage Project (1000 MW) in an area of 117.41Ha in Village Sawale, Khand and Bhivpuri (camp), Sub District Mawal and Karjat, District Pune and Raigarh, Maharashtra by M/s The Tata Power Co. Ltd.

- The project is listed at S.N.1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).
- The EAC, constituted under the provision of the EIA Notification, 2006 comprising Expert Members/domain experts in various fields, examined the proposal submitted by the Project Proponent in desired format along with EIA/EMP reports prepared and submitted by the Consultant accredited by the QCI/ NABET on behalf of the Project Proponent.
- The EAC noted that the Project Proponent has given an undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP reports. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.
- The Committee noted that the EIA reports are in compliance of the ToR issued for the project, reflecting the present environmental status and the projected scenario for all the environmental components. The Committee deliberated on the proposed mitigation measure towards Air, Water, Noise and Soil pollutions. The Committee suggested that the storage of toxic/explosive raw materials/products shall be undertaken with utmost precautions and following the safety norms and best practices.
- The Terms of References (ToRs) has been issued by Ministry vide letter No. J-12011/39/2023-IA.I (R); dated 23.09.2023. The EAC noted that the total land requirement for Bhivpuri Pumped Storage Project works out to approximately 117.41 ha of which 20.15 ha is forest land while 97.26 ha is non-forest land. Out of 97.26 ha Non-Forest Land, 93.82 ha land belongs to Tata Power and 3.44 ha land is private land required for Road and HRT. Further, it is noted that an application No. FP/MH/HYD/IRRIG/447097/2023 for Forest Clearance done on Parivesh on 17/10/23 and Nodal Officer Nagpur recommended the proposal in PSC-II meeting held on 09.08.2024. The estimated project cost is Rs 4743.59 crore. Total capital cost earmarked towards Environment Management Plan/environmental pollution control measures is Rs. 7995.62 lakh and the Recurring cost (operation and maintenance) will be about Rs. 2819.91 lakh about i.e. Rs 633.85 lakh per annum.
- EAC reviewed and discussed the plan in detail and observed that Implementation mechanism has not been covered. Implementation of watershed development plans involves a collaborative effort among various stakeholders with primary responsibility with Watershed Development Department which is specifically tasked with the management of watershed projects across Maharashtra, ensuring sustainable development and resource management.
- EAC recommended that Watershed Development Plan should be implemented by project proponent by involving Zilla Parishads and Panchayati Raj Institutions (PRIs), local government bodies at the district and village levels which are crucial in implementing and monitoring watershed projects with the help of self-help groups (SHGs) and local communities to ensure participation and sustainability.
- EAC also recommended inclusion of regular audits and reviews by a third party in the implementation mechanism to ensure compliance with objectives and to identify areas for improvement.

The EAC reviewed and deliberated on the issues raised during the Public Hearing (PH) and evaluated the action plan submitted by the Project Proponent to address these concerns. The Committee found the action plan satisfactory and advised the Project Proponent to implement it in a time-bound manner. Given the presence of a tribal population in the study area, the EAC emphasized the need to establish Skill Development Centres for the local community and to promote local tribal products through proper marketing, with the Project Proponent overseeing these efforts.

3.2.5. Recommendation of EAC

Recommended

3.2.6. Details of Environment Conditions

3.2.6.1. Specific

Disaster Management	
1.	Disposal of the excavated muck and its filling on the low-lying area with proper measures for the stabilization and greenery to minimize the impacts of the generated construction muck shall be taken up pari passu with construction work.
2.	Stabilization of muck disposal sites using biological and engineering measures shall be taken up immediately to ensure that muck does not roll down the slopes and does not pollute the natural streams and water bodies in surrounding area. The plantation on muck disposal site with local species for restoration of ecology and environment of the project site area.
3.	Necessary control measures such as water sprinkling arrangements, and construction of paved roads leading to muck disposal sites etc. shall be taken up on priority to arrest fugitive dust at all the construction sites.
4.	Solid waste generated, especially plastic waste, etc. should not be disposed of as landfill material. It should be treated with scientific approach and recycled. Use of single-use plastics may be discouraged.
5.	Muck disposal sites be decided in view of provisions of the Western Ghats Notification dated 06.07.2022.
Socio-economic	
1.	Land acquired for the project shall be suitably compensated in accordance with the prevailing guidelines of the state government and provisions under Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
2.	RO plant shall be installed in the nearby 5 villages and the maintenance shall be done by the project Authorities.
3.	Solar panel be provided to the families living in rural areas within 10 km radius of project.
4.	School up to 12 th Standard, equipped with solar power and smart classes, shall be established to provide quality education for free education to childrens from project affected villages/Tribal villages.
5.	The compliance of above conditions shall be monitored by IRO, MoEF&CC and regularly site visit once in year. The compliance report of IRO shall be regularly submitted to MoEF&CC.
6.	50 bed multi-speciality hospital shall be established to cater the need of tribal population/locals. The tribal population within 10 km radius of the project shall be given free of cost medical facility.
7.	Skill development Centre shall be established within 10 km radius of the project and regular training programmes for development and promotion of traditional art/products of tribal/local population.
8.	The area is ecologically fragile therefore Project Proponent shall ensure that safety measures as mentioned in the EMP shall be fully implemented.

Miscellaneous:	
1.	After 5 years of the commissioning of the project, a study shall be undertaken regarding impact of the project on the environment. The study shall be undertaken by an independent agency.
2.	Bio-Gas plant shall be installed in the Project affected area for Utilizing Cattle waste (Cow Dung) into renewable source of fuel.
3.	PP should establish in house (at project site) environment laboratory for measurement of environment parameter with respect to air quality and water (surface and ground). A dedicated team to oversee environment management shall be setup which should comprise of Environment Engineers, Laboratory chemist and staff for monitoring of air, water quality parameters on routine basis.
4.	PP shall procure construction material only from those Organizations having all valid legal/statutory clearances/permissions or necessary permission to be obtained for quarrying construction materials for the project as per the EIA Notification, 2006 and as amended thereof.
5.	An institutional mechanism to be developed to ensure the preference of jobs to PAFs and also a policy for preferential treatment for award of sundry works to the PAFs and their dependents.
Environmental management and Biodiversity conservation	
1.	The water of rainfall yield of self-catchment of the reservoir shall be released to downstream through body of dam/ barrage/ embankment etc.
2.	The water for filling of reservoir/ recoupment of evaporation and recirculation losses shall be met from a source other than the rainfall yield of catchment of non-perennial stream/ nallah.
3.	The Environmental Management Plan (EMP) shall be strictly adhered to as submitted in the EIA/EMP reports. The budgetary provisions for implementation of EMP, shall be fully utilized and not to be diverted to any other purpose. In case of revision of the project cost or due to price level change, the cost of EMP shall also be updated proportionately.
4.	The contract clause limiting the No. of vehicles used during excavation and transportation shall followed scrupulously and the same shall informed to the ministry.
5.	Ambient Air Quality Monitoring Stations for real time data to be installed at project site before commencement of the construction, shall be displayed at project site and its report to be submitted to IRO, MoEF&CC.
6.	No vehicle purchase shall be allowed from funds earmarked for implementation of Wildlife Conservation plan. Measures for minimizing the human–animal conflict specially for black bear and leopard be suitably incorporated in the wildlife conservation plan in consultation with State Forest Department.
7.	10000 plants shall be planted around the muck disposal area and the survival of plants shall be submitted with the 6 monthly compliance report.
8.	Watershed development plan prepared in consultation with ICAR/Expert Govt. institute be implemented within 10 km radius of the project. Implementation status be submitted in the 6 monthly compliance report to the concerned regional office of the Ministry.
9.	Miyavaki Forest shall be developed within 10 km radius of the project.

10.	Safeguard conditions mentioned in the Western Ghats Notification S.O. 3072(E) dated 06.07.2022 be complied with.
11.	Community radio shall be established.
12.	Stage-I Forest Clearance be obtained before grant of prior Environmental Clearance.
13.	Relocation of trees will be attempted strictly in consultation with Forest Department.

3.2.6.2. Standard

1(c)	River Valley/Irrigation projects
Statutory compliance	
1.	The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.
2.	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.
3.	The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report. (in case of the presence of Schedule-I species in the study area).
4.	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee.
5.	NOC shall be obtained from National Commission of Seismic Design Parameters (NCSDS) of CWC.
6.	Necessary approval of CEA shall be obtained for those projects having the project cost more than Rs. 1,000 crores.
Air quality monitoring and preservation	
1.	Regular monitoring of various environmental parameters viz., Water Quality, Ambient Air Quality and Noise levels as per the CPCB guidelines at designated locations shall be carried out on monthly basis and a detailed database of the same shall be prepared and recorded. This shall be used as a baseline data for post construction EIA / Monitoring purposes.
2.	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed standards.
3.	Necessary control measures such as water sprinkling arrangements, etc. be taken up to arrest fugitive dust at all the construction sites.
4.	Conjunctive use of surface water to be planned in the project to check water logging as well as to increase crops productivity. The field drains shall be connected with natural drainage system (if applicable).
5.	Remodelling of existing natural drains (link drains) and connecting them with irrigated land through constructed

	field drains, collector drains, etc. are to be ensured on priority basis (if applicable).
6.	Before impounding of the water, Cofferdams for both at the upstream and downstream are to be decommissioned as per EIA/EMP report so that once the project is commissioned; cofferdam should not create any adverse impact on water environment including the rock mass and muck used for the Cofferdam.
7.	As the reservoir will be acting as balancing reservoir and there would be fluctuation of water level during peaking period, efforts be made to reduce impact on aquatic life including impacts during spawning period both at the upstream and downstream of the project.
8.	Water depth sensors shall be installed at suitable locations to monitor e-flow. Hourly data to be collected and converted to discharge data. The Gauge and Discharge data in the form of Excel Sheet be submitted to the Regional Office, MoEF & CC and to the CWC on weekly basis.
9.	Mixed irrigation shall be practised and necessary awareness be given to all the farmers and trained in the use of such systems. Proper crops selection shall be carried out for making irrigation facility more effective (if applicable).
10.	On Farm Development (OFD) works like landscaping, land levelling, drainage facilities, field irrigation channels and farm roads, etc. should be taken up in phased manner prior to the start of irrigation in the entire command area. The Command Area Development Plan should be strictly implemented as proposed in the EIA/EMP report (if applicable).
Noise monitoring and prevention	
1.	All the equipment likely to generate high noise shall be appropriately enclosed or inbuilt noise enclosures be provided so as to meet the ambient noise standards as notified under the Noise Pollution (Regulation and Control) Rules, 2000, as amended in 2010 under the Environment Protection Act (EPA), 1986.
2.	The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time.
Catchment Area Treatment Plan	
1.	Catchment Area Treatment (CAT) Plan as proposed in the EIA/EMP report shall be implemented in consultation with the State Forest Department and shall be implemented in synchronization with the construction of the project.
Waste management	
1.	Muck disposal be carried out only in the approved and earmarked sites. The dumping sites shall be located sufficiently away from the HFL of the river. Efforts be made to reuse the muck for construction and other filling purposes and balanced be disposed of at the designated disposal sites. Once the muck disposal sites are inactive, proper treatment measures like both engineering and biological measures be carried out so that sites are stabilized quickly.
2.	Solid waste management should be planned in details. Land filling of plastic waste shall be avoided and instead be used for various purposes as envisaged in the EIA/EMP reports. Efforts be made to avoid one time use of plastics.
Green Belt and Wildlife Management	
1.	Based on the recommendation of Cumulative Impact Assessment and Carrying capacity study of river basin or as per the ToR conditions or minimum 15% of the average flow of four consecutive leanest months, whichever value is higher, shall be released as environmental flow.
2.	Detailed information on species composition particular to fish species from previous study/literature be inventoried and proper management plan shall be prepared for insitu conservation in the streams, tributaries of

	river and the main river itself for which adequate budget provision be made and followed strictly.
3.	Wildlife Conservation Plan approved by the Chief Wildlife Warden shall be implemented in consultation with the local State Forest Department.
4.	To enrich the habitat of the project site, plantation shall be raised as envisaged in the EIA/EMP report. Plantation to be developed along the periphery of the reservoir in multi-layers with local indigenous species in consultation with the local State Forest Department.
5.	Compensatory afforestation programme shall be implemented as per the plan approved.
6.	Fish ladder/pass as envisaged in the EIA/EMP report shall be provided for migration of fishes. Regular monitoring of this facility be carried out to ensure its effectiveness.
Public hearing and Human health issues	
1.	Resettlement & Rehabilitation plan be implemented in consultation with the State Govt. as approved by the State Govt.
2.	Budget provisions made for the community and social development plan including community welfare schemes shall be implemented in toto.
3.	Preventive measures viz. fumig and spraying of mosquito control shall be done in and around the labour colonies, affected villages, stagnated pools, etc. Provisions be made to not to create any stagnated pools to avoid creation of breeding grounds of the vector borne diseases.
4.	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.
5.	Labour force to be engaged for construction works shall be examined thoroughly and adequately treated before issuing them work permit. Medical facilities shall be provided at the construction sites.
Risk Mitigation and Disaster Management	
1.	Early Warning Telemetric system shall be installed in the upper catchment area of the project for advance intimation of flood forecast.
2.	Drilling and blasting shall be done only either by licensed explosive agent or by the proponent after obtaining required approvals from Competent Authorities.
3.	Emergency preparedness plan be made for any eventuality of the dam failure and shall be implemented as per the Disaster Management Plan.
4.	Stabilization of muck disposal sites using biological and engineering measures shall be taken up to ensure that muck does not roll down the slopes and shall be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area. The engineering measures for the muck disposal arrangements be evolved after carrying out required slope stability analysis.
5.	Catchment area treatment plan shall be prepared and sufficient fund shall be provided for afforestation, rim plantation, pasture development, nursery development.
Corporate Environment Responsibility	
1.	The project proponent shall comply with the provisions contained in this Ministry's OM vide F.No. 22-65/2017-IA.III dated 30th September, 2020, as applicable, regarding Corporate Environment Responsibility.

2.	Skill mapping be undertaken for the youths of the affected project area and based on the skill mapping, necessary trainings to the youths be provided for their long time livelihood generation
3.	The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest / wildlife norms/ conditions. The company shall have defined system of reporting infringements / deviation/violation of the environmental / forest / wildlife norms/conditions and / or shareholders/ stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.
4.	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.
5.	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six Monthly Compliance Report.
6.	Post EIA and SIA be prepared for the project through a third party and evaluation report be submitted to the Ministry after five years of commissioning of the project.
7.	Multi Disciplinary Committee (MDC) be constituted with experts from Ecology, Forestry, Wildlife, Sociology, Soil Conservation, Fisheries, NGO, etc. to oversee implementation of various environmental safeguards proposed in EIA/EMP report during construction of the project. The monitoring report the Committee shall be uploaded in the website of the Company.
8.	Formation of Water User Association/Co-operative be made involment of the whole community be ensured for discipline use of available water for irrigation purposes
Miscellaneous	
1.	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.
2.	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.
3.	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.
4.	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.
5.	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.
6.	The project proponent shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.
7.	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.

8.	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.
9.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).
10.	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.
11.	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.
12.	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.
13.	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.
14.	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.
15.	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

3.3. Agenda Item No 3:

3.3.1. Details of the proposal

Dangari Pumped Storage Hydro-electric Project (1400 MW) by CHHATTISGARH STATE POWER GENERATION COMPANY LIMITED located at JASHPUR, CHHATTISGARH			
Proposal For		Fresh ToR	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/CG/RIV/490945/2024	J-12011/25/2024-IA-I(R)	06/08/2024	River Valley/Irrigation projects (1(c))

3.3.2. Project Salient Features

<p>14.8.1: The proposal is for grant of Terms of References (ToR) to Dangari Pumped Storage Hydro-electric Project (1400 MW) in an area of 499 ha in village Dangari, Madia and Rajpuri R F, Sub District Bagicha, District Jashpur, Chhattisgarh by M/s Chhattisgarh State Power Generation Company Limited.</p> <p>14.8.2: The Project Proponent and the accredited Consultant M/s WAPCOS Limited, made a detailed presentation on the salient features of the project and informed that:</p> <p>i. The proposal is for ToR to the project for Dangari Pumped Storage Hydro-electric Project (1400 MW) in an area of 499 ha in village Dangari, Madia and Rajpuri R F, Sub District Bagicha, District Jashpur, Chhattisgarh by M/s Chhattisgarh State Power Generation Company Limited.</p>

- ii. The proposed Dangari Pumped Storage Project is located in Dangari/Nawapara village of Jashpur district of Chhattisgarh, India. The upper reservoir falls in 23°10'56.40"N and 83°36'53.46"E and Lower Reservoir falls in 23°11'10"N and 83°35' 0.89" E respectively. It is located 115 KM towards North West direction from District headquarters Jashpur Nagar.
- iii. The proposed Upper and Lower reservoir are accessible through kachcha road at 23 km and 16 km from SH-12 respectively. Both the Dams falls under revenue/ cultivated land and as per preliminary information less habitation is observed.
- iv. The Dangari Pumped Storage Hydro-electric Project (1400 MW) envisages construction of Upper dam, intake, Head race tunnel, pressure tunnel, penstock, powerhouse, transformer hall, tail race tunnel, outlet and Lower dam.

v. Land requirement:

Forest Land	80.03 Hectares
Submergence area/Reservoir area	305.89 Hectares
Land required for project components	401.74 Hectares

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

- Population: As of 2011, the population of Jashpur district was 851,669, The population density is 146 people per square Kilometer.
- Sex ratio: The sex ratio in Jashpur is 1004 females for every 1000 males.
- Literacy rate: The literacy rate in Jashpur is 68.6%.
- Urban vs rural: 8.92% of the population lives in urban areas, and 96% live in rural areas.
- Scheduled Castes and Scheduled Tribes: Scheduled Castes make up 5.73% of the population, and Scheduled Tribes make up 62.28%.

vii. Water requirement:

- Approx. 550 KLD During construction stage
- Approx. 120 KLD During Operational stage

viii. Project Cost: The cost of Project is Rs. 5110.07 Crores at PFR Stage.

ix. Project Benefit: Total Employment will be 1350 persons as direct & 2662000 persons indirect after expansion.

x. 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.

xi. MoU / any other clearance/ permission signed with State government: Yes

xii. Resettlement and rehabilitation: In Dangari site approx. 110 - 125 households are affected in the project area as per the preliminary study and the details are as below.

- a) U/R – 10-12 Households
- b) L/R – 90-100 Households
- c) WCS & PH – 08-10 Households

xiii. Alternative Studies: Total Four (04) nos. Alternatives have been identified and studied

xiv. Project Cost: The estimated project cost is ₹ 5,110.07 Crores at Feb, 2023 price level. The preliminary cost estimate of the project has been prepared as per guidelines of CEA / CWC. The Abstract Summary of the cost estimates is given below:

Item	Estimated Cost (₹ Crores) (Feb. 2023)
------	---------------------------------------

Civil Works	₹ 2,942.20
Electro-mechanical Works	₹ 2,167.87
Total	₹ 5,110.07

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

Project Details:

Name of the Proposal	Dangari Open-Loop Pumped Storage Hydro-electric Project (1400 MW)
Location (Including coordinates)	At Village Dangari, Madia and Rajpuri, Sub-district Bagicha, District Jashpur, Chhattisgarh, India The upper reservoir falls in 23°10'56.40"N & 83°36'53.46"E and Lower Reservoir falls in 23°11'10"N & 83°35' 0.89" E respectively.
Inter- state issue involved	No
Seismic zone	Zone-II

Category Details:

Category of the project	A
Provisions	-
Capacity / Cultural command area (CCA)	1400 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	-

Electricity generation capacity:

Powerhouse Installed Capacity	4 units of 350 MW each
Generation of Electricity Annually	2895.67 GWh
No. of Units	4
Additional information (if any)	-

ToR/EC Details:

Cost of project	Rs. 5110.07 Crores
Total area of Project	401.74 Hectares
(Height of Dam from deepest Foundation level (EL))	Upper dam - 19m Lower dam - 36m

Length of Tunnel/Channel	2920 m	
Details of Submergence area	Non-Forest Land - 252.37 Hectare Forest Land – 53.52 Hectare	
Types of Waste and quantity of generation during construction/ Operation	Sewage generated from Labour camps 400 KLD per day.	
E-Flows for the Project	It is a pumped storage project; E flows will be released from lower dam which is a main storage dam.	
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	NA	

CAF
RIVER
EST
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF
CAF

Wildlife Sanctuary	No	
--------------------	----	--

Court Case Details:

Court Case	NA
Additional information (if any)	-

Affidavit/Undertaking Details:

Affidavit/Undertaking	-
Additional information (if any)	-

Miscellaneous:

Particulars	Details
Details of consultant	M/s WAPCOS Limited
Project Benefits	Hydro-electric power and Employment generation
Status of other statutory clearances	-
R&R details	Yes (Total 110 - 125 Households) Upper Reservoir: 10-12 Households Lower Reservoir: 90-100 Households Water Conductor System & Power House: 8-10 Households
Additional detail (If any)	-

3.3.3. Deliberations by the committee in previous meetings

N/A

3.3.4. Deliberations by the EAC in current meetings

14.8.3 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 and observed that the proposal is for grant of terms of reference to the project for Dangari Pumped Storage Hydro-electric Project (1400 MW) in an area of 499 ha in village Dangari, Madia and Rajpuri R F, Sub District Bagicha, District Jashpur, Chhattisgarh by M/s Chhattisgarh State Power Generation Company Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

The EAC observed that as per kml and information submitted by the Project Proponent the project is proposed on Geor River, a small stream with marginal flow and doesn't seem perennial in nature. After visualization of the video of the project cover area which seems a good habitat from faunal and floral bio-diversity point of view with dominance of Sal trees. The obstruction in flow of stream may affect the water shed and overall productive of the eco-system.

The total land requirement for the project is 401.74 ha hectares, of which 80.03 hectares are forest land and 321.71 hectares are non-forest land. The application for Stage-I forest clearance has yet to be obtained. It was also noted that the Project Proponent has signed a Memorandum of Understanding (MoU) with the State Government on 06.10.2023.

3.3.5. Recommendation of EAC

Recommended

3.3.6. Details of Terms of Reference

3.3.6.1. Specific

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 and water sheds, local populations need.
2.	Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 80.03 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 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.

1 2.	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.
1 3.	A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.
1 4.	Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
1 5.	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.
1 6.	The project area should not come up on any critical mineral zone to be verified by GSI/NMDC.
1 7.	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.
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 7 th 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.

3.3.6.2. 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 Methodology	
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 from 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 from the entire state can be referred to. Once a listing of possible r.e.t. species from 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 from the entire state can be referred to. Once a listing of possible r.e.t. species from 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 (SO ₂) 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.

1 5.	null
1 6.	(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.
1 7.	null
1 8.	History of the ground water table fluctuation in the study area.
1 9.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO ₂ , PO ₄ , Cl, SO ₄ , Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
2 0.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
2 1.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
2 2.	Run off, discharge, water availability for the project, sedimentation rate, etc.
2 3.	Basin characteristics
2 4.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
2 5.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km ² year ⁻¹ .
2 6.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
2 7.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
2 8.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
2 9.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
3 0.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
3 1.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.

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

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, phytoplanktons, 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.

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

1 9.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
2 0.	Pressure on existing natural resources
2 1.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
2 2.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
2 3.	Impact on fish migration and habitat degradation due to decreased flow of water
2 4.	Impact on breeding and nesting grounds of animals and fish.
2 5.	Impact on local community including demographic profile.
2 6.	Impact on socio-economic status
2 7.	Impact on economic status.
2 8.	Impact on human health due to water / vector borne disease
2 9.	Impact on increase traffic
3 0.	Impact on Holy Places and Tourism
3 1.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
3 2.	Positive and negative impacts likely to be accrued due to the project are listed.
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. Detailed muck transportation plan delineating the path ways, number of trucks, quantity of muck to be transported along with monitoring mechanism using latest technology, shall be prepared.
12.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
13.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio- economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development

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

3.4. Agenda Item No 4:

3.4.1. Details of the proposal

Juni Bavli Pumped Storage Hydro Electric Project (450 MW) by GUJARAT STATE ELECTRICITY CORPORATION LIMITED located at TAPI, GUJARAT			
Proposal For		Fresh ToR	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/GJ/RIV/484012/2024	J-12011/23/2024-IA-I(R)	03/08/2024	River Valley/Irrigation projects (1(c))

3.4.2. Project Salient Features

14.9.1: The proposal is for grant of Terms of References (TOR) to the project for Juni Bavli Pumped Storage Hydro Electric Project (450 MW) in an area of 240 Ha in village Amode, Umarda, Untavad, etc, Sub District Nizar, Uchchhal and Songadh, District Tapi, Narmada, and Nandurbar, Gujarat by M/s Gujarat State Electricity Corporation Limited.

14.9.2: The Project Proponent and the accredited Consultant M/s Aarvee Associates, Architects, Engineers and Consultants Private Limited, made a detailed presentation on the salient features of the project and informed that:

- i. Juni Bavli Pumped Storage Project (JPSP) is an Off-Stream Open Loop Pumped Storage development, proposed with an installed capacity of 450MW/2880 MWH.
- ii. The project is located near Juni Bavli village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°17'23.44"N and longitude 73°38'5.15"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°16'20.08"N and longitude 73°38'17.83"E.
- iii. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 18.78 MCM (0.663 TMC) & 7552.83 MCM (266.728 TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 67.61 m (from foundation level). The scheme of operation for the project is with 6.40 Hours of peak hour generation per day and 7.46 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.
- iv. The proposed PSP is Off stream open loop PSP. Water will be recycled between the two reservoirs, hence no consumptive use of water has been envisaged for power generation.
- v. Alternative Study for the selection of Project Layout of Juni Bavli PSP

Based on Reservoir optimisation study it is proposed with option 5 with FRL as 237.00m and MDDL as 226.00m with a gross storage of 18.78 MCM (0.663 TMC) and live storage of 8.847 MCM (0.312 TMC). The live storage capacity for pumped storage scheme required is 8.847 MCM (0.312 TMC). The proposed project will generate 450 MW of power by utilizing net rated head of 130.39 m. The water from the upper reservoir will be diverted through Powerhouse and TRT to the lower reservoir. The water will be pumped back to the upper reservoir through TRT-Reversible Turbines-pressure shaft to upper reservoir.

- vi. Total land required for the construction of proposed activities is approximately 240.25 Ha. break up of land required for different components is given below. The bifurcation of land is given in table below:
- vii.

S.No	Component	Private Land (Ha)	Forest Land (Ha)	Total Area (Ha)
1	Upper Reservoir Including Intake		139.41	139.41
2	Penstocks		6.36	6.36
3	Power House		4.83	4.83
4	Tail Race Tunnel		13.94	13.94
5	Lower Reservoir including intakes	13.38		13.38
6	ADITS & Roads		22.23	22.23
7	Site Office	3.		3.1

8	Magazine Area	1		
9	Labour Camp			
10	Colony Area			
11	Muck Disposal	37.00		37.00
	Total	53.48	186.77	240.25

viii. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site.

ix. **Cost and Benefits of the Scheme:** The total estimated cost of the project including direct and indirect charges excluding Interest during construction is Rs. 2078.77 Cr. For the installed capacity of 450 MW, the cost per MW of installed capacity (Excluding IDC) works out to be Rs. 4.62 Cr

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

Source:	Construction Camps/ Labour Camps	
Quantity (TPA):	365	
Mode of disposal:	Nearest Municipal Dumping yards operated and maintained by the respective Municipalities	
Mode of transport:	Road	
	Calculation of Solid Waste	
	Waste generated per person in kg/day	0.5
	No. of labours=	675
	Total waste generated per day in kg	337.5
	Total waste generated per day in Tonnes	0.3375
	Total waste generated per day in Tonnes per Annum	123.18
Quantity of muck =	2590224.73 Cum (for 3 years)	
density of muck =	1500 kg/m ³	
Quantity of muck in kg =	3885337395 kg for 3 years	
	1295112465 kg for 1 year	
	1295112.46 TPA	

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

• **Project details:**

Name of the Proposal	Juni Bavli Hydro-Electric Pumped Storage Project (450 MW)
Location (Including coordinates)	The project is located near Juni Bavli village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°17'23.44"N and longitude 73°38'5.15"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°16'20.08"N and longitude 73°38'17.83"E.
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project area lies in the seismic zone-III which falls in moderate zone.

• **Category details:**

Category of the project	Category A
Provisions	Pumped Storage Project
Capacity / Cultural command area (CC A)	450 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

• **Electricity generation capacity:**

Powerhouse Installed Capacity	450 MW
Generation of Electricity Annually	998.57 MU
No. of Units	3 (Each of 150 MW)
Additional information (if any)	Nil

• **ToR/EC Details:**

Cost of project	Total Hard Cost of the project is Rs. Rs. 207877.00 Lakhs (2078.77 Cr).
	Total cost of the project including IDC is Rs 234237.00 Lakhs (2372.37 Cr)
Total area of Project	240.25 Ha

Height of Dam from Riverbed (EL)	14.67 m for Upper reservoir dam and Lower Reservoir is Existing
Length of Tunnel/Channel	3 nos; 5.6 m dia Main Pressure Shaft – 540.36 m (L) 3 nos; 7.4 m dia Main TRT – 350 m (L)
Details of Submergence area	The Submergence area of the proposed project upper reservoir area lies in forest area of 82.626 Ha.
Types of Waste and quantity of generation during construction/ Operation	Sewage and solid waste generated at the construction staff colony/ project colony shall be adequately treated/ disposed to avoid water pollution and associated public health problems. Adequate measures will be undertaken to dispose the sewage and waste generated from the labour camps. Appropriate management measures will be recommended as a part of the Comprehensive EIA study.
E-Flows for the Project	Stream flow is not disturbed by the project. The proposed project is an off-stream Open loop project with an installed capacity of 450MW/2880 MWH.
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then 1. 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.	N/A
• Muck Management Details:	
No. of proposed disposal area/(type of land-Forest/Pvt. land)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 26 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 37 Ha has been earmarked for the Muck Dumping area.
Monitoring mechanism for Muck Disposal	The project authorities have identified suitable muck disposal sites which are not located near the riverbanks.
• Land Area Breakup:	
Private land	53.48 Ha

Government land/Forest Land	0 Ha/186.77 Ha
Submergence area/Reservoir area	The Submergence area of the proposed project upper reservoir area lies in forest area of 82.626 Ha. The proposed project is an off stream Open loop project with an installed capacity of 450 MW/2880 MWH. The land required for the proposed upper reservoir and upper intake is 139.41 ha and the land required for the proposed lower reservoir and intake is 13.38 ha.
Land required for project components	240.25 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	Yes	Under process
National Park	No	
Wildlife Sanctuary	No	

• **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

• **Affidavit/Undertaking details:**

Affidavit/Undertaking	The undertaking by GSECL is provided along with this document.
Additional information (if any)	Nil

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

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	N/A
Status of Stage- I FC	Under process
Additional detail (If any)	Nil

Is FRA (2006) done for FC-I	Under process
❖Miscellaneous	
Particulars	Details
Details of consultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad
Project Benefits	<p>The following benefits are anticipated from the project construction and operation phases:</p> <ul style="list-style-type: none"> ❖The availability of alternative resources provided by developer in the rural areas will reduce the dependence of the locals on natural resources such as forest. ❖A number of marginal activities and jobs would be available to the locals during construction phase. ❖Developer bringing large scale investment to the area will also invest in local area development and benefit will be reaped by locals. ❖Education, medical, transportation, road network and other infrastructure will improve. ❖With increased availability of electricity, small-scale and cottage industries are likely to come up in the area.
Status of other statutory clearances	N/A
R&R details	N/A
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

14.9.3 The EAC during deliberations noted the following:

- The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of terms of reference to the project for Juni Bavli Off-Stream Open Loop Pumped Storage Hydro Electric Project (450 MW) in an area of 240Ha in village Amode, Umarda, Untavad, etc, Sub District Nizar, Uchchhal and Songadh, District Tapi, Narmada, and Nandurbar, Gujarat by M/s Gujarat State Electricity Corporation Limited.
- The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

The total land requirement for the project is 240.25 ha hectares, of which 186.77 hectares are forest land and 53.48 hectares are non-forest land. The application for Stage-I forest clearance has yet to be obtained. It was also noted that the Project Proponent has submitted a letter no. EPCD/0457/08/2024 dated 29.08.2024 issued by Under Secretary (Power) Energy & Petrochemicals Department, Govt. of Gujarat regarding in principle approval to setup Pumped Storage Project at Ukai, District Tapi, Gujarat.

3.4.5. Recommendation of EAC

Recommended

3.4.6. Details of Terms of Reference

3.4.6.1. Specific

Environmental Management and Biodiversity Conservation	
1.	Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 186.77 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 (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.	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.
1 4.	A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.
1 5.	Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
1 6.	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.
1 7.	The project area should not come up on any critical mineral zone to be verified by GSI/NMDC.
1 8.	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.
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 7 th 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.
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.
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.

3.4.6.2. Standard

1(River Valley/Irrigation projects
----	---

c)	
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 Methodology	
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 from the entire state can be referred to. Once a listing of possible r.e.t. species from 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 from the entire state can be referred to. Once a listing of possible r.e.t. species from 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 follows:	
1.	null
2.	null
3.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
4.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
5.	Landslide zone or area prone to landslide existing in the study area should be examined.
6.	Presence of important economic mineral deposit, if any.
7.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
8.	Impact of project on geological environment.
9.	null
10.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
11.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO ₂) 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.
1	null

5.	
1 6.	(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.
1 7.	null
1 8.	History of the ground water table fluctuation in the study area.
1 9.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO ₂ , PO ₄ , Cl, SO ₄ , Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
2 0.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
2 1.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
2 2.	Run off, discharge, water availability for the project, sedimentation rate, etc.
2 3.	Basin characteristics
2 4.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
2 5.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km ² year ⁻¹ .
2 6.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
2 7.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
2 8.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
2 9.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
3 0.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
3 1.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.

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

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, phytoplanktons, 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.

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

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

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. Detailed muck transportation plan delineating the path ways, number of trucks, quantity of muck to be transported along with monitoring mechanism using latest technology, shall be prepared.
12.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
13.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio- economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development

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

3.5. Agenda Item No 5:

3.5.1. Details of the proposal

Satkashi Pumped Storage Hydro Electric Project (330 MW) by GUJARAT STATE ELECTRICITY CORPORATION LIMITED located at TAPI, GUJARAT			
Proposal For		Fresh ToR	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/GJ/RIV/484051/2024	J-12011/21/2024-IA-I(R)	05/08/2024	River Valley/Irrigation projects (1(c))

3.5.2. Project Salient Features

<p>14.10.1: The proposal is for grant of Terms of References (TOR) to the project for Satkashi Pumped Storage Hydro Electric Project (330 MW) in an area of 254.2Ha in village Satkashi, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.</p> <p>14.10.2: The Project Proponent and the accredited Consultant M/s. Aarvee Associates, Architects, Engineers and Consultants Private Limited, made a detailed presentation on the salient features of the project and informed that:</p> <p>i. Satkashi Pumped Storage Project (STKPSP) is an Off-Stream Closed Loop Pumped Storage</p>
--

development, proposed with an installed capacity of 330 MW/2030.96 MWh.

- ii. The project is located near Satkasi village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°20'12.29"N and longitude 73°37'57.20"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°19'55.79"N and longitude 73°38'47.79"E.
- iii. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 5.672 MCM (0.200 TMC) & 6.367 MCM (0.225TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 46.00m (from deepest bed level) to create the desired storage capacity while the lower reservoir will have maximum height of 34.00 m (from bed level) constructed at the downhill.
- iv. The one-time filling of the PSP will be carried out from Ukai reservoir, which is about 3.00 Kms from the proposed lower reservoir. The scheme of operation for the project is with 6.15 Hours of peak hour generation per day and 7.19 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.
- v. Alternative studies carried out for various major components of the project and final choice of the project parameters.

A detailed alternative studies have been carried out to identify five numbers of potential PSP sites on the right bank of Ukai reservoir. Summary of the alternatives considered is as follows:

- v In the current studies, a total of 21 reservoir locations were selected in the initial phase and 23 Alternatives with different combinations of these reservoirs were studied.
- v Alternatives with different combinations of these reservoirs were studied.
- v Reservoirs- 14 & 17 (R- 14 & R- 17) were observed with high R&R issues and hence the alternatives formed with these two reservoirs (Alternative- 16, 18, 19 & 20) were not considered for further studies.
- v Alternatives- 2, 3, 4, 5, 7, 8, 10, 14, 15, & 23 were observed with very high L/H ratio and therefore were not considered for further studies.
- v Alternatives- 1, 6, 11, 12, 13, 17, 21 & 22 were studied on their Techno- Commercial Feasibility and top 5 Alternatives were selected based on technical ranking.
- v Final selected alternatives are- Alternative 1, 6, 13, 17 & 22

Further, on selected Alternative, Two options of powerhouse have been studied.

Ø **Alternative- A:** With Surface Powerhouse

Ø **Alternative-B:** With Underground Powerhouse.

Possibility of **Alternative A** are studied and found not suitable due to negative pressures in the WCS in transient analysis. So finally **Alternative -B** is Selected.

- vi. Total land required for the construction of proposed activities is approximately 254.20 ha. break up of land required for different components is given below.

Sl.N o.	Component	Private Land (Ha)	Forest Land (Ha)	Total Area (H a)
1	Upper Reservoir including intake	-	86.31	86.31
2	Lower Reservoir including intake	-	103.31	103.31

3	Penstock	-	1.31	1.31
4	Powerhouse	-	4.29	4.29
5	Tail Race Tunnel(including Batching plant)	-	3.85	3.85
6	Adits	-	22.93	22.93
7	Area for water filling	-	1	1
8	Muck disposal areas	27.9	-	27.9
9	Site office	3.3	-	3.3
10	Magazine area			
11	Labour camp and colony area			
	TOTAL	31.20	223	254.20

vii. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site.

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

Source:	Construction Camps/ Labour Camps	
Quantity (TP A):	365	
Mode of disposal:	Nearest Municipal Dumping yards operated and maintained by the respective Municipalities	
Mode of transport:	Road	
	Calculation of Solid Waste	
	Waste generated per person in kg/day 0.5	0.5
	No. of labours=	496
	Total waste generated per day in kg	248
	Total waste generated per day in Tonnes	0.248
	Total waste generated per day in Tonnes per Annum	90.52

Quantity of muck =	2697396.72 Cum (for 3 years)
density of muck =	1500 kg/m ³
Quantity of muck in kg =	4046095080 kg for 3 years
	1348698360 kg for 1 year
	1348698.36 TPA

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

• **Project details:**

Name of the Proposal	Satkashi Hydro-Electric Pumped Storage Project (330 MW)
Location (Including coordinates)	The project is located near Satkashi village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at Latitude 21°21'1.53"N, and longitude 73°38'13.91"E.. Similarly, the geographical coordinate of lower reservoir is at Latitude 21°20'49.59"N and longitude 73°38'53.25"E
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project area lies in the seismic zone-III which falls in moderate zone.

• **Category details:**

Category of the project	Category A
Provisions	Pumped Storage Project
Capacity / Cultural command area (CCA)	330 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

• **Electricity generation capacity:**

Powerhouse Installed Capacity	330 MW
Generation of Electricity Annually	704.24 MU
No. of Units	2 (Each of 165 MW)
Additional information (if any)	Nil

• **ToR/EC Details:**

Cost of project	Total Hard Cost of the project is Rs. Rs. 164749.00 Lakhs (1647.49 Cr).
	Total cost of the project including IDC is Rs 184305.00 Lakhs (1843.05 Cr)
Total area of Project	254.20 Ha
Height of Dam from Riverbed (EL)	30 m for Upper reservoir dam and 56.07 m for Lower reservoir dam
Length of Tunnel/Channel	2 nos; 5.8 m dia Main Pressure Shaft – 333.51 m (L) 2 nos; 7.6 m dia Main TRT – 356.18 m (L)
Details of Submergence area	The Submergence area of the proposed project area lies in forest area of 87.7 Ha.
Types of Waste and quantity of generation during construction/ Operation	Sewage and solid waste generated at the construction staff colony/ project colony shall be adequately treated/ disposed to avoid water pollution and associated public health problems. Adequate measures will be undertaken to dispose the sewage and waste generated from the labour camps. Appropriate management measures will be recommended as a part of the Comprehensive EIA study.
E-Flows for the Project	Stream flow is not disturbed by the project. The proposed project is an off-stream closed loop project with an installed capacity of 330MW/2030.96 MWH.
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then i. 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.	N/A

• **Muck Management Details:**

No. of proposed disposal area/(type of land-Forest/Pvt. land)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 26.97 Lakh cum of excavated muck will be safely dumped in

	n the designated muck dumping yard to mitigate the environmental hazard. An area of 27.90 Ha has been earmarked for the Muck Dumping area.
Monitoring mechanism for Muck Disposal	The project authorities have identified suitable muck disposal sites which are not located near the riverbanks.

• **Land Area Breakup:**

Private land	31.20 Ha
Government land/Forest Land	0 Ha/223 Ha
Submergence area/Reservoir area	The Submergence area of the proposed project area lies in forest area of 87.7 Ha. The proposed project is an off stream closed loop project with an installed capacity of 330MW/2030.96 MWH. The land required for the proposed upper reservoir and upper intake is 86.31 ha and the land required for the proposed lower reservoir and intake is 103.31 ha.
Land required for project components	254.20 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	Yes	Under process
National Park	No	
Wildlife Sanctuary	No	

• **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

• **Affidavit/Undertaking details:**

Affidavit/Undertaking	The undertaking by GSECL is provided along with this document.
Additional information (if any)	Nil

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

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	N/A
Status of Stage- I FC	Under process
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Under process

• **Miscellaneous**

Particulars	Details
Details of consultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad
Project Benefits	<p>The following benefits are anticipated from the project construction and operation phases:</p> <ul style="list-style-type: none"> • The availability of alternative resources provided by developer in the rural areas will reduce the dependence of the locals on natural resources such as forest. • A number of marginal activities and jobs would be available to the locals during construction phase. • Developer bringing large scale investment to the area will also invest in local area development and benefit will be reaped by locals. • Education, medical, transportation, road network and other infrastructure will improve. • With increased availability of electricity, small-scale and cottage industries are likely to come up in the area.
Status of other statutory clearances	N/A
R&R details	N/A
Additional detail (If any)	Nil

3.5.3. Deliberations by the committee in previous meetings

N/A

3.5.4. Deliberations by the EAC in current meetings

14.10.3 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 and observed that the proposal is for grant of terms of reference to the project for

Satkashi Off-Stream Closed Loop Pumped Storage Hydro Electric Project located at Satkashi Village in Tapi District by M/s Gujarat State Electricity Corporation Limited.

- The project is listed at S.N.1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).
- It was observed that one season data will not give the clear picture about the ecological and biological profile of the region, as after monsoon season there may be high biological activities being the project site located at the tip of Western Ghats. The EAC also assessed the need of study for worst case scenario and critical mineral assessment along with risk analysis.
The total land requirement for the project is 254.20 ha hectares, of which 223 hectares are forest land and 31.20 hectares are non-forest land. The application for Stage-I forest clearance has yet to be obtained. It was also noted that the Project Proponent has submitted a letter no. EPCD/0457/08/2024 dated 29.08.2024 issued by Under Secretary (Power) Energy & Petrochemicals Department, Govt. of Gujarat regarding in principle approval to setup Pumped Storage Project at Ukai, District Tapi, Gujarat.

3.5.5. Recommendation of EAC

Recommended

3.5.6. Details of Terms of Reference

3.5.6.1. Specific

Environmental Management and Biodiversity Conservation	
1.	Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 223 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.	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.
7.	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.
8.	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.

9.	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.
10.	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.
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.
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 7 th 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.

3.5.6.2. 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.

1 2.	Land details including forests, private and other land.
1 3.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
1 4.	Different riverine habitats like rapids, pools, side pools and variations in the river substratum bedrocks, rocks, boulders, sand/silt or clay etc. need to be covered under the study
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 Methodology	
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

	<p>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 from the entire state can be referred to. Once a listing of possible r.e.t. species from 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 from the entire state can be referred to. Once a listing of possible r.e.t. species from the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.</p>
4.	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 follows:	
1.	null
2.	null
3.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
4.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
5.	Landslide zone or area prone to landslide existing in the study area should be examined.
6.	Presence of important economic mineral deposit, if any.
7.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
8.	Impact of project on geological environment.
9.	null
10.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
11.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO ₂) and Oxides of Nitrogen (NO _x) in the study area at 5-6 Locations.

1 2.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
1 3.	null
1 4.	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.
1 5.	null
1 6.	(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.
1 7.	null
1 8.	History of the ground water table fluctuation in the study area.
1 9.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO ₂ , PO ₄ , Cl, SO ₄ , Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
2 0.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
2 1.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
2 2.	Run off, discharge, water availability for the project, sedimentation rate, etc.
2 3.	Basin characteristics
2 4.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
2 5.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km ² year ⁻¹ .
2 6.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
2 7.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
2 8.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.

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, Pteridophytes, 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

6.	analysed.
4 7.	Information (authenticated) on Avi-fauna and wildlife in the study area.
4 8.	Status of avifauna their resident/ migratory/ passage migrants etc.
4 9.	Documentation of butterflies, if any, found in the area.
5 0.	Details of endemic species found in the project area.
5 1.	RET species-voucher specimens should be collected along-with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian Wildlife (Protection) Act, 1972.
5 2.	Existence of barriers and corridors, if any, for wild animals.
5 3.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the proposed project development and loss of biodiversity.
5 4.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
5 5.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
5 6.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplanktons, benthos etc.
5 7.	Fish and fisheries, their migration and breeding grounds.
5 8.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
5 9.	Conservation status of aquatic fauna.
6 0.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.
6 1.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.
6 2.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
6 3.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.

6 4.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
6 5.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
6 6.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
6 7.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
6 8.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other property, possession of cattle, type of house etc.
6 9.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any ethnic/indigenous groups that are getting affected by the project.
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.
1 0.	Water pollution due to disposal of sewage
1 1.	Water pollution from labour colonies/ camps and washing equipment.
1 2.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) (a) due to considerable road construction / widening activity (b) interference of reservoir with the inflowing stream (c) blasting for commissioning of HRT, TRT and some other structures.
1 3.	Changes in land use / land cover and drainage pattern
1	Immigration of labour population

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

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

3.6. Agenda Item No 6:

3.6.1. Details of the proposal

Proposed Kandhaura Pumped Storage Project (1680 MW) at Village: Sashnai, Taluka: Obra and Villages: Mark uri & Cherue Taluka: Robertsganj, District: Sonbhadra, Uttar Pradesh by M/s. JSW Energy PSP Six Limited. b y JSW ENERGY PSP SIX LIMITED located at SONBHADRA,UTTAR PRADESH			
Proposal For		Amendment in ToR	
Proposal No	File No	Submission Date	Activity

			(Schedule Item)
IA/UP/RIV/488779/2024	J-12011/62/2023-IA.I (R)	15/08/2024	River Valley/Irrigation projects (1(c))

3.6.2. Project Salient Features

14.11.1: The proposal is for grant of amendment in Terms of References (TOR) to the project for Kandhaura Pumped Storage Project (1680 MW) in an area of 584.57Ha in village Sashnai, Markuri & Cherue, Taluka Obra and Robertsganj District Sonbhadra, Uttar Pradesh By M/s JSW Energy PSP Six Limited.

14.11.2: The Project Proponent and the accredited Consultant J.M. EnviroNet Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

- i. Proposed Pumped Storage Project (PSP) is Off-Stream Closed Loop pumped storage development proposed with an installed capacity of 1680 MW/10214.40 MWH. The Project comprises of upper & lower reservoirs with a gross storage capacity of 13.30 MCM (0.470 TMC) & 15.40 MCM (0.544 TMC) respectively, out of which upper reservoir to be constructed on the hill top with main dam maximum dam height of 35 m (from deepest foundation level) to create the desired storage capacity while the lower reservoir will have maximum height of 34.20 m (from deepest foundation level) constructed at the downhill.
- ii. The scheme of operation for the project will be 6.08 Hours of peak hour generation per day and 6.86 Hours for pumping back the water to the upper reservoir. Being a closed loop project, proposed one time filling of the reservoir will be taken from Sone River and water will then be used cyclically for energy storage and discharge. Evaporation losses, if any will be recouped periodically.
- iv. The Terms of Reference granted by the Ministry vide letter dated 16.04.2024 for the project Proposed Kandhaura Pumped Storage Project (1680 MW) at village: Sashnai, Taluka: Obra, and Villages: Markuri & Cherue, Taluka: Robertsganj, District: Sonbhadra, Uttar Pradesh in favour of M/s JSW Energy PSP Six Limited.
- v. The project proponent has requested for amendment in the ToR with the details are as under;

S. No.				Reason for Amendment in ToR
				As per Specific ToR point no. 1(A) (1.1) "Explore the possibilities for reducing the Forest land requirement the application for obtaining Stage I FC for 713.72 of forest land (after rationalising the requirement of forest land) involved in the project shall be submitted." In this connection, the company has re-evaluated the proposal w.r.t. area & layout and reduced the project area from 756.89 ha (including 713.72 ha Forest land, 36.48 ha Govt. Land 7.69

S. No.				Reason for Amendment in ToR
				ha Pvt. Land) to 584.57 Ha (including 493.51 ha forest land, 14.14 Ha Govt. Land, 76.92 Ha Pvt. Land).
				Due to change in the project area and layout
				The reservoir area and capacity has been reduced due to optimisation of the Project Layout.
				The water availability has been revised as per reassessment of technical parameters.
				Due to change in the project area and layout
				The reservoir area and capacity has been reduced due to optimisation of the Project Layout.
				Maximum Dam Height has been reduced due to optimisation of the Project Layout.
				Due to change in the project area from 756.89 ha to 584.57Ha
				As per specific ToR Point no. 5(E) 5.6 "Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA 3-22/33/2022-IA.III dated 14.08.2023 for Pumped storage projects shall be used for preparation of EIA/ EMP reports." In this connection EIA/ EMP report has been pr

S. No.				Reason for Amendment in ToR
				prepared as per MoEFCC OM dated 14.08.2023. Intimation letter regarding the same had been submitted to MOEFCC, New Delhi vide letter no. JSW/PSP-Kandhaura/TOR/2024-25/01 dated 30th April 2024. However, EIA/EMP report comply additional/specific ToR as mentioned in Annexure 1, Page no. 3 to 6.
				Revised as per reassessment of technical parameters.
				The scheme of operation has been revised as per reassessment of technical parameters.
				The scheme of operation has been revised as per reassessment of technical parameters.

3.6.3. Deliberations by the committee in previous meetings

N/A

3.6.4. Deliberations by the EAC in current meetings

14.11.3 The EAC during deliberations noted the following:

- The proposal is for grant of amendment in Terms of References (TOR) to the project for Kandhaura Pumped Storage Project (1680 MW) in an area of 584.57Ha in village Sashnai, Markuri & Cherue, Taluka Obra and Robertsganj District Sonbhadra, Uttar Pradesh by M/s JSW Energy PSP Six Limited.
- The project is listed at S.N.1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).

The Terms of Reference granted by the Ministry vide letter dated 16.04.2024 for the project Proposed Kandhaura Pumped Storage Project (1680 MW) at village: Sashnai, Taluka: Obra, and Villages: Markuri & Cherue, Taluka: Robertsganj, District: Sonbhadra, Uttar Pradesh in favour of M/s JSW Energy PSP Six Limited.

3.6.5. Recommendation of EAC

Recommended

3.6.6. Details of Terms of Reference

3.6.6.1. Specific

Additional TOR	
1.	All ToR points mentioned in the ToR letter dated 16.04.2024 shall remain unchanged.
2.	EIA/EMP, collection of baseline data, other statutory clearance and the public hearing shall be carried out as per revised layout.

3.6.6.2. 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.
1 0.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
1 1.	Remote Sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of the study using overlaying mapping techniques viz. Geographic Information System (GIS), False Color Composite (FCC) generated from satellite data of project area.
1 2.	Land details including forests, private and other land.
1 3.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
1 4.	Different riverine habitats like rapids, pools, side pools and variations in the river substratum bedrocks, rocks, boulders, sand/silt or clay etc. need to be covered under the study
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 Methodology	
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 from the entire state can be referred to. Once a listing of possible r.e.t. species from 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 follows:	
1.	null
2.	null
3.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
4.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
5.	Landslide zone or area prone to landslide existing in the study area should be examined.
6.	Presence of important economic mineral deposit, if any.
7.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
8.	Impact of project on geological environment.

9.	null
10.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
11.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO ₂) and Oxides of Nitrogen (NO _x) in the study area at 5-6 Locations.
12.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
13.	null
14.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
15.	null
16.	(i) Generation of thematic maps viz, slope map, drainage map, soil map, land use and land cover map, etc. Based on these, thematic maps, an erosion intensity map should be prepared.
17.	null
18.	History of the ground water table fluctuation in the study area.
19.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO ₂ , PO ₄ , Cl, SO ₄ , Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
20.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
21.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
22.	Run off, discharge, water availability for the project, sedimentation rate, etc.
23.	Basin characteristics
24.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
25.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km ² year ⁻¹ .

2 6.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
2 7.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
2 8.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
2 9.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
3 0.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
3 1.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.
3 2.	A minimum of 1 km distance from the tip of the reservoir to the tail race tunnel should be maintained between upstream and downstream projects.
3 3.	Besides primary studies, review of secondary data/literature published for project area on flora & fauna including RET species shall be reported in EIA/EMP report.
3 4.	null
3 5.	Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.
3 6.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteridophytes, Bryophytes (all groups).
3 7.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
3 8.	Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index (IVI) , Shannon Weiner index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrates, size of quadrates etc. to be reported within the study area in different ecosystems.
3 9.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
4 0.	Economically important species like medicinal plants, timber, fuel wood etc.
4 1.	Details of endemic species found in the project area.
4 2.	Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along-with economic significance. Species diversity curve for RET species should be given.

4 3.	Cropping pattern and Horticultural Practices in the study area.
4 4.	null
4 5.	Fauna study and inventorisation should be carried out for all groups of animals in the study area. Their present status alongwith Schedule of the species.
4 6.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
4 7.	Information (authenticated) on Avi-fauna and wildlife in the study area.
4 8.	Status of avifauna their resident/ migratory/ passage migrants etc.
4 9.	Documentation of butterflies, if any, found in the area.
5 0.	Details of endemic species found in the project area.
5 1.	RET species-voucher specimens should be collected along-with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian Wildlife (Protection) Act, 1972.
5 2.	Existence of barriers and corridors, if any, for wild animals.
5 3.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the proposed project development and loss of biodiversity.
5 4.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
5 5.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
5 6.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplanktons, benthos etc.
5 7.	Fish and fisheries, their migration and breeding grounds.
5 8.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
5 9.	Conservation status of aquatic fauna.
6 0.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.

6 1.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.
6 2.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
6 3.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
6 4.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
6 5.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
6 6.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
6 7.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
6 8.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other property, possession of cattle, type of house etc.
6 9.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any ethnic/indigenous groups that are getting affected by the project.
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.
1 0.	Water pollution due to disposal of sewage
1	Water pollution from labour colonies/ camps and washing equipment.

1.	
1 2.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) (a) due to considerable road construction / widening activity (b) interference of reservoir with the inflowing stream (c) blasting for commissioning of HRT, TRT and some other structures.
1 3.	Changes in land use / land cover and drainage pattern
1 4.	Immigration of labour population
1 5.	Quarrying operation and muck disposal
1 6.	Changes in land quality including effects of waste disposal
1 7.	River bank and their stability
1 8.	Impact due to submergence.
1 9.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
2 0.	Pressure on existing natural resources
2 1.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
2 2.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
2 3.	Impact on fish migration and habitat degradation due to decreased flow of water
2 4.	Impact on breeding and nesting grounds of animals and fish.
2 5.	Impact on local community including demographic profile.
2 6.	Impact on socio-economic status
2 7.	Impact on economic status.
2 8.	Impact on human health due to water / vector borne disease
2 9.	Impact on increase traffic

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

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	Absent
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	
9	Dr J A Johnson	Member (EAC)	jaj@wii.gov.in	
10	Dr A K Sahoo	Member (EAC)	ami****@gmail.com	Absent
11	Yogendra Pal Singh	Scientist E	yog*****@nic.in	

MINUTES OF THE 14TH MEETING OF THE EXPERT APPRAISAL COMMITTEE FOR RIVER VALLEY AND HYDROELECTRIC PROJECTS HELD ON 30TH – 31ST AUGUST, 2024 THROUGH VIDEO CONFERENCE (ONLINE)

The 14th 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 30th August, 2024 – 31st August, 2024 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 13th EAC meeting:

The Minutes of the Meeting held on 13th EAC meeting on 13th August, 2024 were confirmed.

Agenda Item No. 14.1

Bhawali Pumped Storage Project (1500 MW) in an area of 278.92 Ha in Village Kalbhonde, Kothale and Jamunde Sub District Shahapur and Igatpuri, District Thane and Nashik, Maharashtra by M/s JSW Energy PSP Two Limited – Environmental Clearance (EC) – reg.

[Proposal No. IA/MH/RIV/481391/2024; F. No. J-12011/08/2022-IA-I(R)]

14.1.1: The proposal is for grant of Environmental Clearance (EC) to the project for Bhawali Pumped Storage Project (1500 MW) in an area of 278.92 Ha in Village Kalbhonde, Kothale and Jamunde Sub District Shahapur and Igatpuri, District Thane and Nashik, Maharashtra by M/s JSW Energy PSP Two Limited.

14.1.2: The Project Proponent and the accredited Consultant M/s. EQMS India Private Limited, 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 Bhawali Pumped Storage Project (1500MW), located at Village Kalbhonde, Kothale and Jamunde Sub District Shahapur and Igatpuri, District Thane and Nashik, Maharashtra, by M/s JSW Energy PSP Two Ltd.
- ii. The project proposal was considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 27th meeting held during 09.05.2022 and recommended for grant of Terms of References (ToR) for the Project. The ToR has been issued by Ministry vide letter No J-12011/08/2022-IA. I(R) dated 27.6.2022.
- iii. The project is listed at S.N.1(c) (i) of the Schedule to the Environment Impact Assessment (EIA) Notification under category ‘A’ and is appraised at Central Level by Expert Appraisal Committee (EAC).
- iv. The geographical co-ordinate of the project are -
Latitude: 19⁰34’ 56.38” N to 19⁰36’31.69” N

Longitude: 73° 35' 10.0" E to 73° 35' 45.06" E

- v. The Bhavali Pumped Storage Project envisages creation of an upper reservoir (gross storage:12.35 MCM & live storage:11.419 MCM) by constructing 962.47m long dam comprising of 822.47 m long Geomembrane faced rockfill dam (GRFD) with maximum height of 48.64m from foundation, 60m long and 61m height ungated spillway with 4 bays of 12.5m each; 4 blocks of 20m length each non-overflow section of maximum height of 49.57m from foundation, two each on either side of spillway. 80m long saddle dam (maximum height 10m from foundation) to reduce backwater to enter ESZ area. The lower reservoir (gross storage:13.26MCM; live storage:11.71MCM) shall be created by constructing concrete gravity dam 365.5m long at top with maximum height of 48.15m from foundation and 104 m long ,74m high (from foundation) ungated spillway with 8 bays of 10.5m each. Diffuser type Intake structure with 3 intakes (25.5mx10.5m) of 42.44m length shall be provided. The water conductor system shall comprise of 67.96 m long three intake tunnels of 7m diameter each with design discharge of 131.74cumec each. 5.1m diameter, followed Steel lined pressure shaft 3 nos. of independent, 5.1m diameter with length varying from 1568.09m to 1594.89m, six 3.8m diameter branch pressure shaft after first bifurcation of design discharge 65.96cumec each; two 2.9m diameter 46.83m long steel lined branch pressure shaft after second bifurcation of design discharge 32.98cumec each. Underground powerhouse (167mx22mx52.9m) housed with 7 No's. Francis vertical shaft reversible pump-turbine (5 X 250MW & 2 X 125 MW) discharging into circular draft tube 5.20 m and 4.0m diameter for large and small unit; two 4m diameter concrete lined branch tail race tunnel for 32.98cumec discharge after 3rd bifurcation; six 5.2meter diameter concrete lined branch tail race tunnel for 65.78 cumec discharge after 4th bifurcation; followed by three 7m diameter main tail race tunnel with length varying from 621.17m to 646.57m, each discharging 131.74cumec, 105m long trapezoidal tail race pool followed by 560m long trapezoidal tail race channel. Annual energy generation by Bhavali PSP in turbine mode is 4044.06 MU whereas annual energy consumed in pump mode is 5120.53 MU.
- vi. **Land Requirement:** The total land requirement under the project for upper and lower rock fill dam, reservoir & other works, has been assessed as 278.92 ha of which private land is 35.18 ha, forest land 243.74 ha.
- vii. **Demographic details in 10 km radius of project area:** The study area comprises of 40 villages. As per the Census of India 2011, the total households under study area villages are 9190. The total population of villages is 52201 composed of 26398 males and 25803 females with sex ratio of 977. The cast wise composition of the total population made up the Scheduled Cast population is 2234 (4.28%) and Scheduled Tribe population is 32079 (61.45%), which shows that the Scheduled Tribe is the dominant cast in most of the villages in study area. The total literate population is 28605, of which male and female population is 16974 and 11631 respectively. Total literate population is 64.83%, of which male and female literates are 76.40 % are 53.09 % respectively. The total working population is 24293 (46.53%) which comprises of main workers 18849 (36.10%) and marginal workers 5444 (10.43%) while non-workers are 27908 (53.47%). Among main workers, cultivators constitute the highest category (54.3%), followed by cultivators (29.7%) and other workers (15.90%). Among marginal workers agricultural labour constitutes the highest category (50.7%) followed by cultivators (31.9%) and other workers (15.4%).

- viii. **Water Requirement:** The total water requirement during construction shall be 1000 kld(Domestic:100kld & Construction 900kld) and shall be met from the surface sources viz., nearby reservoir(s).
- ix. **Project Cost:** The estimated project cost is Rs. 8964.02 Crores. Total capital cost earmarked towards environmental pollution control measures is Rs10680 lakh. and the Recurring cost will be about Rs 1168 lakh to be spent in four years (Average annual: Rs.292 lakh).
- x. **Project Benefit:** Employment will be 3000 persons as direct. PP proposes to allocate Rs 600 lakh for implementing issues raised during public hearing towards CER (As per Ministry's O.M. F.No.22-65/2017-IA.III, dated 30th September,2020, CER cost is not based on percentage cost of project)
- xi. **Environmental Sensitive area:** Kalsubai Harichandragad Wildlife Sanctuary exists within 10 km of project boundary. However, no part of the project lies within Eco-sensitive zone of the Sanctuary. The nearest project boundary is about 12.5 m from ESZ boundary.
- xii. **MoU / any other clearance/ permission signed with State government:**
- (1) The MOU for setting up of the proposed Bhavali Pumped Storage Project (1500MW) has been made on 14th day of September,2021, between the Industries Department, Government of Maharashtra and M/s JSW Neo Energy Ltd.
- (2) Govt. of Maharashtra, Water Resources Department, Hydrology and Dam Safety, issued certificate for water availability for project vide No. WFR/Ulhas/894, dated 21.11.2022.
- xiii. **Resettlement and rehabilitation:** The total private land required for the project is 35.18 ha which is spread over Jamunde village in Tehsil Igatpuri, District Nashik, Maharashtra. There shall be 130 affected families of which 10 shall be displaced families. The acquisition of the land shall be carried out by mutual negotiation in consonance with "RFCTLARRA", 2013. The total cost for implementing Rehabilitation and Resettlement Plan is Rs 1232 lakh comprised of the cost of land acquisition (Rs 854.54 lakh), R&R entitlement (Rs 82.05 lakh) and the cost of Tribal Development Plan (Rs 295 lakh).
- xiv. **Scheduled –I species:** Nine mammalian species (Panther, Striped Hyaena, Jackal, Khokad, Jungle cat, Wolf, Chow Singha, Barking deer and Porcupine); ten avifauna species (White backed Vulture, Slender billed vulture, Sparrow hawk. Brahminy kite, Booted eagle, Crested serpent eagle, Grey junglefowl, Indian peafowl, Barn owl and Brown wood) and three herpetofauna species (Indian Cobra, Russell's Viper and Rat snake) were recorded/reported from study area.
- xv. **Alternative Studies:**
- Based on ground topography and surface geo-mapping for preliminary understanding of the geological set up of the project area, for layout of WCS and powerhouse, two alternatives, viz., Alternate -1 with all components of WCS and powerhouse as underground and the Alternate-2 with surface powerhouse, were studied. Alternate-1 was preferred over Alternate-2 as the latter involved about 135m deep surface excavation for surface

powerhouse, which would necessitate intricate supports and slope stability measures, besides posing seepage problem during operation compounded with problems with storm water drainage. The selected alternative has been found to be more suitable considering the minimal overall forest land requirement and minimal requirement of private land and least displacement of people habitations.

xvi. **Baseline Environmental Scenario:**

Period	1.3.2022 to 30.12.2022 (Three seasons)
AAQ parameters at 6 locations (minimum & maximum)	PM ₁₀ : 38.3 to 66.3 µg/m ³
	PM _{2.5} : 15.6 to 25.5 µg/m ³
	SO ₂ : 5.1 to 9.6 µg/m ³
	NO _x : 6.5 to 12.8 µg/m ³
Incremental GLC Level	PM ₁₀ : Max. GLC: 13.83 µg/m ³
	PM _{2.5} : Max. GLC: 1.22 µg/m ³
	SO ₂ : Max. GLC: 1.0 µg/m ³
	NO _x : Max. GLC: 12.67 µg/m ³
River water samples at 3 locations	pH: 6.97 to 7.41
	Dissolved Oxygen: 7.3 to 8.3 mg/l
	Total Dissolved Solids: 74 to 81 mg/l
	Total Hardness (as CaCO ₃): 56 to 63 mg/l
	Total Alkalinity (as CaCO ₃): 2 to 28 mg/l
	Calcium (as Ca): 16.8 to 18.4 mg/l
	Magnesium (as Mg): 2.9 to 4.7 mg/l
	Oil and Grease: <2 mg/l
	Sulphate (as SO ₄): 8.2 to 11.6 mg/l
	Nitrate (as Na): 2.4 to 6.7 mg/l
	Chloride (as Cl): 30.3 to 40.8 mg/l
	Iron (as Fe): 0.12 to 0.3 mg/l
	Copper (as Cu): <0.05 mg/l
	Lead (as Pb): <0.01 mg/l
	Cadmium (as Cd): <0.003 mg/l
	Chromium (as Cr): <0.05 mg/l
	Manganese (as Mn): <0.05 mg/l
	Arsenic (as As): <0.01 mg/l
	Mercury (as Hg): <0.001 mg/l
Pond water samples at 3 locations	pH: 7.12 to 7.56
	Dissolved Oxygen: 6.9 to 8.4 mg/l
	Total Dissolved Solids: 82 to 107 mg/l
	Total Hardness (as CaCO ₃): 59 to 77 mg/l
	Total Alkalinity (as CaCO ₃): 2 to 27 mg/l

	Calcium (as Ca):18.1to21. mg/l
	Magnesium (as Mg):3.3 to5.8mg/l
	Oil and Grease:<2mg/l
	Sulphate (as SO ₄):7.4to14.1mg/l
	Nitrate (as Na): 3.1to 4.9mg/l
	Chloride (as Cl):30.9to 41.1 mg/l
	Iron (as Fe):0.05 to 0.21mg/l
	Copper (as Cu): <0.05 mg/l
	Lead (as Pb): <0.01mg/l
	Cadmium (as Cd): <0.003mg/l
	Chromium (as Cr): <0.05mg/l
	Manganese (as Mn): <0.05mg/l
	Arsenic (as As): <0.01mg/l
	Mercury (as Hg): <0.001mg/l
Ground Water samples at 6 locations	pH: 6.58 to 7.86
	Total Dissolved Solids: 216 to 310 mg/l
	Total Hardness (as CaCO ₃):140 to190mg/l
	Total Alkalinity (as CaCO ₃): 37 to 89 mg/l
	Calcium (as Ca): 34.1 to 47mg/l
	Magnesium (as Mg): 12.4 to26.9 mg/l
	Oil and Grease: <2mg/l
	Sulphate (as SO ₄):21.3to36.0 mg/l
	Nitrate (as Na):2.8 to 5.1 mg/l
	Chloride (as Cl):57.1to 83 mg/l
	Iron (as Fe) : 0.3 to 0.10mg/l
	Copper (as Cu): <0.05 mg/l
	Lead (as Pb): <0.01mg/l
	Cadmium (as Cd): <0.003mg/l
	Chromium (as Cr): <0.05mg/l
Noise levels Leq (Day & Night) at 6 locations	Manganese (as Mn): <0.05mg/l
	Arsenic (as As): <0.01mg/l
	Mercury (as Hg): <0.001mg/l
	Residential Area Leq. (Day): 46.9 to 53.1 dB (A)
	Residential Area Leq. (Night): 35.7 to42.8 dB (A)
	Commercial Area Leq. (Day): 59.9 to62.6 dB (A)
	Commercial Area Leq. (Night): 48.3 to 50.3 dB (A)

Soil Quality at 10 locations	Bulk density:1.28 to1.49 gm/cc
	pH range: 6.60-to7.34
	Electrical conductivity (EC);107 to 446 μ mhos/cm
	Calcium content:1524 to 3281mg/kg;
	Sodium:154 to 418 mg/kg
	Potassium: 127to 826 mg/kg;
	Nitrogen:153to 849 mg/kg
	Phosphorous: 6.6to 46.9 mg/kg;
	Cation Exchange Capacity (CEC):10.7 to 23.67 meq/100gm
	Magnesium: 242 to 452mg/kg
	Sulphur: 15.4 to 32.8 mg/kg
	Organic Matter: 1.33 % to 5.26%
Flora & Fauna	<p>Flora: During primary and secondary study carried out under present project, 88 tree species (37 families), 41 shrub species (23 families), 40 herbs species (26 families) and 14 species of climbers (10 families) and 18 species of grasses (1 family) were recorded from the study area. About 5 economically important and 36 important medicinal/ethnobotanical importance plant species were recorded. One endemic specie was also reported.</p>
	<p>Fauna</p> <p>Sixteen mammalian species were found/reported from secondary sources as well as from the primary survey and consultations. Out of reported species nine species are Schedule-I species and three species and four species belong to Schedule -II and IV respectively. As per IUCN criteria (3.1) study area harbors three vulnerable species and one species categorized under threatened category,</p> <p>Forty-nine bird species were observed /reported during the survey of which ten species belong to Schedule-1 of WPA, 1972. Rest of the species belong to either Schedule-II or IV. As per the IUCN Red list two species Vultures are</p>

	<p>categorized as “Critically Endangered” and all other species are listed as “Least Concern”.</p> <p>Two species of amphibians, 4 species of snakes and 4 species of lizards recorded/confirmed in the study area of which Indian Cobra, Russell’s Viper and Rat snake belong to Schedule-I of WPA,1972, as amended in December,2022.</p> <p>Eight species of butterflies were recorded/reported of which none belong to Schedule-1</p> <p>Aquatic</p> <p>Twenty-one Phytoplankton species were recorded: Cyanophyceae (8), Bacillariophyceae (5), Chlorophyceae (7), Euglenophycin (1). Twelve species of Zooplankton were recorded: Rotifera (5), Cladocera (4), Copepods (2) and Ostracoda (1).</p> <p>Among fish population 10 species belonging to 4 families viz., Cyprinidae (<i>Catla catla</i>, <i>Labeo rohita</i>, <i>Cirrihinus mrigala</i>, <i>Labeo calbasu</i>, <i>Puntius chola</i> and <i>Garra mullya</i>); Channidae (<i>Channa gachua</i> & <i>Channa punctatus</i>); Bagridae (<i>Rita rita</i>); Saccobranchidae (<i>Heteropneustes fossilis</i>) were identified.</p>
--	--

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

- a) Solid Waste: Municipal Solid Waste (MSW) likely to be generated during construction and operation shall be 38.8 Ton/annum and 7.2ton/annum respectively which shall be managed as per Solid Wastes Management Rules, 2016.

Hazardous waste: It inter alia includes burnt mobile oil and greases (6ton/annum) from vehicles and construction machinery and equipment which shall be handled and disposed through authorised dealer as per Hazardous and other Wastes (Management & Transboundary Movement) Rules, 2016.

- b) Muck & its management

The total quantity of muck / debris, to be generated due to the project, shall be 64.06 lakh cum, out of which 36.08 lakh cum shall be consumed on the project work leaving 28.43 lakh cum, which with 42% swell factor shall amount to 40.37 lakh cum shall be disposed at two designated muck disposal sites in an area of 44.09 ha. The muck disposal sites shall be developed from below the ground level by providing Retaining wall. After construction of retaining wall, the muck brought in dumpers shall be dumped and manually spread behind the wall. The muck shall be laid with vertical angle not exceeding 28° in such a manner that rock

mass is properly stacked behind the wall with minimum of voids. The muck pile shall be later covered with geo-Geo-coir textile properly held to the ground by steel wire U-nails and rehabilitated by afforestation of herbs and shrubs.

xviii. **Public Hearing:**

Particular	District Nashik	District Thane
Advertisement for PH with date	Local newspaper “Sakal” (Marathi) and the “Times of India” (English) on 07.12.2023.	Local newspaper” Sakal” (Marathi) and the “Free Press Journal” (English) on 12.01.2024.
Date of Public Hearing	10.01.2024	13.02.2024
Venue	Near to the Upper Reservoir, in village Jamunde, Post Manvede, Tehsil Igatpuri, District Nashik	Near to the Lower Reservoir, in village Kalbhonde, Tehsil Shahpur, District Thane.
Chaired by	Mr. Ravindra Thakre, SDM, Igatpuri, Nashik	Ms. Manisha Jaybhaye Dhule, Additional Collector, Thane
Main issues raised during PH	<ul style="list-style-type: none"> • Adequate compensation should be granted for acquiring their land • Job opportunities for the youth and unemployed people • Impact to flow of water, wildlife, trees and medicinal plants, agricultural and horticultural crops • Remedial measures for addressing pollution control and wildlife impacts during construction • Addressal of problems like scarcity of water, electricity and lack of roads and education facilities, • Relocation of Temple in Jamunde. • Demanded school bus for children • Assistance to the villagers in education, health and employment sector 	<ul style="list-style-type: none"> • Job opportunities for the youth and unemployed people • Addressal of problems like scarcity of water, electricity and lack of roads and education facilities • Demanded Company to establish a High School in the village • Repairs of local Deities & clan God • Mobile team of health workers should be provided • Books and clothes should be distributed to village children • Plantation of trees by the company • Job opportunities for the youth and unemployed people

	<ul style="list-style-type: none"> •Livelihood opportunities for the people of the area •CSR grant for developing local villages 	
--	--	--

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

- **Project Details**

Name of the Proposal	“Bhawali Pumped Storage Project” (1500MW) at village Jamunde, Tehsil Igatpuri, District Nashik and villages Kalbhonde and Kothale, Tehsil Shahpur District Thane, Maharashtra M/s JSW Energy PSP Two Limited
Proposal No.	Proposal No.: IA/MH/RIV/481391/2024; File No. J-12011/08/2022-IA. I(R)
Location (Including Coordinates)	Upper dam: Jamunde (Igatpuri Tehsil-Nasik) Lower dam: Kalbhonde & Kothale (Shahapur Tehsil - Thane) Upper Reservoir: 19°36'31.69" N ,73°35' 45.06" E; Lower Reservoir: 19°34' 56.38" N,73° 35' 10.0" E
Company's Name	JSW Energy PSP Two Ltd.
CIN no. of Company/user agency	U40108MH2021PLC367136

Accredited Consultant and certificate no.	EQMS India Pvt. Ltd., Karkardooma, Delhi-110092 QCI/NABET/ENV/ACO/2225/0303, Valid up to 23.11.2025.
Project location (Coordinates /River/Reservoir)	Upper Reservoir: 19°36'31.69" N ,73°35'45.06" E; Lower Reservoir: 19°34'56.38" N,73°35'10.0" E
Inter- state issue involved	No
Proposed on River/ Reservoir	Off-stream
Type of Hydro-electric project	Standalone Pump Storage Project.
Seismic zone	Zone III (Moderate Damage Risk Zone)

- **Category Details**

Category of the project	A
Capacity / Cultural command area (CCA)	1500MW/11600 MWH
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	-

- **ToR/EC Details**

ToR Proposal No.	IA/MH/RIV/265129/2022
EAC meeting date	27th meeting held on 09.05.2022.
ToR Letter No.	J-12011/08/2022-IA. I(R)
ToR grant Date	27 th June 2022.
Cost of project	Rs. 8964.02 Crores
Total area of Project	278.92 ha (excluding transmission line ROW)
Height of Dam from Riverbed (EL)	Upper dam: Maximum 48.64m from foundation Lower dam: Maximum 48.15m from foundation
Details of submergence area	169.60 ha
District to provide irrigation facility (if applicable)	Not applicable
Details of tunnels on upper level & lower level and length of canal (if applicable)	Intake tunnel (3 Nos ,7.0 m dia and 67.96 m long) 3 Nos. of Independent Penstocks (5.2 m dia.)- 2 nos. bifurcating into 4 nos. individual units

	<p>(250 MW each) and 1 no. bifurcating for 3 nos. individual unit 1 no. 250 MW unit & 2 nos. 125MW Units).</p> <p>Length of Penstock/Pressure Shaft: 1741m</p> <p>Main TRT (7.0 m dia.;621.17 to 646.57m long)</p> <p>Branched TRT (4.0 m & 5.20 m diameter</p> <p>Total length of TRT: 713.43 m from Draft tube</p>
No. of affected Village.	3
No. of Affected Families	130
Project Benefits	<p>Project benefits <i>inter alia</i> shall include the benefits like (i) Average annual generation of 4044.06 MU of energy with 95% plant availability; (ii) Increased vegetal cover due to implementing of CAT Plan and Green Belt Development Plans (iii) Employment Potential during construction (3000 labour); (iv) Overall development of area by implementing CER initiatives based on the Public hearing issues and Watershed Development Plan.</p>
R&R details	<p>Total Private land to be acquired: 35.18 ha.</p> <p>Displaced families: 10</p> <p>Project Affected Families:130</p> <p>Land acquisition cost: Rs 854.54 lakh</p> <p>R&R Grants: Rs 82.05 lakh</p> <p>Tribal Development Plan: Rs 295 lakh</p> <p>Total: Rs 1232 lakh</p>
Catchment area/ Command area	Catchment :11.72 sq.km; Command area: Nil
Types of Waste and quantity of generation during construction/Operation	MSW-38.8 Ton/annum during construction and 7.2 Ton/annum during operation
Material used for blasting and its composition as per DGMS standards	Ammonium Nitrate Fuel Oil (ANFO), a mixture of ammonium nitrate and fuel oil.
E-Flows for the Project	<p>The inflow of Darna River at upper dam site shall be released from bottom outlet throughout the year. The inflow of Chorni River at lower dam site shall be released from spillway after first filling of reservoir.</p>

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.	No Not applicable, in case of PSP. Not applicable, in case of PSP
Details on provision of fish pass	Pumping operation can have strong impacts like mortality of fishes through turbine passage, change of habitat etc. During operation phase water shall travel through reversible turbines under high pressure from the column of water above it, conditions for organic species are quite tough. Larger species like fish or water animals cannot survive passing through turbines. The diurnal very high extent of water-level fluctuation of about 26 m in the upper reservoir and 30m in lower reservoir may affect changes in the fish-food fauna and cause mortality of fries and fingerlings. Extreme fluctuations can increase turbidity which is detrimental to egg and fry survival. Therefore, no fisheries management plan is proposed in either of pump storage reservoir.
Project benefit including employment details (no of employee)	Benefits from project already stated at S.N.4 Temporary employment during construction: 1575000 man-days Permanent employment during construction :100 Nos.
Area of Compensatory Afforestation (CA) with tentative no of plantation.	243.74 ha (268114 tree saplings)
Previous EC details	None, as EC is yet to be granted
EC Compliance Report by R.O, MOEF&CC	Not applicable

- Electricity Generation Capacity**

Powerhouse Installed Capacity	1500MW
-------------------------------	--------

Generation of Electricity Annually	4044.06 MU
No. of Units	5 X 250MW + 2 X 125 MW

• **Muck Management Details:**

No. of proposed disposal area/ (type of land- Forest/Pvt land)	2 (Forest land)
Cross section of proposed muck area, height of muck with slope.	D-1: Area=22.3ha, Height average=12.50m D-2: Area=22.6ha, Height average=5.5m Slope of muck shall be lesser than 28 ⁰
Distance of muck disposal area(location), from muck generation sources (project area)/River, HFL of proposed muck disposal area.	1.0-2.5 km No river at muck disposal site.
Total Muck Disposal Area	44.90 ha (forest)
Estimate Muck to be generated	Muck to be generated: 64.51 lakh cum Consumed on work: 36.08 lakh cum To be disposed: 28.43 lakh cum
Transportation	By road
Monitoring mechanism for Muck Disposal	The project authorities shall erect a barrier to regulate to and fro movement of traffic from the excavation site. Entry of all vehicles passing the barrier and the information regarding quantities of earth material being transported shall be properly arrayed in a register in a transparent manner and shall be liable to be made public by the project authorities as and when required. Proper e-challan shall be issued.

• **Land Area Breakup:**

Private land	35.18 ha
Forest Land	243.74 ha
Government land	0.00 ha
Submergence area/Reservoir area	169.60
Land required for project components	74.14 ha

- **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	-
National Park	No	Kalsubai Harichandragad Wildlife Sanctuary exists within 10 km of project boundary. However, no part of the project lies within Eco-sensitive zone of the Sanctuary. The nearest project boundary is about 12.5 m from ESZ boundary which has been certified DCF (wildlife), Nashik, Maharashtra
Wildlife Sanctuary	Yes	
Archaeological sites monuments/historical temples etc	No	-
Additional information (if any)	No	-

- **Court case details:** No court case/litigation is pending.
- **Status of other statutory clearances:**

Particulars	Letter no. and date
Status of Stage- I FC	Not, yet. The forest land diversion case submitted vide FP/MH/HYD/153240/2022, dated 06.03.2022, dated 6.3.2022, is under examination.
Approval of Central Water Commission	Hydrology approved vide letter CWC U.O.:7/Maha-2021-Hyd(S)/107, dated 28.6.2022
Approval of Central Electricity Authority	The power potential Studies have been cleared by Directorate (HPA) CEA, New Delhi, vide I/23691/2022, File No. CEA-HY-12-24-4-2021-HPA, Division, dated 16.9.2022.
Additional detail (If any)	The DPR has been submitted to the CEA, New Delhi for concurrence.
Is FRA (2006) done for FC-I	Under progress

- **Details of the EMP:**

S. N.	Plans	Cost (Rs. Lakh)	Capital cost (Rs lakh)	Annual recurring cost (Rs lakh)
1.	Catchment Area Treatment Plan	250.00	210.00	10.00
2.	Compensatory Afforestation Scheme	4854.00	4854.00	0.00
3.	Wildlife and Bio-diversity Management plan	326.00	286.00	10.00
4.	Resettlement & Rehabilitation Plan	1232.00	1232.00	0.00
5.	Green Belt Development Plan	120.00	80.00	10.00
6.	Reservoir Rim Treatment Plan	30.00	30.00	0.00
7.	Fisheries Management Plan	130.00	130.00	0.00
8.	Muck Management Plan	2390.00	2350.00	10.00
9	Restoration Plan for Quarry Sites & landscaping	65.00	45.00	5.00
10.	Disaster Management Plan	30.00	26.0	1.00
11.	Water, Air and Noise Management Plan	140.00	48.00	23.00
12.	Public Health Delivery Plan	95.00	31.00	16.00
13.	Labour Management Plan	160.00	42.00	29.50
14.	Sanitation & Solid Waste Management Plan	145.00	85.00	15.00
15.	Local Area Development Plan	100.00	100.00	0.00
16.	Environmental Safeguards During Const.	316.00	00.00	79.00
17.	Energy Conservation Measures	225.00	15.00	52.50
18.	Environmental Monitoring Plan	140.00	16.00	31.00
19	CER Plan for addressing issues raised during public hearing	600.00	600.00	0.00
20	Watershed Management	500.00	500.00	0.00
Total EMP		11848.00	10680.00	292.00

14.1.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of Environmental Clearance to the project for Bhavali Pumped Storage Project (1500 MW) in an area of 278.92 Ha in Village Kalbhonde, Kothale and Jamunde Sub District Shahapur and Igatpuri, District Thane and Nashik, Maharashtra by M/s JSW Energy PSP Two Limited

The Hydro-electric project is listed as item no. 1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification, 2006, as amended under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).

The project proposal was earlier considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 27th meeting held during 09.05.2022 and recommended for grant of Terms of References (ToR) for the Project. The ToR has been issued by Ministry vide letter No J-12011/08/2022-IA. I(R) dated 27.6.2022.

The EAC noted that the total land requirement under the project for upper and lower rock fill dam, reservoir & other works, has been assessed as 278.92 ha of which private land is 35.18 ha, forest land 243.74 ha. The EAC also noted that, Kalsubai Harichandragad Wildlife Sanctuary exists within 10 km of project boundary. However, no part of the project lies within Eco-sensitive zone of the Sanctuary. The nearest project boundary is about 12.5m from ESZ boundary. Same has been certified by Deputy Conservator of Forest (Wildlife), Nashik, vide letter O.W. No. Cell-4/Survey/C.N.1/7/ Year 2023-24, Date: 06/4/2023. There are no tiger/elephant corridors within the project area.

The EAC members expressed serious concerns about the availability of water for filling the reservoir, as the PP indicated that the reservoir would be filled only once during the rainy season. However, based on existing records, rainfall during the rainy season is very limited. Under these conditions, the reservoir cannot be adequately filled during the monsoon season. The EAC also observed that the regular flow of water in the tream/nalah is crucial for mangrove plants, and any blockage may have negative impacts on them. Additionally, the EAC noted that soil sampling analysis revealed a high carbon content in the soil which has no correlation with the topography of the region.

14.1.4 The EAC after detailed deliberations **deferred** the proposal for want of following additional information:

- i. The Project Proponent (PP) shall re-visit soil sampling analysis as results shows very high contain carbon in Soil analysis and submit the revised results mentioning permissible limits in the results of soil analysis.
- ii. PP shall relocate the location of Muck Disposal site and should be away from Forest land.
- iii. Assessment of water requirement of local population and water availability shall be studied.
- iv. Permission for water availability obtained from CWC /concerned department mentioning that rain water is sufficient for filling one time filling reservoir.
- v. PP shall submit the undertaking stating that no water flow stoppage/blockage shall be done for filling reservoir during monsoon season.
- vi. The PP shall prepare wild life conservation plan in consultation with expert Institutions and submit the wildlife conservation plan approved by Chief Wildlife Warden as Kalsubai Harichandragad Wildlife Sanctuary exists within 10 km of project boundary. As the project cover area is located in Western Ghats, the EAC sub-committee shall conduct site visit for assessing the ground conditions and possible environmental impacts due to project comprehensively before further consideration of the proposal.

- vii. Given that 243.74 ha. Forest land are involved, the PP shall provide a detailed classification /land use pattern /vegetation details of the project area including information on forest density, species diversity, and other relevant ecological characteristics.
- viii. Submit details of tree to be removed for construction of the project.

Agenda Item No. 14.2

Brutang Irrigation Project (CCA 23300Ha) in an area of 3552.06 ha in village Manjari, Sub District, District Nayagrah, Odisha by Chief Engineer Project Planning Formulation and Investigation - Environmental Clearance (EC) - reg.

[Proposal No. IA/OR/RIV/476403/2024; F. No. J-12011/09/2020-IA-I(R)]

14.2.1: The proposal is for grant of Environmental Clearance to the project for Brutang Irrigation Project (CCA 23300Ha) in an area of 3552.06 ha in village Manjari, Sub District, District Nayagrah, Odisha by Chief Engineer Project Planning Formulation and Investigation.

14.2.2: The Project Proponent and the accredited Consultant Centre for Envotech & Management Consultancy Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

- i. The proposal is for grant of Environmental Clearance to the project for Brutang Irrigation Project located at village Manjari, 30 km away from Daspalla town in Nayagarh district of Odisha by Water Resources Department, Govt. of Odisha.
- ii. The project proposal was considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 33rd meeting held during 24.06.2020 and recommended for grant of Terms of References (ToRs) for the Project. The ToR has been issued by Ministry vide letter No.; J-12011/09/2020-IA-I(R)] dated 01.09.2020.
- iii. The geographical co-ordinate of the project are:

Latitude	: 20° 22' 57.83" N
Longitude	: 84° 41' 00.22" E
- iv. Ministry had issued EC earlier vide letter no. J-12011/87/2005-IA-I dated 02.06.2006 in favour of Chief Engineer, Planning, Dept of Water Resources, Govt. of Odisha. 1st extension of validity of EC was also accorded for additional five years i.e. up to 02.06.2016 vide letter No. J-12011/87/2005-IA-I dated 10.01.2013. The project was not given further extension because of delay in application for grant of extension of validity.
- v. Brutang irrigation project contemplates a dam across river Brutang, a tributary of river Mahanadi, near village Manjari, 30 km away from Daspalla town in Nayagarh district of Odisha. This river is located in a hilly area without having sufficient ayacut of its own basin. Hence the water from Brutang reservoir will be fed to the existing Kuanria reservoir through a link canal of 12 km length and the Brutang Main Canal will offtake from Kuanria reservoir through a new head regulator to the right side of Kuanria Dam and will run parallel to the

existing right distributary of Kuanria project for a distance of 9.25 km and thereafter will have a new canal system covering the total ayacut of 23300 ha. The existing features of Kuanria Project are not affected due to feeding of additional water from Brutang reservoir since it will be regulated from Burtang reservoir as per the requirement of Brutang Main Canal.

- vi. **Purpose of the Project:** The purpose of the Project is to irrigate 23300 ha of CCA at an investment cost of Rs. 165872.44 lakhs. The ayacut coverage of Canal System will boost the crop cultivation through assured irrigation water supply. It envisages a Khariff ayacut of 20970 ha and Rabi ayacut of 9320 ha resulting an Annual Irrigation Potential of 30290.00 ha @ 130% irrigation intensity.
- vii. A provision of 360 HaM of surface water has been kept in this project to provide drinking water to 50,000 people of the command area.
- viii. **Land requirement:** Total land required for this project is 3552.06 ha, out of this forest land is 1524.17 ha. At FRL 165.00 m, submerged area = 2077.61 ha, Of which Forest area = 1014.49 ha, Govt. land = 575.43 ha, Private land = 487.69 ha
- ix. Demographic details in 10 km radius of project area:

Total number of villages & towns	385
Number of Households	64096
Total Population	269638
Total number of Males	141553
Total number of Females	128085
Male/ Female (Sex) ratio	942
Percentage of S.C population	14.7%
Percentage of S.T Population	5.7%
Percentage of Literates	72.1%

- x. **Project Cost:** The estimated project cost is Rs165872.00 lakhs. Total capital cost earmarked towards environmental pollution control measures is Rs. and the Recurring cost (operation and maintenance) will be about Rs.43,00,000.00 per annum.
- xi. **Project Benefit:** Total Employment will be 3300 persons during construction phase and 134 persons during operation phase. as direct & persons indirect after expansion. Rs. 3.00 crores has been kept towards CSR activities such as development of local roads, installation of lift irrigation system, piped water scheme for drinking water purpose and construction of community hall. Also Rs.7.5 lakhs has been budgeted towards annual maintenance of above activities.

- xii. **Environmental Sensitive area:** There are Baisipali wildlife sanctuaries (1.29 km), Buguda-Central RF elephant corridor (2.65 km) and Satkoshia gorge (1.29 km) etc. are within 10 km distance from the project site. River/ water body: three streams such as Lapari Nala, Bhimakandha Nala, Kalua Nala other than Brutang River are flowing at a distance of approximately 4.35 km in SW, 7.28 km in Southern, 9.8 km in ENE direction.
- xiii. **Resettlement and rehabilitation:** The Ministry of Tribal Affairs (MoTA) has communicated for clearance of R&R plan vide correspondence No. 20011/8/2003-CP&R/NGO Dated 09.06.2008.
- xiv. **Schedule – I species:**
- Mammals (Manis crassicaudata, Canis lupus pallipes, Elephas maximus, Melarsus ursinus, Mellivora capensis, Ratufa indica, Canis aureus, Hyaena hyaena, Cervus unicolor, Felis chaus, Herpestesedwardsi, Hystrix indica),
 - Birds (Pavocristatus, Spilornixcheela),
 - Reptiles (Python molurus, Varanus bengalensis, Viperaruselli, Ptyasmucosus, Xenochrophis piscator, Lissemys punctata, Chamelaeozeylanicus, Varanus flavescens, NajaKaouthia)
- xv. **Alternative Studies:**
The first two Alternative sites were dropped due to following reasons
- The first site was discarded as the canal would have to traverse in a mountainous terrain, it is to negotiate a large number of CD works. Initial length of canal from pick up weir up to 32.5 km would run practically idle and hence uneconomical.
 - The second site was discarded due to sudden drop of bed level of Brutang river at downstream of Pehelaju which is at 90.50m, whereas the command level of canal is required to be 118.00m and thus a high pick up weir is required.
- xvi. **Baseline Environmental Scenario:** Pre-Monsoon : March to May 2021, Monsoon : June to sept 2021 Post-Monsoon: Oct to Dec 2021

AAQ parameters at 06 locations (min. & Max.)	Pre-Monsoon
	<input type="checkbox"/> PM10 = 54.2 to 61.2 µg/m ³ <input type="checkbox"/> PM2.5 = 27.2 to 32.2 µg/m ³ <input type="checkbox"/> SO ₂ = 7.2 to 12.2 µg/m ³ <input type="checkbox"/> NO _x = 10.8 to 18.26 µg/m ³ <input type="checkbox"/> CO = 0.31 to 0.45 mg/m ³
	Post-Monsoon
	<ul style="list-style-type: none"> • PM10 = 51.64 to 59.72 µg/m³ • PM2.5 = 25.76 to 30.84 µg/m³ • SO₂ = 7.04 to 11.33 µg/m³ • NO_x = 9.5 to 15.8 µg/m³

	<ul style="list-style-type: none"> CO = 0.21 to 0.43 mg/m³
River water samples (2 samples)	<p>Pre-Monsoon</p> <p>pH: 7.26 to 7.62, Total Hardness (as CaCO₃): 142 to 146 mg/lit & Total Alkalinity (asCaCO₃):106 to 118 mg/lit; Calcium (as Ca): 35.3 to 36.1 mg/lit; Magnesium (as Mg): 13.1 to 13.6 mg/lit; Oil and grease: <1to <1 (mg/lit); Sulphate (as SO₄): 18.4 to19.1 mg/lit, Nitrate (asNO₃) :4.3 to 5.4 mg/lit;; Iron (as Fe): 0.35 to 0.41 mg/lit; BOD 2.2 to2.3 mg/lit;</p> <p>Heavy metals like Copper (as Cu)-0.19 to 0.25, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05, Manganese (as Mn), Arsenic (as As)- <0.001 and Mercury (as Hg) - <0.001</p>
Pond water samples quality at 3 locations	<p>pH: 7.43to 7.58, Total Hardness (as CaCO₃): 150to 164 mg/lit & Total Alkalinity (asCaCO₃):110to 120 mg/lit; Calcium (as Ca): 37.7to 42.5 mg/lit; Magnesium (as Mg) :13.6to 14.6 mg/lit; Oil and grease: <1to <1 (mg/lit); Sulphate (as SO₄): 14.6to18.8 mg/lit, Nitrate (asNO₃) :5.6to 6.4 mg/lit; Chloride (as Cl) : ---to --- mg/lit; Iron (as Fe): 0.31to 0.35 mg/lit; BOD 2.0to2.6 mg/lit;</p> <p>Heavy metals like Copper (as Cu)-0.23 to 0.41, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05,</p>
River water samples (2 samples)	<p>Monsoon</p>
	<p>pH7.46 to 7.71, Total Hardness (as CaCO₃): 126 to 132 mg/lit & Total Alkalinity (asCaCO₃):110 to 122 mg/lit; Calcium (as Ca): 32.1 to 32.9 mg/lit; Magnesium (as Mg) :11.2 to 12.2 mg/lit;</p>

	<p>Oil and grease: <1to <1 (mg/lit); Sulphate (as SO₄): 15.1 to16.2 mg/lit, Nitrate (asNO₃) :4.8 to 6.1 mg/lit;</p> <p>Iron (as Fe): 0.29 to 0.33 mg/lit;</p> <p>BOD 2.5 to2.6 mg/lit;</p>
Pond water samples quality at 3 locations	<p>Heavy metals like</p> <p>Copper (as Cu)-0.13 to 0.19, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05, Manganese (as Mn), Arsenic (as As)-<0.001 and Mercury (as Hg)- <0.001</p>
	<p>pH: 7.62 to 7.75,</p> <p>Total Hardness (as CaCO₃): 134 to 146 mg/lit & Total Alkalinity (asCaCO₃):116 to 128 mg/lit;</p> <p>Calcium (as Ca): 34.5 to 37.7 mg/lit; Magnesium (as Mg) :11.7 to 13.6 mg/lit;</p> <p>Oil and grease: <1to <1 (mg/lit); Sulphate (as SO₄): 11.4 to15.3 mg/lit, Nitrate (asNO₃):6.6 to 7.2 mg/lit;</p> <p>Iron (as Fe): 0.22 to 0.26 mg/lit;</p> <p>BOD 2.0 to2.6 mg/lit;</p>
	<p>Heavy metals like</p> <p>Copper (as Cu)-0.18 to 0.34, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05, Manganese (as Mn), Arsenic (as As)-<0.001 and Mercury(as Hg)- <0.001</p>
River water samples (2 samples)	<p>Post-Monsoon</p> <p>pH7.33 to 7.63,</p> <p>Total Hardness (as CaCO₃): 136 to 140 mg/lit & Total Alkalinity (asCaCO₃):110 to 122 mg/lit;</p> <p>Calcium (as Ca): 34.5 to 35.3 mg/lit; Magnesium (as Mg): 12.2 to 12.6 mg/lit;</p> <p>Oil and grease: <1to <1 (mg/lit); Sulphate (as SO₄): 17.2 to18.2 mg/lit, Nitrate (asNO₃) :3.8 to 4.6 mg/lit;</p> <p>Iron (as Fe): 0.32 to 0.39 mg/lit;</p> <p>BOD 2.4 to2.5 mg/lit;</p>

	<p>Heavy metals like</p> <p>Copper (as Cu)-0.16 to 0.22, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05, Manganese (as Mn), Arsenic (as As)-<0.001 and Mercury (as Hg)- <0.001</p>
Pond water samples quality at 3 locations	<p>pH7.54 to 7.66,</p> <p>Total Hardness (as CaCO₃): 142 to 158 mg/lit & Total Alkalinity (asCaCO₃):116 to 128 mg/lit; Calcium (as Ca): 36.9 to 40.9 mg/lit; Magnesium (as Mg) :12.2 to 14.6 mg/lit; Oil and grease: <1to <1 (mg/lit); Sulphate (as SO₄): 13.2 to17.6 mg/lit, Nitrate (asNO₃) :4.4 to 5.6 mg/lit; Iron (as Fe): 0.28 to 0.30 mg/lit; BOD 2.2 to2.7 mg/lit;</p>
	<p>Heavy metals like</p> <p>Copper (as Cu)-0.21 to 0.38, Lead (as Pb)-<0.1, Cadmium (as Cd)-<0.003, Chromium (as Cr)-<0.05, Manganese (as Mn), Arsenic (as As)-<0.001 and Mercury (as Hg)- <0.001</p>
Ground Water samples at 5	Pre-monsoon
	<p>Total Dissolved Solids: 248.2 to 327.4 mg/lit; Total Hardness (as CaCO₃): 168 to 192 mg/lit; Total Alkalinity(asCaCO₃): 108 to 126 mg/lit; Calcium (as Ca): 46.3 to 54.8 mg/lit; Magnesium (as Mg): 10.9 to 13.8 mg/lit; Oil and grease: (<1.4 mg/lit); Sulphate (asSO₄): 20.8 to 26.6 mg/lit, Nitrate (asNO₃): 1.6 to 4.4 mg/lit; Chloride (as Cl): 14.9 to 90.9 mg/lit; Iron (as Fe):0.18 to 0.28 mg/lit; Heavy metals like Copper (as Cu)-<0.03, Lead (as Pb)-<0.1, Cadmium (as Cd) - <0.003, Chromium (as Cr)-<0.05, Manganese (as Mn)- <0.02, Arsenic (as As)- <0.001 and Mercury (as Hg)-<0.001</p>

Ground Water samples at 5	Monsoon
	<p>pH: 6.83to 7.56;</p> <p>Total Dissolved Solids: 242.6to 311.8 mg/lit;</p> <p>Total Hardness (as CaCO₃): 172to 194 mg/lit;</p> <p>Total Alkalinity(asCaCO₃): 110to 130 mg/lit;</p> <p>Calcium (as Ca): 48.2to 58.3 mg/lit; Magnesium (as Mg): 11.8to 12.9 mg/lit;</p> <p>Oil and grease: (<1.4 mg/lit); Sulphate (asSO₄): 17.3to 23.6 mg/lit,</p> <p>Nitrate (asNO₃): 1.7to 4.2 mg/lit; Chloride (as Cl): 9.9 to 82.9 mg/lit; Iron (as Fe): 0.13to 0.22 mg/lit; Heavy metals like</p> <p>Copper (as Cu)-<0.03, Lead (as Pb)-<0.1, Cadmium (asCd) - <0.003, Chromium (as Cr)-<0.05, Manganese (as Mn)- <0.02, Arsenic (as As)- <0.001 and Mercury (as Hg)-<0.001</p>
Ground Water samples at 5	Post-Monsoon
	<p>pH: 6.72to 7.43;</p> <p>Total Dissolved Solids: 266.4to 318.6 mg/lit;</p> <p>Total Hardness (as CaCO₃): 170to 190 mg/lit;</p>
	<p>Total Alkalinity(asCaCO₃): 118to 136 mg/lit;</p> <p>Calcium (as Ca): 48.2 to 54.4 mg/lit; Magnesium (as Mg): 12.5to 14.5 mg/lit;</p> <p>Oil and grease: (<1.4 mg/lit); Sulphate (asSO₄): 19.4to 25.2 mg/lit,</p> <p>Nitrate (asNO₃): 1.4to 3.9 mg/lit; Chloride (as Cl): 11.9 to 86.9 mg/lit; Iron (as Fe): 0.16to 0.25 mg/lit; Heavy metals like</p> <p>Copper (as Cu)-<0.03, Lead (as Pb)-<0.1, Cadmium (as Cd) - <0.003, Chromium (as Cr)-<0.05, Manganese (as Mn)- <0.02, Arsenic (as As)- <0.001 and Mercury (as Hg)-<0.001</p>
Noise levels Leq (Day & Night) at 6 locations	Pre-Monsoon
	<p>The Leq values for day time was observed to be 49.3 to 52.3 dB (A) in residential area, while during night time 42.5 to 44.4 dB (A).</p>

Noise levels Leq (Day & Night) at 6 locations	Monsoon
	The Leq values for day time was observed to be 47.0 to 50.0 dB (A) in residential area, while during night time 40.2to 42.1 dB (A).
Noise levels Leq (Day & Night) at 6 locations	Post-Monsoon
	The Leq values for day time was observed to be 48.1 to 51.1 dB (A) in residential area, while during night time 41.3to 43.2 dB (A).
Soil Quality at 9 Locations	Pre-Monsoon
	Bulk density:0.94 to 1.15 gm/cm ³ ; pH range 7.02 to 7.45; Electrical conductivity (EC);208.7 to 234.2 µmhos/cm; Calcium content: 362.2 to 396.3mg/kg; sodium:180.6 to 210.0 mg/kg; potassium:101.4 to 120.6 mg/kg; Nitrogen: 478.2 to608.2 mg/kg; Phosphorous: 20.6 to32.8 mg/kg; Magnesium: 165.2 to 180.4 mg/kg; Organic
Soil Quality at 9 Locations	Monsoon
	Bulk density:0.82 to 1.02 gm/cm ³ ; pH range 7.28 to 7.72;
Soil Quality at 9 Locations	Electrical conductivity (EC);162.6 to 201.4 µmhos/cm; Calcium content: 351.4 to 382.6mg/kg; sodium:161.6 to 201.6 mg/kg; potassium:92.3 to 119.3 mg/kg; Nitrogen: 458.2 to589.2 mg/kg; Phosphorous: 16.4 to29.2 mg/kg; Magnesium: 158.6 to 173.4 mg/kg;
	Post-Monsoon
	Bulk density:0.88 to 1.11 gm/cm ³ ; pH range 7.16 to 7.61; Electrical conductivity (EC);188.8 to 218.6 µmhos/cm; Calcium content: 357.2 to 389.4mg/kg; sodium:172.2 to 206.4 mg/kg; potassium:98.6 to 117.2 mg/kg; Nitrogen: 466.4 to596.4 mg/kg; Phosphorous: 18.9 to31.2 mg/kg;

	Magnesium: 162.8 to 178.6 mg/kg;
Flora & Fauna Schedule-I species observed in the study area	<p>Mammals: (Manis crassicaudata, Canis lupus pallipes, Elephas maximus, Melarsus ursinus, Mellivora capensis, Ratufa indica, Canis aureus, Hyaena hyaena, Cervus unicolor, Felis chaus, Herpestes edwardsi, Hystrix indica)</p> <p>Birds: (Pavocristatus, Spilornix cheela),</p> <p>Reptiles: (Python molurus, Varanus bengalensis, Viperaruselli, Ptyasmucosus, Xenochrophis piscator, Lissemys punctata, Chamelaeozeylanicus, Varanus flavescens, Naja Kaouthia)</p>

xvii. The salient details of the project are as follows:

1. Project details:

Name of the Proposal	Brutang Irrigation Project
Proposal No	IA/OR/RIV/476403/2024
Location (Including coordinates)	Village Manjari in Dasapalla Block under Nayagarh District, Odisha.
Company's Name	Department of Water resources, Govt. of Odisha.
CIN no. of Company/user agency	
Accredited Consultant and certificate no.	Centre for Envotech and Management Consultancy Pvt. Ltd. Certificate No: NABET/EIA/2124/RA 0243
Project location (Coordinates /River/ Reservoir)	Latitude : 20 ⁰ 22' 57.83" N Longitude : 84 ⁰ 41' 00.22" E
Inter- state issue involved	No
Proposed on River/ Reservoir	River Brutang
Type of Hydro-electric project	NA
Seismic zone	Zone-II

2. Category details:

Category of the project	River Valley Projects
Capacity / Cultural command area (CCA)	23300 ha

Attracts the General Conditions (Yes/No)	No
Additional information (if any)	NA

3. ToR/EC Details:

ToR Proposal No.	IA/OR/RIV/152878/2020
EAC meeting date	24.06.2020
ToR Letter No.	J-12011/09/2020-IA-I (R)
ToR grant Date	01.09.2020
Cost of project	165872.00 lakhs
Total area of Project	3552.06 ha
Height of Dam from River Bed (EL)	42.00 M
Details of Submergence area	2077.61 ha
District to provide irrigation facility (if applicable)	Nayagarh District
Details of tunnels on upper level & lower level and length of canal (if applicable)	No tunnel construction will be done. Canal length: 71.5 km
No. of affected Village.	41
No. of Affected Families	As per approved plan- 680 As per present assessment -1034
Project Benefits	Brutang Irrigation Project envisages assured irrigation to 30290 ha. Kharif and Rabi cultivation and financial benefit by Rs.31892.512 lakhs per annum. The State Govt. intends to achieve food security and social upliftment of the people by initiating this project proposal.
R&R details	There are 41 nos. of submerged villages so there is displacement. Some families are losing their land for canal network for which they will get compensation. The Ministry of Tribal Affairs (MoTA) has communicated for clearance of R&R plan vide correspondence No. 20011/8/2003-CP&R/NGO Dated 09.06.2008.
Catchment area/ Command area	Catchment Area- 725 Sq Km Gross Command Area (GCA) = 31110 ha. Culturable Command Area (CCA) = 23300 ha

Types of Waste and quantity of generation during construction/ Operation	Spoils will be generated during construction of dam and canals. Spoils from Base stripping, excavation of foundation etc. would account for about 3000MT. Most of the spoils would be reutilized for area levelling and temporary Haul Roads.
Material used for blasting and its composition as per DGMS standards.	Explosive will be used for a very small period related to Blasting of Hard Rock in the foundation.
E-Flows for the Project	Attached as Appendix-1
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	30% in monsoon season, 20% in lean season and 25% in non-monsoon & non-lean season, to be followed corresponding to flow of 90% dependable year.
Details on provision of fish pass	Provision for fish pass will be kept through Construction sluice and proposed link Channel to Kuanria Reservoir.
Project benefit including employment details (no of employee)	Brutang Irrigation Project envisages assured irrigation to 30290 ha. Kharif and Rabi cultivation and financial benefit by Rs.31892.512 lakhs per annum. The State Govt. intends to achieve food security and social upliftment of the people by initiating this project proposal. No. of Employee: During Construction- 3300 Nos. During Operation- 134 Nos.
Area of Compensatory Afforestation (CA) with tentative no of plantation.	CA Land- 1524.17 ha Non-Forest Land. 1000 Nos. of Plants per hectare in identified Land.

Previous EC details	<p>Environmental Clearance accorded to this project earlier vide letter no. J-12011/87/2005-IA-I dated 02.06.2006.</p> <p>1st extension of validity of EC accorded for additional five years i.e. up to 02.06.2016 vide letter No. J-12011/87/2005-IA-I dated 10.01.2013.</p> <p>The project was not given further extension because of delay in application for grant of extension of validity, which is reflected in minutes of the 21st meeting of the EAC for River Valley and Hydroelectric Projects held on 28.01.2019 at Teesta meeting hall Indira Paryavaran Bhawan, New Delhi.</p>
EC Compliance Report by R.O, MOEF&CC	Not Applicable

4. Muck Management Details:

No. of proposed disposal area/ (type of land-Forest/Pvt land)	In places such as low pockets at the downstream of dam, haul roads, temporary approach roads to quarry & borrow areas.
Cross section of proposed muck area, Height of muck with slope.	Not Required
Distance of muck disposal area (location), from muck generation sources (project area)/River, HFL of proposed muck disposal area.	<p>Muck disposal areas is appx. within 5 Km radius of the Dam site</p> <p>Earth debris Filling & leveling of low pockets at the downstream of dam for developing garden, Backfilling of borrow areas and low pockets around the colony.</p> <p>Excavated rock debris Construction of haul roads, temporary approach roads to quarry & borrow areas.</p> <p>Debris from stone quarry Debris to be reused for restoration of quarry and back filling after the</p>

	construction period is over. Domestic garbage from project owned colony Transported to a distant incineration around (low laying pit) and burn to ashes.
Total Muck Disposal Area	Not Required as it will be used in the haul and quarry roads
Estimate Muck to be generated	3300 MT
Transportation	By truck of 25 ton capacity
Monitoring mechanism for Muck Disposal Transportation	By usual conveyance method as it is only around 1700 Cum

5. Land Area Breakup:

Private land	1237.01 ha
Government land/Forest Land	790.88/ 1524.17 ha
Submergence area/Reservoir area	2077.61 ha
Land required for project components	1474.45 ha

6. 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	Baisipalli RF, Central RF, Nashaghar RF
National Park		
Wildlife Sanctuary	Yes	Baisipalli Wildlife Sanctuary
Archaeological sites monuments/historical temples etc.	No	
Additional information (if any)	Yes	Buguda-Central Reserve Forest Elephant Corridor, Satkosia Tiger Reserve.

Availability of Schedule-I species in study area:

Mammals: *Manis crassicaudata*, *Canis lupus pallipes*, *Elephas maximus*, *Melarsus ursinus*, *Mellivora capensis*, *Ratufa indica*, *Canis aureus*, *Hyaena hyaena*, *Cervus unicolor*, *Felis chaus*, *Herpestes edwardsi*, *Hystrix indica*.

Birds: *Pavo cristatus*, *Spilornix cheela*.

Reptiles: *Python molurus*, *Varanus bengalensis*, *Vipera ruselli*, *Ptyas mucosus*, *Xenochrophis piscator*, *Lissemys punctata*, *Chamelaeo zeylanicus*, *Varanus flavescens*, *Naja Kaouthia*.

7. Public Hearing (PH) details:

Advertisement for PH with date	12.01.2024 on “The Times of India” & “Prameya”
Date of PH	16.02.2024
Venue	Ground located at Banka Taila school under Dasapalla tahasil of Nayagarh district.
Chaired by	Sri Dilip Kumar Bal, ADM Nayagarh Er. Deepak Kumar Sahoo, RO SPCB
Main issues raised during PH	<ul style="list-style-type: none"> • Identification and demarcation of allotted land to the beneficiaries. • Permanent RoR should be issued to the displaced families of Kuanria Dam on priority basis. • The Government shall pay proper compensation for the land proposed to be acquired. • All the adult males and unmarried adult women shall be treated as separate families and accordingly compensation shall be paid to them. Government shall allocate homestead patta land and 5 to 10 acres agricultural land to each displaced person. • The rehabilitation colony shall be located close to the National Highway with proper road connectivity with NH.
No. of people attended	80 Nos.

8. Brief of baseline Environment:

Particulars	Details
Period of baseline data collection/Sampling period.	March to May 2021 October to December 2021
Air Pre-Monsoon	March to May 2021

Post-Monsoon	October to December 2021
Noise	April & April 2021
Pre-Monsoon	July to July 2021
Monsoon	November & November 2021
Post-Monsoon	
Water	March to May 2021
Pre-Monsoon	July 2021
Monsoon	October to December 2021
Post-Monsoon	
Soil	March to May 2021
Pre-Monsoon	July 2021
Monsoon	October to December 2021
Post-Monsoon	
flora and fauna of the project area,	March, August and October 2021
aquatic ecology, etc.	March, August and October 2021
Brief description on hydrology and water assessment as per the approved Pre-DPR:	The catchment area of Brutang near proposed dam at Manjari site is 725 sq. km. lies entirely in Odisha state. The yield series has been generated from the discharge data of Manjari and Banigochha gauge site for a period of 32 year i.e. 1964-1995. The 75% Dependable yield for the project site is 19196.00 Ham.
Additional detail (If any)	No

9. Court case details:

Court Case	No
Additional information (if any)	No

10. Status of other statutory clearances

Particulars	Letter no. and date
Status of Stage-I FC	F.No.8-23/2010-FC of MoEF&CC (Forest Division) dated 9 th September, 2010.

Approval of Central Water Commission	TEC for Brutang project was discussed in the 75 th meeting of CWC held on 18.12.2000 and accepted the project techno economically viable.
Approval of Central Electricity Authority	NA
Additional detail (If any)	---
Is FRA (2006) done for FC-I	Yes

11. Details of the EMP

Activities	Capital cost (Crores)	Recurring cost (Lakhs/annum)
Pre-Construction Stage	2.04	20.00
Construction Stage	0.99	9.00
Operation Stage	0.11	1.00

14.2.3 The EAC during deliberations noted the following:

- The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of Environmental Clearance to the project for Brutang Irrigation Project located at village Manjari, 30 km away from Daspalla town in Nayagarh district of Odisha by Water Resources Department, Govt. of Odisha.
- The project site is located within 10km radius of Baishipalli wildlife sanctuary. So, the General Conditions of the EIA Notification, 2006 as amended are applicable.
- The project is listed at S.N.1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification, 2006 under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).
- The EAC, constituted under the provision of the EIA Notification, 2006 comprising Expert Members/domain experts in various fields, examined the proposal submitted by the Project Proponent in desired format along with EIA/EMP reports prepared and submitted by the Consultant accredited by the QCI/ NABET on behalf of the Project Proponent.
- The EAC noted that the Project Proponent has given an undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP reports. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.
- The Committee noted that the EIA reports are in compliance of the ToR issued for the project, reflecting the present environmental status and the projected scenario for all the environmental

components. The Committee deliberated on the proposed mitigation measure towards Air, Water, Noise and Soil pollutions. The Committee suggested that the storage of toxic/explosive raw materials/products shall be undertaken with utmost precautions and following the safety norms and best practices.

- The Terms of References (ToRs) has been issued by Ministry vide letter No. J-12011/09/2020-IA-I(R)] dated 01 September 2020. The EAC noted that Total land required for this project is 3552.06 ha, out of this forest land is 1524.17 ha. At FRL 165.00 m, submerged area is 2077.61 ha, of which Forest area is 1014.49 ha, Govt. land is 575.43 ha, Private land is 487.69 ha . Stage-I FC has been obtained vide F.No.8-23/2010-FC of MoEF&CC (Forest Division) dated 9th September, 2010. The estimated project cost is Rs165872.00 lakhs. Total capital cost earmarked towards environmental pollution control measures is Rs. and the Recurring cost (operation and maintenance) will be about Rs.43,00,000.00 per annum.
- The Committee deliberated on the Public Hearing (PH) issues along with action plan submitted by the proponent to address the issues raised during the public hearing and found it satisfactory. The committee advised the PP to implement the PH action plan in a time bound manner. In view of presence of tribal population in the study area the EAC felt the need for establishing Skill Development Centres for locals, promotion of local tribal products through proper marketing for the same under supervision of Project Proponent. The Committee was also of the view that PP should bear the responsibility to provide amenities like setting up schools, solar panel, computer with internet facility in schools, pure drinking water facility for overall upliftment of tribal population.

14.2.4 The EAC after examining the information submitted and detailed deliberations **recommended** the proposal for grant of Environmental Clearance by the Ministry to Brutang Irrigation Project located at village Manjari, 30 km away from Daspalla town in Nayagarh district of Odisha by Water Resources Department, Govt. of Odisha, under the provisions of EIA Notification, 2006 and as amended with subject to compliance of applicable Standard EC conditions with the following additional conditions:

[A] Environmental management and Biodiversity conservation:

- i. The water of rainfall yield of self-catchment of the reservoir shall be released to downstream through body of dam/ barrage/ embankment etc.
- ii. The water for filling of reservoir/ recoupment of evaporation and recirculation losses shall be met from a source other than the rainfall yield of catchment of non-perennial stream/ nallah.
- iii. The Environmental Management Plan (EMP) shall be strictly adhered to as submitted in the EIA/EMP reports. The budgetary provisions for implementation of EMP, shall be fully utilized and not to be diverted to any other purpose. In case of revision of the project cost or due to price level change, the cost of EMP shall also be updated proportionately.
- iv. The contract clause limiting the No. of vehicles used during excavation and transportation shall followed scrupulously and the same shall informed to the ministry.

- v. Ambient Air Quality Monitoring Stations for real time data to be installed at project site before commencement of the construction, shall be displayed at project site and its report to be submitted to IRO, MoEF&CC.
- vi. No vehicle purchase shall be allowed from funds earmarked for implementation of Wildlife Conservation plan. Measures for minimizing the human–animal conflict specially for black bear and leopard be suitably incorporated in the wildlife conservation plan in consultation with State Forest Department.
- vii. 10000 plants shall be planted around the muck disposal area and the survival of plants shall be submitted with the 6 monthly compliance report.
- viii. Watershed development plan prepared in consultation with ICAR/expert Govt. institute be implemented within 10 km radius of the project. Implementation status be submitted in the 6 monthly compliance report to the concerned regional office of the Ministry.
- ix. In view of proximity of the wildlife sanctuary proper path ways be constructed for safe movement of wildlife in the region. An action plan in this regard be prepared in consultation with State Forest and Wildlife Department.

[B] Disaster Management:

- i. Disposal of the excavated muck and its filling on the low-lying area with proper measures for the stabilization and greenery to minimize the impacts of the generated construction muck shall be taken up pari passu with construction work.
- ii. Stabilization of muck disposal sites using biological and engineering measures shall be taken up immediately to ensure that muck does not roll down the slopes and does not pollute the natural streams and water bodies in surrounding area. The plantation on muck disposal site with local species for restoration of ecology and environment of the project site area.
- iii. Necessary control measures such as water sprinkling arrangements, and construction of paved roads leading to muck disposal sites etc. shall be taken up on priority to arrest fugitive dust at all the construction sites.
- iv. Solid waste generated, especially plastic waste, etc. should not be disposed of as landfill material. It should be treated with scientific approach and recycled. Use of single-use plastics may be discouraged.

[C] Socio-economic:

- i. Land acquired for the project shall be suitably compensated in accordance with the prevailing guidelines of the state government and provisions under Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
- ii. Solar panel be provided to the families living in rural areas within 10 km radius of project.
- iii. School up to 12th Standard with smart classrooms shall be established to provide quality education for children from project affected villages/Tribal villages.
- iv. The compliance of above conditions shall be monitored by IRO, MoEF&CC and regularly site visit once in year. The compliance report of IRO shall be regularly submitted to MoEF&CC.

- v. 50 bed multi-speciality hospital shall be established to cater the need of tribal population/locals. The tribal population within 10 km radius of the project shall be given free of cost medical facility.
- vi. Skill development Centre shall be established within 10 km radius of the project and regular training programmes for development and promotion of traditional art/products of tribal/local population.

[D] Miscellaneous:

- i. After 5 years of the commissioning of the project, a study shall be undertaken regarding impact of the project on the environment. The study shall be undertaken by an independent agency.
- ii. Bio-Gas plant shall be installed in the Project affected villages @ per family for Utilizing Cattle waste (Cow Dung) into renewable source of fuel.
- iii. PP should establish in house (at project site) environment laboratory for measurement of environment parameter with respect to air quality and water (surface and ground). A dedicated team to oversee environment management shall be setup which should comprise of Environment Engineers, Laboratory chemist and staff for monitoring of air, water quality parameters on routine basis.
- iv. PP shall procure construction material only from those Organizations having all valid legal/statutory clearances/permissions or necessary permission to be obtained for quarrying construction materials for the project as per the EIA Notification, 2006 and as amended thereof.
- v. An institutional mechanism to be developed to ensure the preference of jobs to PAFs and also a policy for preferential treatment for award of sundry works to the PAFs and their dependents.

Agenda Item No. 14.3:

Amalpada Pumped Storage Hydro Electric Project (300 MW) in an area of 293.65ha in village Amalpada, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited – Terms of References (TOR) - reg.

[Proposal No. IA/GJ/RIV/483991/2024; F. No. J-12011/24/2024-IA-I(R)]

14.3.1: The proposal is for grant of Terms of Reference (ToR) to the project for Amalpada Pumped Storage Hydro Electric Project (300 MW) in an area of 293.65ha in village Amalpada, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.

14.3.2: The Project Proponent and the accredited Consultant M/s Aarvee Associates, Architects, Engineers and Consultants Private Limited, made a detailed presentation on the salient features of the project and informed that:

- i. Amalpada Pumped Storage Project (SLPSP) is an Off-Stream Closed Loop Pumped Storage development, proposed with an installed capacity of 300MW/1812MWh.

- ii. The project is located near Amalpada village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°23'24.11"N and longitude 73°42'29.79"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°22'36.12"N and longitude 73°42'43.68"E.
- iii. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 10.51 MCM (0.0371 TMC) & 7.79 MCM (0.275 TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 82.00m (from deepest bed level) to create the desired storage capacity while the lower reservoir will have maximum height of 21.00 m (from bed level) constructed at the downhill.
- iv. The one-time filling of the PSP will be carried out from Ukai reservoir, which is about 3.00 Kms from the proposed lower reservoir. The scheme of operation for the project is with 6.04 Hours of peak hour generation per day and 7.05 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.
- v. **Alternative studies** carried out for various major components of the project and final choice of the project parameters.

A detailed alternative studies have been carried out to identify five numbers of potential PSP sites on the right bank of Ukai reservoir. Summary of the alternatives considered is as follows:

- In the current studies, a total of 21 reservoir locations were selected in the initial phase and 23 Alternatives with different combinations of these reservoirs were studied.
- Alternatives with different combinations of these reservoirs were studied.
- Reservoirs- 14 & 17 (R- 14 & R- 17) were observed with high R&R issues and hence the alternatives formed with these two reservoirs (Alternative- 16, 18, 19 & 20) were not considered for further studies.
- Alternatives- 2, 3, 4, 5, 7, 8, 10, 14, 15, & 23 were observed with very high L/H ratio and therefore were not considered for further studies.
- Alternatives- 1, 6, 11, 12, 13, 17, 21 & 22 were studied on their Techno- Commercial Feasibility and top 5 Alternatives were selected based on technical ranking.
- Final selected alternatives are- Alternative 1, 6, 13, 17 & 22

Further, on selected Alternative, two options of powerhouse have been studied.

❖ **Alternative-A:** Alternative-A with a surface powerhouse.

❖ **Alternative-B:** Alternative-B with an underground powerhouse.

Possibility of Surface powerhouse is studied and found not suitable due to negative pressures in the WCS in transient analysis.

Therefore, **Alternative-B** with Underground powerhouse is selected for further studies.

- vi. Total land required for the construction of proposed activities is approximately 293.65 ha. break up of land required for different components is given below. A major part of land is belonging to forest land. The whole land is free from any wildlife sanctuary and national park.

Sl.No	Component	Private Land (Ha)	Forest Land (Ha)	Total Area (Ha)
1	Upper Reservoir including intake and roads	-	89.87	89.87
2	Lower Reservoir including intake and roads	-	131.21	131.21
3	Penstock	-	2.53	2.53
4	Powerhouse	-	5.57	5.57
5	Tail Race Tunnel	-	6.52	6.52
6	Adits	-	4.75	4.75
7	Water filling	-	1.00	1.00
8	Muck disposal areas	49	-	49
9	Site office	3.2	-	3.2
10	Magazine area			
11	Labour camp and colony area			
	TOTAL	52.20	241.45	293.65

- vii. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site.

viii. **Cost and Benefits of the Scheme:**

The total estimated cost of the project including direct and indirect charges excluding Interest during construction is Rs.1772.19 Cr. For the installed capacity of 300 MW, the cost per MW of installed capacity (excluding IDC) works out to be Rs. 5.91 Cr. The project would generate designed energy of 627.96 MU. Other benefit of this storage project can be in the form of spinning reserve with almost instantaneous start-up from zero to full power supply, supply of reactive energy, primary frequency regulation, voltage regulation etc.

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

Source:	Construction Camps/ Labour Camps	
Quantity (TPA):	365	

Mode of disposal:	Nearest Municipal Dumping yards operated and maintained by the respective Municipalities	
Mode of transport:	Road	
	Calculation of Solid Waste	
	Waste generated per person in kg/day =	0.5
	No. of labours =	450
	Total waste generated per day in kg =	225
	Total waste generated per day in Tonnes =	0.225
	Total waste generated per day in Tonnes per Annum	82.125

Quantity of muck =	42,20,205.97 Cum (for 3 years)
density of muck =	1500 kg/m ³
Quantity of muck in kg =	6,330,308,955 kg for 3 years
	2,110,102,985 kg for 1 year
	2,110,102.985 TPA

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

- **Project details:**

Name of the Proposal	Amalpada Hydro-Electric Pumped Storage Project (300 MW)
Location (Including coordinates)	The project is located near Amalpada village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°23'24.11"N and longitude 73°42'29.79"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°22'36.12"N and longitude 73°42'43.68"E.
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project area lies in the seismic zone-III which falls in moderate zone.

- **Category details:**

Category of the project	Category A
Provisions	Pumped Storage Project
Capacity / Cultural command area (CCA)	300 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

- **Electricity generation capacity:**

Powerhouse Installed Capacity	300 MW
Generation of Electricity Annually	627.96 MU
No. of Units	2 (Each of 150 MW)
Additional information (if any)	Nil

- **ToR/EC Details:**

Cost of project	Total Hard Cost of the project is Rs. Rs. 177219.00 Lakhs (1772.19 Cr).
	Total cost of the project including IDC is Rs 198304.00 Lakhs (1983.04 Cr)
Total area of Project	293.65 Ha
Height of Dam from Riverbed (EL)	82 m for Upper reservoir dam and 21 m for Lower reservoir daM
Length of Tunnel/Channel	2 nos; 6 m dia Main Pressure Shaft – 331.05 m (L) 2 nos; 8.2 m dia Main TRT – 619.45 m (L)
Details of Submergence area	The Submergence area of the proposed project area lies in forest area of 113.86 Ha.
Types of Waste and quantity of generation during construction/ Operation	Sewage and solid waste generated at the construction staff colony/ project colony shall be adequately treated/ disposed to avoid water pollution and associated public health problems. Adequate measures will be undertaken to dispose the sewage and waste generated from the labour camps. Appropriate management measures will be recommended as a part of the Comprehensive EIA study.

E-Flows for the Project	Stream flow is not disturbed by the project. The proposed project is an off-stream closed loop project with an installed capacity of 300MW/1812 MWH.
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.	N/A

• **Muck Management Details:**

No. of proposed disposal area/(type of land-Forest/Pvt. land)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 42.21 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 49 Ha has been earmarked for the Muck Dumping area.
Monitoring mechanism for Muck Disposal	The project authorities have identified suitable muck disposal sites which are not located near the riverbanks.

• **Land Area Breakup:**

Private land	52.20 Ha
Government land/Forest Land	0 Ha/241.45 Ha
Submergence area/Reservoir area	The Submergence area of the proposed project area lies in forest area of 113.86 Ha. The proposed project is an off stream closed loop project with an

	installed capacity of 300MW/1812 MWH. The land required for the proposed upper reservoir and upper intake is 89.87 ha and the land required for the proposed lower reservoir and lower intake is 131.21 ha.
Land required for project components	293.65 Ha
Additional information (if any)	Nil

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

Forest Land/ Area/ Environmental Sensitivity Zone	Protected Yes/No	Details of Certificate/ letter/ Remarks
Reserve Forest/Protected Forest Land	Yes	Under process
National Park	No	
Wildlife Sanctuary	No	

• **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

• **Affidavit/Undertaking details:**

Affidavit/Undertaking	The undertaking by GSECL is provided along with this document.
Additional information (if any)	Nil

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

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	N/A
Status of Stage- I FC	Under process
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Under process

• **Miscellaneous**

Particulars	Details
-------------	---------

Details of consultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad
Project Benefits	<p>The following benefits are anticipated from the project construction and operation phases:</p> <ul style="list-style-type: none"> • The availability of alternative resources provided by developer in the rural areas will reduce the dependence of the locals on natural resources such as forest. • A number of marginal activities and jobs would be available to the locals during construction phase. • Developer bringing large scale investment to the area will also invest in local area development and benefit will be reaped by locals. • Education, medical, transportation, road network and other infrastructure will improve. <p>With increased availability of electricity, small-scale and cottage industries are likely to come up in the area.</p>
Status of other statutory clearances	N/A
R&R details	N/A
Additional detail (If any)	Nil

14.3.4 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 and observed that the proposal is for grant of terms of reference to the project for Amalpada Pumped Storage Hydro Electric Project (300 MW) Off-Stream Closed Loop Pumped Storage in an area of 293.65ha in village Amalpada, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

It was observed that one season data will not give the clear picture about the ecological and biological profile of the region, as after monsoon season there may be high biological activities being the project site located at the tip of Western Ghats. The EAC also assessed the need of study for worst case scenario and critical mineral assessment along with risk analysis.

The total land requirement for the project is 293.65 ha hectares, of which 241 hectares are forest land and 52 hectares are non-forest land. The application for Stage-I forest clearance yet to be submitted. It was also noted that the Project Proponent has submitted a letter no. EPCD/0457/08/2024 dated 29.08.2024 issued by Under Secretary (Power) Energy & Petrochemicals Department, Govt. of Gujarat regarding in principle approval to setup Pumped Storage Project at Ukai, District Tapi, Gujarat.

14.3.4 The EAC based on the information submitted and as presented during the meeting, **recommended** the proposal for grant of Specific ToR issued by the Ministry for Closed Loop Pumped Storage Projects vide OM dated 14.08.2023 for conducting EIA study for proposed construction of the project for Amalpada Pumped Storage Hydro Electric Project (300 MW) in an area of 293.65ha in village Amalpada, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation 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 241 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 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.

[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 source.

Agenda Item No. 14.4:

Juni Kayaliwel Pumped Storage Hydro Electric Project (300 MW) in an area of 308.77 ha in village Kayaliwel, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited – Terms of References (TOR) - reg.

[Proposal No. IA/GJ/RIV/484025/2024; F. No. J-12011/22/2024-IA-I(R)]

14.4.1: The proposal is for grant of Terms of References (ToR) to the project for Juni Kayaliwel Pumped Storage Hydro Electric Project (300 MW) in an area of 308.77 ha in village Kayaliwel, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.

14.4.2: The Project Proponent and the accredited Consultant M/s. Aarvee Associates, Architects, Engineers and Consultants Private Limited, made a detailed presentation on the salient features of the project and informed that:

- i. Juni Kayaliwel Pumped Storage Project (JKPSP) is an Off-Stream Closed Loop Pumped Storage development, proposed with an installed capacity of 300MW/1854.91 MWh.
- ii. The project is located in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°18'33.36"N and longitude 73°37'36.21"E.

Similarly, the geographical coordinate of lower reservoir is at latitude 21°17'35.18"N and longitude 73°36'40.19"E.

- iii. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 5.656 MCM (0.200 TMC) & 6.792 MCM (0.240 TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 57 m (from foundation level) to create the desired storage capacity while the lower reservoir will have maximum height of 44 m (from foundation) constructed at the downhill.
- iv. The one-time filling of the PSP reservoir will be carried out from Ukai reservoir, which is about 4.0 Kms from the proposed lower reservoir. The scheme of operation for the project is with 6.18 Hours of peak hour generation per day and 7.48 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.
- v. Alternative studies carried out for various major components of the project and final choice of the project parameters.

A detailed alternative studies have been carried out to identify five numbers of potential PSP sites on the right bank of Ukai reservoir. Summary of the alternatives considered is as follows:

- In the current studies, a total of 21 reservoir locations were selected in the initial phase and 23 Alternatives with different combinations of these reservoirs were studied.
- Alternatives with different combinations of these reservoirs were studied.
- Reservoirs- 14 & 17 (R- 14 & R- 17) were observed with high R&R issues and hence the alternatives formed with these two reservoirs (Alternative- 16, 18, 19 & 20) were not considered for further studies.
- Alternatives- 2, 3, 4, 5, 7, 8, 10, 14, 15, & 23 were observed with very high L/H ratio and therefore were not considered for further studies.
- Alternatives- 1, 6, 11, 12, 13, 17, 21 & 22 were studied on their Techno- Commercial Feasibility and top 5 Alternatives were selected based on technical ranking.
- Final selected alternatives are- Alternative 1, 6, 13, 17 & 22.

Further, on selected Alternative, three options of powerhouse have been studied.

- **Alternative-A:** with a surface powerhouse.
- **Alternative-B:** with an underground powerhouse including surge chamber.
- **Alternative -C: With an Underground powerhouse without surge chamber.**

Possibility of Alternative -A -Surface powerhouse is studied and found not suitable due to negative pressures in the WCS in transient analysis. Also Alternative -B is not suitable because of requirement of costly surge chamber.

Therefore, Alternative-C i.e. Underground powerhouse without surge chamber is selected.

- vi. Total land required for the construction of proposed activities is approximately 308.77 ha. break up of land required for different components is given below:

Sl.No	Component	Private Land (Ha)	Forest Land (Ha)	Total Area (Ha)
1	Upper Reservoir	-	100.30	100.30
2	Penstocks	-	1.19	1.19
3	Power House	-	3.92	3.92
4	Tail Race Tunnel	-	7.42	7.42
5	Lower Reservoir	-	145.55	145.55
6	ADITS + pothead yard	-	5.24	5.24
7	Water Filling	-	1.00	1.00
8	Site Office	3.15	-	3.15
9	Magazine Area			
10	Labour Camp			
11	Colony Area			
12	Muck Disposal	41	-	41
	TOTAL	44.15	264.62	308.77

- vii. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site.
- viii. **Cost and Benefits of the Scheme:** The total estimated cost of the project including direct and indirect charges excluding Interest during construction is Rs.1806.40 Cr. For the installed capacity of 300 MW, the cost per MW of installed capacity (excluding IDC) works out to be Rs. 6.02 Cr. The project would generate designed energy of 643.19 MU. Other benefit of this storage project can be in the form of spinning reserve with almost instantaneous start-up from zero to full power supply, supply of reactive energy, primary frequency regulation, voltage regulation etc.
- ix. Details of Solid waste/ Hazardous waste generation/ Muck and its management.

Source:	Construction Camps/ Labour Camps	
Quantity (TPA):	365	
Mode of disposal:	Nearest Municipal Dumping yards operated and maintained by the respective Municipalities	
Mode of transport:	Road	
	Calculation of Solid Waste	
	Waste generated per person in kg/day	0.5
	No. of labours=	450

	Total waste generated per day in kg	225
	Total waste generated per day in Tonnes	0.225
	Total waste generated per day in Tonnes per Annum	82.125

Quantity of muck =	1873819.43 Cum (for 4 years)
density of muck =	1500 kg/m ³
Quantity of muck in kg =	2810729145 kg for 4 years
	936909715 kg for 1 year
	936909.715 TPA

- x. Status of Litigation Pending against the proposal, if any.
- xi. The salient features of the project are as under: -

• **EAC Meeting Details:**

EAC meeting/s	14th Meeting of the Expert Appraisal Committee
Date of Meeting/s	30.08.2024
Date of earlier EAC meetings	No

• **Project details:**

Name of the Proposal	Juni Kayaliwel Hydro-Electric Pumped Storage Project (300 MW)
Location (Including coordinates)	The project is located in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°18'33.36"N and longitude 73°37'36.21"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°17'35.18"N and longitude 73°36'40.19"E.
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project area lies in the seismic zone-III which falls in moderate zone.

• **Category details:**

Category of the project	Category A
Provisions	Pumped Storage Project
Capacity / Cultural command area	300 MW

(CCA)	
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

• **Electricity generation capacity:**

Powerhouse Installed Capacity	300 MW
Generation of Electricity Annually	643.19 MU
No. of Units	2 (Each of 150 MW)
Additional information (if any)	Nil

• **ToR/EC Details:**

Cost of project	Total Hard Cost of the project is Rs. Rs. 180640.00 Lakhs (1806.40 Cr).
	Total cost of the project including IDC is Rs. 202202.00 Lakhs (2022.02 Cr)
Total area of Project	308.77 Ha
Height of Dam from Riverbed (EL)	57 m for Upper reservoir dam and 44 m for Lower reservoir daM
Length of Tunnel/Channel	2 nos; 5.2 m dia Main Pressure Shaft – 550 m (L) 2 nos; 7.4 m dia Main TRT – 710.23 m (L)
Details of Submergence area	The Submergence area of the proposed project area lies in forest area of 74.67 Ha.
Types of Waste and quantity of generation during construction/ Operation	Sewage and solid waste generated at the construction staff colony/ project colony shall be adequately treated/ disposed to avoid water pollution and associated public health problems. Adequate measures will be undertaken to dispose the sewage and waste generated from the labour camps. Appropriate management measures will be recommended as a part of the Comprehensive EIA study.
E-Flows for the Project	Stream flow is not disturbed by the project. The proposed project is an off-stream closed loop project with an installed capacity of 300MW/1854.91 MWH.
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then	N/A

a) 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)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 18.75 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 41 Ha has been earmarked for the Muck Dumping area.
Monitoring mechanism for Muck Disposal	The project authorities have identified suitable muck disposal sites which are not located near the riverbanks.

• **Land Area Breakup:**

Private land	44.65 Ha
Government land/Forest Land	0 Ha/264.62 Ha
Submergence area/Reservoir area	The Submergence area of the proposed project area lies in forest area of 74.65 Ha. The proposed project is an off stream closed loop project with an installed capacity of 300MW/1854.91 MWH. The land required for the proposed upper reservoir and upper intake is 100.3 ha and the land required for the proposed lower reservoir and lower intake is 145.55 ha.
Land required for project components	308.77 Ha
Additional information (if any)	Nil

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

Forest Land/ Area/ Environmental Sensitivity	Yes/No	Details of Certificate/ letter/ Remarks
---	--------	--

Zone		
Reserve Forest/Protected Forest Land	Yes	Under process
National Park	No	
Wildlife Sanctuary	No	

• **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

• **Affidavit/Undertaking details:**

Affidavit/Undertaking	The undertaking by GSECL is provided along with this document.
Additional information (if any)	Nil

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

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	N/A
Status of Stage- I FC	Under process
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Under process

• **Miscellaneous**

Particulars	Details
Details of consultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad
Project Benefits	<p>The following benefits are anticipated from the project construction and operation phases:</p> <ul style="list-style-type: none"> • The availability of alternative resources provided by developer in the rural areas will reduce the dependence of the locals on natural resources such as forest. • A number of marginal activities and jobs would be available to the locals during construction phase. • Developer bringing large scale investment to the area will also invest in local area development and benefit will be

	<p>reaped by locals.</p> <ul style="list-style-type: none"> • Education, medical, transportation, road network and other infrastructure will improve. • With increased availability of electricity, small-scale and cottage industries are likely to come up in the area.
Status of other statutory clearances	N/A
R&R details	N/A
Additional detail (If any)	Nil

14.4.3 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 and observed that the proposal is for grant of terms of reference to the project for Juni Kayaliwel Off-Stream Closed Loop Pumped Storage Hydro Electric Project (300 MW) in an area of 308.77 ha in village Kayaliwel, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

It was observed that one season data will not give the clear picture about the ecological and biological profile of the region, as after monsoon season there may be high biological activities being the project site located at the tip of Western Ghats. The EAC also assessed the need of study for worst case scenario and critical mineral assessment along with risk analysis.

The total land requirement for the project is 308.77 ha hectares, of which 264.62 hectares are forest land and 44.15 hectares are non-forest land. The application for Stage-I forest clearance has yet to be obtained. It was also noted that the Project Proponent has submitted a letter no. EPCD/0457/08/2024 dated 29.08.2024 issued by Under Secretary (Power) Energy & Petrochemicals Department, Govt. of Gujarat regarding in principle approval to setup Pumped Storage Project at Ukai, District Tapi, Gujarat.

14.4.4 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 Juni Kayaliwel Off-Stream Closed Loop Pumped Storage Hydro Electric Project (300 MW) in an area of 308.77 ha in village Kayaliwel, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited, under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR.

[A] Environmental Management and Biodiversity Conservation:

- Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 264.62 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 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.

[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 source.

Agenda Item No. 14.5:

Serula Pumped Storage Hydro Electric Project (960 MW) in an area of 542.54 Ha in village Serula, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited – Terms of References (TOR) - reg.

[Proposal No. IA/GJ/RIV/484067/2024; F. No. J-12011/20/2024-IA-I(R)]

14.5.1: The proposal is for grant of Terms of References (TOR) to Serula Pumped Storage Hydro Electric Project (960 MW) in an area of 542.54Ha in village Serula, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.

14.5.2: The Project Proponent and the accredited Consultant M/s Aarvee Associates, Architects, Engineers and Consultants Private Limited, made a detailed presentation on the salient features of the project and informed that:

- i. Serula Pumped Storage Project (SLPSP) is an Off-Stream Closed Loop Pumped Storage development, proposed with an installed capacity of 960MW/6211.2 MWh.
- ii. The project is located near Serula village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°20'28.72"N and longitude 73°34'7.00"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°18'52.68"N and longitude 73°34'19.15"E.
- iii. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 21.67 MCM (0.765 TMC) & 25.38 MCM (0.896 TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 55.00m (from deepest bed level) to create the desired storage capacity while the lower reservoir will have maximum height of 46.00 m (from bed level) constructed at the downhill.
- iv. The one-time filling of the PSP will be carried out from Ukai reservoir, which is about 6.00 Kms from the proposed lower reservoir. The scheme of operation for the project is with 6.47 Hours of peak hour generation per day and 7.63 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.
- v. Alternative studies carried out for various major components of the project and final choice of the project parameters.

A detailed alternative studies have been carried out to identify five numbers of potential PSP sites on the right bank of Ukai reservoir. Summary of the alternatives considered is as follows:

- In the current studies, a total of 21 reservoir locations were selected in the initial phase and 23 Alternatives with different combinations of these reservoirs were studied.
- Alternatives with different combinations of these reservoirs were studied.

- Reservoirs- 14 & 17 (R- 14 & R- 17) were observed with high R&R issues and hence the alternatives formed with these two reservoirs (Alternative- 16, 18, 19 & 20) were not considered for further studies.
- Alternatives- 2, 3, 4, 5, 7, 8, 10, 14, 15, & 23 were observed with very high L/H ratio and therefore were not considered for further studies.
- Alternatives- 1, 6, 11, 12, 13, 17, 21 & 22 were studied on their Techno- Commercial Feasibility and top 5 Alternatives were selected based on technical ranking.
- Final selected alternatives are- Alternative 1, 6, 13, 17 & 22

Further, on selected Alternative, four options of powerhouse have been studied.

- Alternative- A: with a surface powerhouse with capacity 6×160 MW with 3 units of Upper intakes
- Alternative- B: with a surface powerhouse with capacity 6 x 160 MW with 6 units of intakes
- Alternative- C: with an underground powerhouse with capacity 6 x 160 MW With 3 units of upper intakes.
- Alternative- D: with a with Surface power house capacity 8 x 120 MW with 4 units of intakes.
- Possibility of Alternative A, B & D are studied and found not suitable due to negative pressures in the WCS in transient analysis. So finally Alternative -C is selected.

- vi. Total land required for the construction of proposed activities is approximately 542.54 ha. break up of land required for different components is given below. The bifurcation of land is given in table below.

S.No	Component	Forest Land (Ha)	Private Land (Ha)	Total Area (Ha)
1	Upper Reservoir Including Intake	192.10		192.10
2	Penstocks	17.53		17.53
3	Tail Race Tunnel	7.71		7.71
4	Power House	10.88		10.88
5	Lower Reservoir Including Intake	227.78		227.78
6	ADITS	8.04		8.04
7	Water Filling	1.00		1.00
8	Site Office	-	3	3
9	Magazine Area			
10	Labour Camp			

11	Colony Area			
12	Muck Disposal	-	74.5	74.5
	Total	465.04	77.50	542.54

- vii. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site.
- viii. Details of Solid waste/ Hazardous waste generation/ Muck and its management.

Source:	Construction Camps/ Labour Camps	
Quantity (TPA):	365	
Mode of disposal:	Nearest Municipal Dumping yards operated and maintained by the respective Municipalities	
Mode of transport:	Road	
	Calculation of Solid Waste	
	Waste generated per person in kg/day	0.5
	No. of labours=	1400
	Total waste generated per day in kg	700
	Total waste generated per day in Tonnes	0.7
	Total waste generated per day in Tonnes per Annum	255.5

Quantity of muck =	7445000Cum (for 3 years)
density of muck =	1500 kg/m ³
Quantity of muck in kg =	1167500000 kg for 3 years
	3722500000 kg for 1 year
	3722500 TPA

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

- Project details:**

Name of the Proposal	Serula Hydro-Electric Pumped Storage Project (960 MW)
Location (Including coordinates)	The project is located near Serula village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°20'28.72"N and longitude 73°34'7.00"E. Similarly, the geographical

	coordinate of lower reservoir is at latitude 21°18'52.68"N and longitude 73°34'19.15"E.
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project area lies in the seismic zone-III which falls in moderate zone.

• **Category details:**

Category of the project	Category A
Provisions	Pumped Storage Project
Capacity / Cultural command area (CCA)	960 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

• **Electricity generation capacity:**

Powerhouse Installed Capacity	960 MW
Generation of Electricity Annually	2153.84 MU
No. of Units	6 (Each of 160 MW)
Additional information (if any)	Nil

• **ToR/EC Details:**

Cost of project	Total Hard Cost of the project is Rs. Rs. 429775.00 Lakhs (4297.75 Cr).
	Total cost of the project including IDC is Rs 497523.00 Lakhs (4975.23 Cr)
Total area of Project	542.54 Ha
Height of Dam from Riverbed (EL)	55 m for Upper reservoir dam and 46 m for Lower reservoir dam
Length of Tunnel/Channel	3 nos;10 m dia HRT – 745.22 m (L) 6 nos;7.8 m dia Main TRT – 418.5 m (L) 6 nos; 5.6 m dia Main Pressure Shaft – 312.36 m (L) 6 nos; 7.8 m dia Draft Tube Tunnel – 22.10 m (L)
Details of Submergence area	The Submergence area of the proposed project area lies in forest area of 255.94 Ha.
Types of Waste and quantity of generation during construction/	Sewage and solid waste generated at the construction staff colony/ project colony shall be adequately treated/

Operation	disposed to avoid water pollution and associated public health problems. Adequate measures will be undertaken to dispose of the sewage and waste generated from the labour camps. Appropriate management measures will be recommended as a part of the Comprehensive EIA study.
E-Flows for the Project	Stream flow is not disturbed by the project. The proposed project is an off-stream closed loop project with an installed capacity of 960MW/6211.2 MWH.
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.	N/A

• **Muck Management Details:**

No. of proposed disposal area/(type of land-Forest/Pvt. land)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 74.45 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 74.5 Ha has been earmarked for the Muck Dumping area.
Monitoring mechanism for Muck Disposal	The project authorities have identified suitable muck disposal sites which are not located near the riverbanks.

• **Land Area Breakup:**

Private land	77.50 Ha
Government land/Forest Land	0 Ha/465.04 Ha
Submergence area/Reservoir area	The Submergence area of the proposed project area lies in forest area of 255.94 Ha. The proposed project is an off stream

	closed loop project with an installed capacity of 960MW/6211.2 MWH. The land required for the proposed upper reservoir and upper intake is 192.10 ha and the land required for the proposed lower reservoir and intake is 227.78 ha.
Land required for project components	542.54 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	Yes	Under process
National Park	No	
Wildlife Sanctuary	No	

- Court case details:**

Court Case	Nil
Additional information (if any)	Nil

- Affidavit/Undertaking details:**

Affidavit/Undertaking	The undertaking by GSECL is provided along with this document.
Additional information (if any)	Nil

- Previous EC compliance and necessary approvals:**

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	N/A
Status of Stage- I FC	Under process
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Under process

- Miscellaneous**

Particulars	Details
Details of consultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad

Project Benefits	<p>The following benefits are anticipated from the project construction and operation phases:</p> <ul style="list-style-type: none"> • The availability of alternative resources provided by developer in the rural areas will reduce the dependence of the locals on natural resources such as forest. • A number of marginal activities and jobs would be available to the locals during construction phase. • Developer bringing large scale investment to the area will also invest in local area development and benefit will be reaped by locals. • Education, medical, transportation, road network and other infrastructure will improve. • With increased availability of electricity, small-scale and cottage industries are likely to come up in the area.
Status of other statutory clearances	N/A
R&R details	N/A
Additional detail (If any)	Nil

14.5.4 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 and observed that the proposal is for grant of terms of reference to the project for Serula Off-Stream Closed Loop Pumped Storage Hydro Electric Project (960 MW) in an area of 542.54Ha in village Serula, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

It was observed that one season data will not give the clear picture about the ecological and biological profile of the region, as after monsoon season there may be high biological activities being the project site located at the tip of Western Ghats. The EAC also assessed the need of study for worst case scenario and critical mineral assessment along with risk analysis.

The total land requirement for the project is 542.54 ha hectares, of which 465.04 hectares are forest land and 77.50 hectares are non-forest land. The application for Stage-I forest clearance has yet to be obtained. It was also noted that the Project Proponent has submitted a letter no. EPCD/0457/08/2024 dated 29.08.2024 issued by Under Secretary (Power) Energy & Petrochemicals Department, Govt. of Gujarat regarding in principle approval to setup Pumped Storage Project at Ukai, District Tapi, Gujarat.

14.5.4 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 Serula Off-Stream Closed Loop Pumped Storage Hydro Electric Project (960 MW) in an area of 542.54Ha in village Serula, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation 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 465.04 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 source.

Agenda Item No. 14.6:

Attappady Irrigation Project (CCA 4,255 ha) in an area of 302.0005 ha in village Agali and Sholayur, Sub District Mannarkkad, District Palakkad, Kerala by M/s Department of Irrigation, Kerala – Terms of Reference (ToR) - reg.

[Proposal No. IA/KL/RIV/462955/2024; F. No. J-12011/10/2016-IA-I (R)]

14.6.1: The proposal is for grant of Terms of Reference (ToR) to the project for Attappady Irrigation Project (CCA 4,255 ha) in an area of 302.0005 ha in village Agali and Sholayur, Sub District Mannarkkad, District Palakkad, Kerala by M/s Department of Irrigation, Kerala.

14.6.2: The Project Proponent and the accredited Consultant M/s Mantec & Consultants Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

- ii. The Irrigation Research & Design Board, Kerala proposed to design a medium irrigation project, envisages the construction of a Concrete gravity dam across Siruvani river, a tributary of Bhavani river at Chittur in Agali Village of Mannarkkad Taluk in Palakkad district of Kerala state. The dam will impound 65 Mm³ (2.29 TMC) of water. Awarded

share of water from Bhavani river basin for Attappady Irrigation Project (A.I.P.) is 2.87 TMC as per the Final Award of Cauvery Water Dispute Tribunal (CWDT) as modified by judgment dated 16.02.2018 of Hon. Supreme Court. No power generation is proposed.

- iii. The AIP dam at Chittur is located in between longitude 76°39'8.218"E and latitude 11°03'9.501"N and longitude 76°39'22.797"E and latitude 11°03'12.649"N in Chittur of Mannarkkad taluk in Palakkad district. The geodetic location of the proposed AIP is 11°02' & 11°11' N latitude and 76°34' & 76°43'E longitudes. It is bounded by Bhavani River in North, Kodungarapallam River in East and Kanjirapuzha Irrigation Project catchment in west.
- iv. The investigation for the AIP started way back in 1970. The investigations for location of the dam were carried out from 1975 to 1982 with the assistance of geologists from the Geological Survey of India (GSI). After the finalization of the dam alignment, necessary steps for speedy completion of the project were carried out from 1976 onwards. The land acquisition for the project was carried out by a Special Land Acquisition Tahsildar, AIP and acquisition procedure was initiated for the land for the submergible area of the dam, canals, office and quarters etc.
- v. The basic infrastructure facilities like office buildings, inspection bungalows and quarters for supervising staff etc were constructed. In the absence of a final order from the CWDT, the approval of the Central Water Commission (CWC) was not taken for the project. Due to non-clearance by CWC and paucity of funds, the works relating to AIP was held up since 1989. The Final Order of CWDT was released on 05.02.2007 and gazette notification was published by the Government of India vide extraordinary gazette notification dated 19.02.2013, from which date the Final Order of CWDT came into force. In the Final Order of CWDT, Kerala was awarded 6 TMC from the Bhavani river basin as modified by judgment dated 16.02.2018 of Hon. Supreme Court.
- vi. This project falls under Category 'B2' as per EIA notification 2006 & its amendment dated 14th August, 2018, as CCA >2000 and < 10,000 Ha. But as per the Gazette Notification dated 20th April 2022, Irrigation projects involving Inter-State issues shall be appraised at Central level without change in category.
- vii. Attappady region in Palakkad district of Kerala state is one of the most drought prone areas in the State of Kerala. The district is having the most backward tribals in the State, majority of them living below poverty line and occupies a lowest position in socioeconomic development. Being a rain shadow region, rain is scarce in Attappady region. Due to non-availability of water for agricultural purpose, vast fertile area of Attappady area is slowly turning into wastelands.
- viii. There are no major/medium irrigation works in the Command area of the project except for three small diversion weirs. Since there is practically no storage for the above weirs, crops cannot be irrigated in summer season. Most of the irrigation facilities available are private owned lift irrigation systems and is confined to small patches near the river banks. Hence,

majority of the farmers rely on rainfed agriculture only. Also, there is shortage of water for domestic use during the summer season.

- ix. Land requirement: The land acquisitions for the project area which includes land for road, dam site, submergence area, quarters and office buildings etc were started from 1976 onwards under Special Land Acquisition Tahsildar, AIP.

Details of Land Requirement for the Dam

Type of Land	Forest Land (ha)	Private Land (ha)	Total (ha)
Required	91.7925	210.208	302
Already Acquired	17.5255	210.208	227.7335
Balance to be acquired	74.267	Nil	74.267

Land acquired for various components of Project

Sl No	Details of land acquired	Area (ha)
1	Submergible area due to dam	210.208
2	Goolikkadavu-Chittoor road	10.8903
3	Canals	16.9805
3	Service road to dam site	4.1125
4	Link road to Valley View colony	0.5475
5	AIP Colony road	0.194
6	Site for dumping earth excavated from dam site	2.6531
7	Quarters at Chittur dam site and Division Office & Camp Quarters at Agali	25.4016

For the construction of Goolikadavu-Chittoor road and dam, 3.081 ha and 28.2285 ha of Vested forest land was transferred to Irrigation department under Kerala Private Forests (Vesting and Assignment) Act 1971. An additional area of 74.267 ha. of Vested Forest land is required for submergence area of the dam. Necessary application is submitted to the Divisional Forest Officer, Mannarkkad for diversion of 74.267 Ha. of forest land, under Forest Conservation Act 1980.

- x. Tribal families affected:
At present there are no tribal settlements in the submergence area of 302 Ha of the dam. Till date 51 adivasi families have been rehabilitated from the reservoir area and resettled by Irrigation department at Vengakkadavu Ooru. For the displaced Adivasi families from the

submergence area, accommodation was provided by the Irrigation department at Vengakkadavu Ooru, by construction of houses.

Demographically, 40 % of the population in Attappady is tribals, who are generally backward, living below poverty line and dependable on cultivation and cattle rearing. The Attappady area is classified as an Integrated Tribal Development Block (ITDP).

- xi. Water requirement: Adequate water for construction purpose can be taken from Siruvani River.
- xii. Project cost: The total capital cost of the proposed project will be approximately Rs 497 Crores.
- xiii. Project benefit:
 - The proposed project will irrigate 4255 ha of land.
 - Cropping area will increase from existing 1387.8 ha to 8418.00 ha for various food and cash crops due to implementation of the project.
 - It is estimated that the project would require 6,29,000 number of man-days including both skilled and non-skilled category.
- xiv. 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. River Siruvani river, in Chittur, Agali & Sholayur Villages is adjacent to the project site.(Project is to be constructed across Siruvani River).
- xv. Resettlement and rehabilitation: 51 tribal families who were residing in the area of submergence of the proposed project, has already been rehabilitated and resettled by the Irrigation department.
- xvi. Alternative Studies:

Alternate site studies –

The alignment of the dam proposed during 1975, (AA') was along N880E- S880W. This alignment was analyzed by bore holes considering the rock level and geological characteristics. During 1976- 77, another two alignments were also investigated. I. Alignment (BB') at 25 m upstream of alignment AA' II. Alignment (CC') at 25 m downstream of alignment AA'. On analysis, the centre alignment AA', was found cost effective. Again during 1977-78, another two alignments were investigated, to avoid the E-W lineament at the dam site. I. Alignment DD', connecting, 25m upstream of left bank of BB and 17m downstream of right bank of BB', along N820E- S820W. II. Alignment EE', at 175 m upstream of alignment DD', along N820E- S820W On analyzing the 5 alignments, it was found that the intensity and thickness of shear zones are less at alignment EE' than other lower alignments. The construction of dam along the alignment EE' was found economical relative to lower sites, as rock occurs at higher levels. Considering the advantages of the alignment EE', this alignment was finalized and blasting for foundation was started along EE', at the right flank of the dam.

- xvii. Details of Solid waste/ hazardous waste generation /Muck and its management: A considerable part of the muck generated from the construction activities shall be used as aggregate for construction to the maximum possible extent, if found suitable from laboratory tests. Some of the muck shall be reused for construction of roads and land development of low-lying areas. The balance muck will be dumped in a proper manner with due compaction in layers in the designated dumping areas. Muck dumping sites will be reclaimed with proper vegetative measures.
- xviii. The salient features of the project are as under: -

- **Project details:**

Name of the Proposal	Attappady Irrigation Project(AIP)
Location (Including coordinates)	(a) State : Kerala (b) District : Palakkad (c) Taluk : MannarkkadGPS coordinates: Latitude : 11 ⁰ 3' 9.501" N & 11 ⁰ 3' 12.649" N Longitude : 76 ⁰ 39' 8.218" E & 76 ⁰ 39' 22.797" E
Inter- state issue involved	Yes
Seismic zone	III

- **Category details:**

Category of the project	B2 category
Provisions	1 (c)
Capacity / Cultural command area (CCA)	CCA – 4255 Ha
Attracts the General Conditions (Yes/No)	Yes

- **Electricity generation capacity:**

Powerhouse Installed Capacity	NA
Generation of Electricity Annually	NA
No. of Units	NA
Additional information (if any)	--

• **ToR Details:**

Cost of project	Rs. 497 Crores
Total area of Project	GIA-8418 ha
Height of Dam from River Bed (EL)	53.10 m
Length of Tunnel/Channel	
Details of Submergence area	Submergence area – 302 Ha
Types of Waste and quantity of generation during construction/ Operation	
E-Flows for the Project	<p>E-flow is 20% of Average of 4 lean months (Feb, March, April and May) = 0.36 Mm³</p> <p>E-flow is 30% of average monsoon months (June, July, August and September) = 3.26 Mm³</p>
<p>Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then</p> <p>a. E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin.</p> <p>If not the E-Flows maintain criteria for sustaining river ecosystem.</p>	NA

• **Muck Management Details:**

No. of proposed disposal area/(type of land-Forest/Pvt. land)	The required land was acquired for dumping earth excavated from the site
Muck Management Plan	A considerable part of the muck generated from the construction activities shall be used as aggregate for construction to the maximum possible extent, if found suitable from laboratory tests. Some of the muck shall be reused for construction of roads and land development of low-lying areas. The

	balance muck will be dumped in a proper manner with due compaction in layers in the designated dumping areas. Muck dumping sites will be reclaimed with proper vegetative measures.
Monitoring mechanism for Muck Disposal	--

• **Land Area Breakup:**

Private land	210.208 ha
Government land/Forest Land	91.7925 ha of forest land required. Out of this 17.5255 Ha of forest land already acquired. 74.267 Ha forest land to be acquired
Submergence area/Reservoir area	302 Ha
Land required for project components	<ol style="list-style-type: none"> 1. Submersible area due to dam - 210.208 2. Goolikkadavu-Chittoor road - 10.8903 ha 3. Canals - 16.9805 ha 4. Service road to dam site - 4.1125 ha 5. Link road to Valley View colony - 0.5475ha 6. AIP Colony road - 0.194 ha 7. Site for dumping earth excavated from dam site - 2.6531 ha <p>Quarters at Chittur dam site and Division Office & Camp Quarters at Agali - 25.4016 ha</p>

• **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	Attappady reserve forest is 0.18 km from project site

National Park	No	--
---------------	----	----

14.6.3 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 and observed that the proposal is for grant of terms of reference to the project for Attappady Irrigation Project (CCA 4,255 ha) in an area of 302.0005 ha in village Agali and Sholayur, Sub District Mannarkkad, District Palakkad, Kerala by M/s Department of Irrigation, Kerala.

The Attappady Irrigation Project (AIP) envisages the construction of a Concrete gravity dam across Siruvani River, a tributary of Bhavani River at Chittur in Agali Village of Mannarkkad Taluk in Palakkad district of Kerala State.

This project falls under Category 'B2' as per EIA notification 2006 & its amendment dated 14th August, 2018, as CCA >2000 and < 10,000 Ha. However, as per the MoEF&CC Gazette Notification dated 20th April 2022, irrigation projects involving Inter-State issues shall be appraised at Central level without change in category.

The EAC noted that as per information submitted by the PP on Parivesh Portal the implementation for the project was in a standstill position for want of Final Order of Cauvery Water Disputes Tribunal (CWDT) and paucity of funds since 1989. Based on the Final Order of CWDT, this medium irrigation project can be implemented for the benefit of drought affected tribal areas of Attappady Valley. The project was submitted to SEAC Kerala for obtaining Terms of Reference (ToR) for EIA studies but the SEIAA Kerala vide its letter No 764/EC1/2015/SEIAA dated 19.10.2015 has approved to delist the proposal in State and asked the project proponent to move to MoEF&CC for obtaining ToR due to presence of Ecologically Sensitive Area (ESA) of Western Ghats. Attappady Irrigation Project (AIP) was placed before the Expert Appraisal Committee (EAC) for appraising the request of Terms of Reference. EAC, in its meeting held on August 11-12, 2016 has recommended issuance of TOR subject to certain conditions. However, in between, Government of Tamil Nadu has raised serious objections against this project. It was informed that this project is a part of Cauvery River Basin.

14.6.4 The EAC based on the information submitted was of the view that the project proposal involves inter-state issues with Tamil Nadu and the PP has not submitted any information regarding settlement of the inter-state issues. The EAC suggested the PP to submit the inter-state clearance from the CWDT & CWC prior to consideration of proposal for grant of Terms of Reference (TOR). The EAC decided to return the proposal in present form.

Agenda Item No. 14.7:

Bhivpuri Open Loop Pumped Storage Project (1000 MW) in an area of 117.41Ha in Village Sawale, Khand and Bhivpuri (camp), Sub District Mawal and Karjat, District Pune and Raigarh, Maharashtra by M/s The Tata Power Co. Ltd. – Environmental Clearance (EC) - reg.

[Proposal No. IA/MH/RIV/490456/2024; F. No. J-12011/39/2023-IA.I (R)]

14.7.1 The proposal is for grant of Environmental Clearance (EC) to the project for Bhivpuri Open Loop Pumped Storage Project (1000 MW) in an area of 117.41Ha in Village Sawale, Khand and Bhivpuri (camp), Sub District Mawal and Karjat, District Pune and Raigarh, Maharashtra by M/s The Tata Power Co. Ltd..

14.7.2 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 proposal is for Environmental Clearance to the project for Bhivpuri Off-Stream Open Loop Pumped Storage Project (1000 MW) in an area of 117.41 ha in Village Sawale, Khand and Bhivpuri (camp), Sub District Mawal and Karjat, District Pune and Raigarh, Maharashtra by M/s The Tata Power Co. Ltd.
- ii. The project proposal was considered by the Expert Appraisal Committee (River Valley and Hydropower Projects) in its 50th meeting held on 11.08.2023 and recommended for grant of Terms of Reference (ToRs) for the project. The ToR has been issued by Ministry vide letter No. J-12011/39/2023-IA.I (R); dated 23.09.2023.
- iii. The geographical co-ordinate of the project are Latitude: 18° 56' 9.34" N Longitude: 73° 29' 14.59" E.
- iv. Bhivpuri Off-Stream Open Loop Pumped Storage Project (1000 MW) envisages the construction of temporary cofferdam, upper Intake system, water conducting systems, surge shaft, pit powerhouse, lower Intake system, and lower reservoir (equipped with bottom outlet).
- v. The Bhivpuri Off-stream Open Loop Pumped Storage Hydro Project (Bhivpuri PSP) located in Pune and Raigad Districts of Maharashtra envisages the construction of temporary cofferdam, upper Intake system, water conducting systems, surge shaft, pit powerhouse, lower Intake system, and lower reservoir (equipped with bottom outlet). Lower reservoir and powerhouse and part of water conductor system are located near Bhivpuri town, Karjat Taluka in Raigad District of Maharashtra State. Existing Thokarwadi reservoir (upper reservoir) falls in Pune district, therefore, upper intake and HRT falls in Pune district. The scheme will involve the usage of the existing Thokarwadi reservoir as an upper reservoir with 12.485 TMC gross storage capacity and will involve construction of 1899.0 m long Geomembrane faced rockfill embankment dam for creation of lower reservoir with 0.163 TMC gross capacity. The complete scheme envisages utilization of design discharge of 216.7 cumec for generation of 1000 MW (4X200+2X100). A rated net head of 520.40 m with design discharge of 173.20 cumec shall be

used for generation of 800 MW (4 units of 200 MW each) and a rated head of 516.60 m with design discharge of 43.60 cumec shall be used for generation of 200MW (2 units of 100 MW each).

vi. Land requirement:

The total land requirement for Bhivpuri Pumped Storage Project works out to approximately 117.41 ha of which 20.15 ha is forest land while 97.26 ha is non-forest land. Out of 97.26 ha Non-Forest Land, 93.82 ha land belongs to Tata Power and 3.44 ha land is private land required for Road and HRT.

- vii. **Demographic details in 10 km radius of project area:** The entire study area falls under two districts, namely Pune and Raigad. The project covers a total of 91 villages in the study area. Among the 91 villages, 67 are located in Karjat tehsil of Raigad district, and the remaining 24 are in Pune district (5 villages in Khed tehsil and 19 villages in Mawal tehsil). The total population of the study area is 69068, with 35214 (50.98%) males and 33854 (49.01%) females. The number of households is 13981, with an average occupancy of 4-5 persons per household. The child population below 6 years old was found to be 8585, which is 12.42% of the total population. The sex ratio was found to be 961 females per 1000 males.

There are 2844 scheduled castes in the study area, accounting for 4.11% of the total population, with 1434 scheduled caste males and 1410 scheduled caste females. There are 22446 scheduled tribes in total, accounting for 32.49% of the total population, with 11224 scheduled tribe males and 11222 scheduled tribe females. The literacy rate in the villages is 75.13% (above the 6-year-old population), with males and females having rates of 82.91% and 67.04%, respectively, creating a gender gap of 15.87%. The workers coming under the main and marginal workers categories are those involved in activities such as cultivation, agriculture, livestock, fishing, plantation, manufacturing, servicing, and repair in the household industry, construction, trade and commerce, transportation, and other services.

In the study area, there are total of 31584 workers, and 68.4% of them are involved in agriculture and related activities. Out of this group, 35.35% are cultivators, and 33.05% are agricultural laborers. Additionally, 3.49% of the population is engaged in household industries, while 28.09% are in various other services such as trade, commerce, business, transport, government, and private jobs.

- viii. **Water requirement:** Approximately 4.5 MCM will be required to meet generation of 1,000 MW for 6.02 hours. The storage capacity of existing upper Thokarwadi reservoir is 352.52 MCM and of planned lower reservoir is 4.54 MCM. Annual losses due to the evaporation from the lower reservoir work out to 0.43 MCM. It will be recouped periodically from Upper Reservoir.
- ix. **Project Cost:** The estimated project cost is Rs 4743.59 crore. Total capital cost earmarked towards Environment Management Plan/environmental pollution control measures is Rs. 7995.62 lakh and the Recurring cost (operation and maintenance) will be about Rs. 2819.91 lakh about i.e. Rs 633.85 lakh per annum.

- x. **Project Benefit:** Total Employment will be 1200 persons as direct & 300 persons indirect after expansion. Industry proposes to allocate Rs. 1172.00 Lakh @ of 0.25% towards CER (as per Ministry's OM dated 30th Sep 2020).
- xi. **Environmental Sensitive area:** Nearest Protected Area to the Project Components is Bhimashankar Wildlife Sanctuary which is at a distance of around 10.70 km from existing Thokarwadi Reservoir (upper reservoir). There are no wildlife corridors within 10 Km of the project area. Project partly falls within the Western Ghat Ecologically Sensitive Area as per draft notification issued by MoEF&CC on 31st July 2024.
- xii. **MoU / any other clearance/ permission signed with State government:** MoU was signed with the Govt. of Maharashtra on 09th August 2023 for development of 1000 MW Bhivpuri off-stream open loop Pumped Storage Project. Further, as per the PSP policy issued by the GoM in December 2023, a fresh MoU was signed with WRD, GoM on 12th August 2024
- xiii. **Resettlement and rehabilitation:** The total land requirement works out to approximately 117.41 ha of which 20.15 ha is forest land while 97.26 ha is non-forest land. Out of 97.26 ha Non-Forest Land, 93.82 ha land belongs to Tata Power and 3.44 ha land is private land required for Road and HRT. The Tata Power land was acquired around 100 years back for a specific purpose of 'generation of electricity & associated activities' and is under right, title, interest & possession of Tata Power till today for the same purpose. Two revenue villages namely Khand and Sawale villages of Mawal Tehsil of Pune District of Maharashtra are affected and Private land identified for the project belongs to 4 land owner families.
- xiv. **Scheduled – I species:** Among the mammals, 10 species are categorised as schedule I species. Rest of the mammalian species are listed under schedule II category of WPAA, 2022). As per the IUCN Red List of Threatened Species, Version 2023-1, Leopard, Sloth Bear, Sambar Deer, Indian Bison and Bonnet Macaque under Vulnerable (VU) category and Striped Hyaena is listed under Near Threatened (NT) category.

As per the IUCN Red List of Threatened Species version 2023-1, all birds have been listed under Least Concern (LC) category. As per the WPAA 2022, Indian Peafowl (*Pavo cristatus*) is listed as Schedule I species. All other bird species are listed as Schedule II category.

In case of herpetofauna, all species are listed under Least Concern (LC) category as per the IUCN Red List of Threatened Species version 2023-1. As per the WPAA, 2022, Asian Chameleon, Indian rat Snake, Indian Cobra and Russel's Viper are categorised as schedule I species. Among the butterflies, Danaid Eggyfly (*Hypolimnas misippus*) is listed under Least Concern (LC) category of IUCN Red List categories (Ver. 2023-1). No species of butterfly is categorised as a schedule species as per the WPAA 2022.

- xv. **Alternative Studies:** 7 alternatives have been studied for Bhivpuri pumped storage project.
 - Alternative-1 (120 MW)-Independent PSP
 - Alternative-2 (24 MW)-One PSP unit using existing HRT
 - Alternative-3 (48 MW)- One PSP unit using existing HRT

- Alternative 4 (360 MW)- (Independent PSP by utilizing of existing upper reservoir).
- Alternative 5 (2200 MW)- (Independent PSP by utilizing of existing upper reservoir).
- Alternative 6 (1000 MW)- (Independent PSP by utilizing of existing upper reservoir).
- Alternative 7 (900 MW)- (Independent PSP by utilizing of existing upper reservoir).
- After carefully considering the merits and drawbacks of all the alternatives, Alternative 6 has been selected as the final layout.

xvi. The capital and recurring costs involved for implementation of the Environmental Management Plan for Bhivpuri Pumped Storage Project is Rs 7995.62 Lakh

S. No.	Component of EMP	Capital Cost (Rs. In lakh)	Recurring Cost (Rs. In lakh)							Total Cost (Rs. In Lakh)
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	
1	Catchment Area Treatment Plan	121.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	121.25
2	Compensatory Afforestation Plan & NPV*	490.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	490.99
3	Biodiversity Conservation & Wildlife Management Plan	210.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210
4	Fisheries Conservation and Management Plan	50.00	14.75	14.75	14.75	14.75	0.00	0.00	0.00	109
5	Muck Dumping and Management Plan	86.50	508.00	900.20	925.17	925.00	18.25	18.25	18.25	3399.62
6	Landscaping, Restoration of Quarry, and	20.00	15.00	20.00	30.25	25.75	20.25	10.25	10.00	151.5

	Construction Sites									
7	Green Belt Development Plan	0.00	3.40	6.40	10.00	5.00	5.00	5.00	5.00	39.8
8	Sanitation and Solid Waste Management Plan	142.00	25.25	25.25	25.25	25.25	0.00	0.00	0.00	243
9	Public Health Delivery System	110.00	34.75	34.75	34.75	34.75	0.00	0.00	0.00	249
10	Energy Conservation Measures	40.00	65.50	65.50	65.50	65.50	0.00	0.00	0.00	302
11	Labour Management Plan	30.00	13.00	13.00	13.00	13.00	0.00	0.00	0.00	82
12	Disaster Management Plan	275.00	31.25	31.25	31.25	31.25	0.00	0.00	0.00	400
13	Control of Air, Noise and Water Pollution	0.00	15.00	15.00	15.00	15.00	0.00	0.00	0.00	60
14	Environmental Monitoring Programme	0.00	38.44	38.44	38.44	38.44	0.00	0.00	0.00	153.76
15	Rehabilitation and Resettlement Plan**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
16	Local Area Development Plan	1172.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1172.06
17	Watershed Development Plan	811.6386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	811.64
	Total	3558.70	764.34	1164.54	1203.36	1193.69	43.50	33.50	33.25	7995.62

xvii. The salient features of the project are as under:

1. EAC Meeting Details:

EAC meeting/s	14 th meeting
Date of Meeting/s	31.08.2024
Date of earlier EAC meetings	11.08.2023 (50 th meeting for TOR)

2. Project details:

Name of the Proposal	Bhivpuri Off-Stream Open Loop Pumped Storage Project (1000 MW)
Proposal No.	IA/MH/RIV/490456/2024
Location (Including Coordinates)	Near Bhivpuri town, Karjat Taluka in Raigad District of Maharashtra State Lat: 18 ⁰ 56' 9.34" N Long: 73 ⁰ 29' 14.59" E
Company's Name	The Tata Power Company Limited
CIN no. of Company/user agency	L28920MH1919PLC000567
Accredited Consultant and certificate no.	R S Envirolink Technologies Pvt Ltd; NABET/EIA/2225/RA 0274
Project location (Coordinates /River/ Reservoir)	Existing Thokarwadi reservoir Andra River, a tributary of Indrayani river Lat: 18 ⁰ 56' 9.34" N Long: 73 ⁰ 29' 14.59" E
Inter- state issue involved	No; Interstate related water allocation clearances was accorded by CWC vide their file no. File No.T-89017/1/2019-ISM1 DTE-Part(1), dated 24/04/2024
Proposed on River/ Reservoir	Existing Thokarwadi reservoir Andra River, a tributary of Indrayani river
Type of Hydro-electric project	Pumped Storage Project
Seismic zone	Seismic Zone III

3. Category details:

Category of the project	A
Capacity / Cultural command area (CCA)	1000 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	-

4. TOR/EC details:

ToR Proposal No.	IA/MH/RIV/437464/2023
EAC meeting date	11.08.2023
ToR Letter No.	J-12011/39/2023-IA.I (R)
ToR grant Date	23.09.2023
Cost of project	Rs 4743.59 crore
Total area of Project	117.41 ha
Height of Dam from River Bed (EL)	Maximum height of GFRD embankment is 28 m
Details of submergence area	29.24 ha of lower reservoir
District to provide irrigation facility (if applicable)	NA
Details of tunnels on upper level & lower level and length of canal (if applicable)	HRT Tunnel: Circular Finish - 8.3 m Diameter, Concrete Lined, 1981.70 M Main TRT Tunnel: 5 Nos, 4.50 m Diameter, Circular shape, Steel Lined, 230.21 M
No. of affected Village	Two revenue villages namely Khand and Sawale villages of Mawal Tehsil of Pune District of Maharashtra
No. of Affected Families	Private land identified for the project belongs to 04 land owner families
Project Benefits	Economical and social benefits like peaking power generation by using cheap solar/wind tariff during off-peak time, grid stability, Employment and Local Area Development
R&R details	No R&R involved; process adopted will be through a voluntary sale with a willing seller and willing buyer basis
Catchment area/ Command area	Total catchment area of existing upper Thokarwadi reservoir is 124.15 sq.km and catchment area for the planned lower reservoir is about 0.205 sq.km
Types of Waste and quantity of generation during construction/Operation	Municipal Solid Waste- Bio degradable (512 Tons in four years), Non degradable (236.52 Tons in four years)

Material used for blasting and its composition as per DGMS standards.	It has been assessed that one magazine of 10 MT capacities would be sufficient to meet the requirement of the project. A mobile explosive van shall be deployed to carry explosive at the site of use at upper and lower dam area. Movement of van should be done with armed guards and proper documentation recommended by PESO.
E-Flows for the Project	Not applicable since it's a pumped storage project with an existing upper Thokarwadi reservoir and proposed lower reservoir.
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.	No
Details on provision of fish pass	Not applicable since it's a pumped storage project with an existing upper Thokarwadi reservoir and proposed lower reservoir.
Project benefit including employment details (no of employee)	1200
Area of Compensatory Afforestation (CA) with tentative no of plantation.	20.15 ha; Rs 2201.50 lakh Total Cost for compensatory afforestation with Rs 10 lakh per ha rate. In addition, NPV of Rs 289.49 lakh has been considered.
Previous EC details	-
EC Compliance Report by R.O,	-

5. Electricity generation capacity:

Powerhouse Installed Capacity	1000 MW
Generation of Electricity Annually	2079.42 MU
No. of Units	6; 1000 MW [4 x 200 + 2 x 100]

6. Muck Management Details:

No. of proposed disposal area/ (type of land- Forest/Pvt land)	Five dumping sites have been identified over an area of about 41.00 ha area with a total capacity of 33,73,000 cum muck to be accommodated in non-forest area.
Cross section of proposed muck area, Height of muck with slope.	Enclosed as Annexure
Distance of muck disposal area(location), from muck generation sources (project area)/River, HFL of proposed muck disposal area	Dumping Area 1-North of Lower Reservoir
	Dumping Area 2: East of Lower Reservoir
	Dumping Area 3: South of Lower Reservoir
	Dumping Area 4: South of Lower Reservoir
	Dumping Area 5: South of Upper Reservoir
Total Muck Disposal Area	41 ha
Estimate Muck to be generated	33,73,000 cum
Transportation	Generated muck will be carried in dumper trucks covered with heavy duty tarpaulin properly tied to the vehicle in accordance with best international practices
Monitoring mechanism for Muck Disposal Transportation	All five designated sites for disposal of muck are not far from the respective sources. The provisions of Monitoring have been kept under proposed Environmental Monitoring Plan.

7. Land Area Breakup:

Private land	97.26 ha Non-Forest Land is involved, 93.82 ha land belongs to Tata Power and 3.44 ha land is private land required for Road and HRT
Forest land	20.15 ha
Submergence area/reservoir area	29.24 ha lower reservoir
Land required for project components	117.41 ha

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	No	Nearest Protected Area to the Project Components is Bhimashankar Wildlife Sanctuary which is at a distance of around 10.70 km from existing Thokarwadi Reservoir (upper reservoir). There are no wildlife corridors within 10 Km of the project area. Project partly falls within the Western Ghat Ecologically Sensitive Area as per draft notification issued by MoEF&CC on 31 st July 2024
National Park	No	
Wildlife Sanctuary	No	
Archaeological sites monuments/historical temples etc	No	There are various tourism, religious, and historical sites such as caves and famous temple in the nearby project area which are more than 5 km away from the project components
Additional information (if any)	-	

Conservation Status of Fauna

Among the mammals, 10 species are categorised as schedule I species. Rest of the mammalian species are listed under schedule II category of WPAA, 2022). As per the IUCN Red List of Threatened Species, Version 2023-1, Leopard, Sloth Bear, Sambar Deer, Indian Bison and Bonnet Macaque under Vulnerable (VU) category and Striped Hyaena is listed under Near Threatened (NT) category.

As per the IUCN Red List of Threatened Species version 2023-1, all birds have been listed under Least Concern (LC) category. As per the WPAA 2022, Indian Peafowl (*Pavo cristatus*) is listed as Schedule I species. All other bird species are listed as Schedule II category .

In case of herpetofauna, all species are listed under Least Concern (LC) category as per the IUCN Red List of Threatened Species version 2023-1. As per the WPAA, 2022, Asian Chameleon, Indian rat Snake, Indian Cobra and Russel's Viper are categorised as schedule I species. Among the butterflies, Danaid Eggfly (*Hypolimnys misippus*) is listed under Least Concern (LC) category of IUCN Red List categories (Ver. 2023-1). No species of butterfly is categorised as a schedule species as per the WPAA 2022.

9. Public Hearing (PH) Details

Advertisement for PH with date	30 days advance public notice was published in the Local Marathi Newspaper Daily Krushival and Daily Raigad Times and in English newspaper National Newspaper Indian Express.
Date of PH	5 th April 2024 & 12 th April 2024
Venue	5 th April: Tata camp, Mouje khand, Tal: Maval, Dist Pune 12 th April: The Tata Power Company Ltd. Hydro Generating Station, PO Bhivpuri camp, Tal: Karjat, Distt Raigad
Chaired by	Additional District Magistrate, Pune Additional District Magistrate, Raigad
Main issues raised during PH	<ul style="list-style-type: none"> - Provision of Employment of local Youth - Provision of Medical Facilities - Financial assistance for strengthening of basic infrastructure in the area
No of people attended	Pune (Khand) – 279 Raigad (Bhivpuri) – 323

10. Brief of base line Environment:

Particulars	Details		
Period of baseline data collection/Sampling period.	Parameters	Pre-Monsoon/Summer	Winter
(Air, noise, water, land)			
flora and fauna of the project area,			
aquatic ecology, etc.			
	Soil	April-May, 2023	December, 2023
	Air Environment	April-May, 2023	December, 2023
	Noise & Traffic	April-May, 2023	December, 2023
	Water Quality	April-May, 2023	December, 2023
	Vegetation	April-May, 2023	December, 2023

	Fauna surveys	April-May, 2023	December, 2023
	Socio-economic survey	December, 2023	
Brief description on hydrology and water assessment as per the approved Pre-DPR:	Approximately 4.5 MCM will suffice to meet generation of 1,000 MW for 6.02 hours. The storage capacity of existing upper Thokarwadi reservoir is 352.52 MCM and of planned lower reservoir is 4.54 MCM. Annual losses due to the evaporation from the lower reservoir work out to 0.43 MCM. It will be recouped periodically from Upper Reservoir.		
Additional detail (If any)	-		

11. Court cases:

Court Case	-
Additional information (if any)	-

12. Status of other statutory clearances

Particulars	Letter no. and date
Status of Stage- I FC	Application No. FP/MH/HYD/IRRIG/447097/2023 for Forest Clearance done in Parivesh on 17/10/23 Nodal Officer Nagpur recommended the proposal in PSC-II meeting held on 09.08.2024. Formal communication to State Forest Secretary awaited.
Approval of Central Water Commission	<ul style="list-style-type: none"> Hydrology Directorate Approval for Hydrological Aspects vide Letter No. T11031/3/2023-HYD(S) DTE dt 30.04.2024
	<ul style="list-style-type: none"> Hydel Civil Design Directorate Approval for Layout vide Letter No. T-16031/8/2023-HCD(ENE) DTE dt 25.06.2024
Approval of Central Electricity Authority	Hydro Project Appraisal Division Approval for Power Potential Studies vide Letter No.- CEA-HY-12-12/7/2023-HPA dt 20.03.2024
Additional detail (If any)	Final DPR submitted to CEA and under approval.

Is FRA (2006) done for FC-I	FRA Letter No. RB/LND/A03/VANHAKKA/1859830/06/2024 issued by Raigad District Collectorate on 28.05.2024.
-----------------------------	---

14.7.3 The EAC during deliberations noted the following:

- The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of Environmental Clearance to the project for Bhivpuri Open Loop Pumped Storage Project (1000 MW) in an area of 117.41Ha in Village Sawale, Khand and Bhivpuri (camp), Sub District Mawal and Karjat, District Pune and Raigarh, Maharashtra by M/s The Tata Power Co. Ltd.
- The project is listed at S.N.1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).
- The EAC, constituted under the provision of the EIA Notification, 2006 comprising Expert Members/domain experts in various fields, examined the proposal submitted by the Project Proponent in desired format along with EIA/EMP reports prepared and submitted by the Consultant accredited by the QCI/ NABET on behalf of the Project Proponent.
- The EAC noted that the Project Proponent has given an undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP reports. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.
- The Committee noted that the EIA reports are in compliance of the ToR issued for the project, reflecting the present environmental status and the projected scenario for all the environmental components. The Committee deliberated on the proposed mitigation measure towards Air, Water, Noise and Soil pollutions. The Committee suggested that the storage of toxic/explosive raw materials/products shall be undertaken with utmost precautions and following the safety norms and best practices.
- The Terms of References (ToRs) has been issued by Ministry vide letter No. J-12011/39/2023-IA.I (R); dated 23.09.2023. The EAC noted that the total land requirement for Bhivpuri Pumped Storage Project works out to approximately 117.41 ha of which 20.15 ha is forest land while 97.26 ha is non-forest land. Out of 97.26 ha Non-Forest Land, 93.82 ha land belongs to Tata Power and 3.44 ha land is private land required for Road and HRT. Further, it is noted that an application No. FP/MH/HYD/IRRIG/447097/2023 for Forest Clearance done on Parivesh on 17/10/23 and Nodal Officer Nagpur recommended the proposal in PSC-II meeting held on 09.08.2024. The estimated project cost is Rs 4743.59 crore. Total capital cost earmarked towards Environment Management Plan/environmental pollution control

measures is Rs. 7995.62 lakh and the Recurring cost (operation and maintenance) will be about Rs. 2819.91 lakh about i.e. Rs 633.85 lakh per annum.

- EAC reviewed and discussed the plan in detail and observed that Implementation mechanism has not been covered. Implementation of watershed development plans involves a collaborative effort among various stakeholders with primary responsibility with Watershed Development Department which is specifically tasked with the management of watershed projects across Maharashtra, ensuring sustainable development and resource management.
- EAC recommended that Watershed Development Plan should be implemented by project proponent by involving Zilla Parishads and Panchayati Raj Institutions (PRIs), local government bodies at the district and village levels which are crucial in implementing and monitoring watershed projects with the help of self-help groups (SHGs) and local communities to ensure participation and sustainability.
- EAC also recommended inclusion of regular audits and reviews by a third party in the implementation mechanism to ensure compliance with objectives and to identify areas for improvement.
- The EAC reviewed and deliberated on the issues raised during the Public Hearing (PH) and evaluated the action plan submitted by the Project Proponent to address these concerns. The Committee found the action plan satisfactory and advised the Project Proponent to implement it in a time-bound manner. Given the presence of a tribal population in the study area, the EAC emphasized the need to establish Skill Development Centres for the local community and to promote local tribal products through proper marketing, with the Project Proponent overseeing these efforts.

14.7.4 The EAC after examining the information submitted and detailed deliberations **recommended** the proposal for grant of Environmental Clearance by the Ministry to Bhivpuri Open Loop Pumped Storage Project (1000 MW) in an area of 117.41Ha in Village Sawale, Khand and Bhivpuri (camp), Sub District Mawal and Karjat, District Pune and Raigarh, Maharashtra by M/s The Tata Power Co. Ltd., under the provisions of EIA Notification, 2006 and as amended with subject to compliance of applicable Standard EC conditions with the following specific environmental safeguard conditions:

[A] Environmental management and Biodiversity conservation:

- i. The water of rainfall yield of self-catchment of the reservoir shall be released to downstream through body of dam/ barrage/ embankment etc.
- ii. The water for filling of reservoir/ recoupment of evaporation and recirculation losses shall be met from a source other than the rainfall yield of catchment of non-perennial stream/ nallah.
- iii. The Environmental Management Plan (EMP) shall be strictly adhered to as submitted in the EIA/EMP reports. The budgetary provisions for implementation of EMP, shall be fully utilized and not to be diverted to any other purpose. In case of revision of the project cost or due to price level change, the cost of EMP shall also be updated proportionately.

- iv. The contract clause limiting the No. of vehicles used during excavation and transportation shall followed scrupulously and the same shall informed to the ministry.
- v. Ambient Air Quality Monitoring Stations for real time data to be installed at project site before commencement of the construction, shall be displayed at project site and its report to be submitted to IRO, MoEF&CC.
- vi. No vehicle purchase shall be allowed from funds earmarked for implementation of Wildlife Conservation plan. Measures for minimizing the human–animal conflict specially for black bear and leopard be suitably incorporated in the wildlife conservation plan in consultation with State Forest Department.
- vii. 10000 plants shall be planted around the muck disposal area and the survival of plants shall be submitted with the 6 monthly compliance report.
- viii. Watershed development plan prepared in consultation with ICAR/Expert Govt. institute be implemented within 10 km radius of the project. Implementation status be submitted in the 6 monthly compliance report to the concerned regional office of the Ministry.
- ix. Miyavaki Forest shall be developed within 10 km radius of the project.
- x. Safeguard conditions mentioned in the Western Ghats Notification S.O. 3072(E) dated 06.07.2022 be complied with.
- xi. Community radio shall be established.
- xii. Stage-I Forest Clearance be obtained before grant of prior Environmental Clearance.
- xiii. Relocation of trees will be attempted strictly in consultation with Forest Department.

[B] Disaster Management:

- xiv. Disposal of the excavated muck and its filling on the low-lying area with proper measures for the stabilization and greenery to minimize the impacts of the generated construction muck shall be taken up pari passu with construction work.
- xv. Stabilization of muck disposal sites using biological and engineering measures shall be taken up immediately to ensure that muck does not roll down the slopes and does not pollute the natural streams and water bodies in surrounding area. The plantation on muck disposal site with local species for restoration of ecology and environment of the project site area.
- xvi. Necessary control measures such as water sprinkling arrangements, and construction of paved roads leading to muck disposal sites etc. shall be taken up on priority to arrest fugitive dust at all the construction sites.
- xvii. Solid waste generated, especially plastic waste, etc. should not be disposed of as landfill material. It should be treated with scientific approach and recycled. Use of single-use plastics may be discouraged.
- xviii. Muck disposal sites be decided in view of provisions of the Western Ghats Notification dated 06.07.2022.

[C] Socio-economic:

- xix. Land acquired for the project shall be suitably compensated in accordance with the prevailing guidelines of the state government and provisions under Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.

- xx. RO plant shall be installed in the nearby 5 villages and the maintenance shall be done by the project Authorities.
- xxi. Solar panel be provided to the families living in rural areas within 10 km radius of project.
- xxii. School up to 12th Standard, equipped with solar power and smart classes, shall be established to provide quality education for free education to childrens from project affected villages/Tribal villages.
- xxiii. The compliance of above conditions shall be monitored by IRO, MoEF&CC and regularly site visit once in year. The compliance report of IRO shall be regularly submitted to MoEF&CC.
- xxiv. 50 bed multi-speciality hospital shall be established to cater the need of tribal population/locals. The tribal population within 10 km radius of the project shall be given free of cost medical facility.
- xxv. Skill development Centre shall be established within 10 km radius of the project and regular training programmes for development and promotion of traditional art/products of tribal/local population.
- xxvi. The area is ecologically fragile therefore Project Proponent shall ensure that safety measures as mentioned in the EMP shall be fully implemented.

[D] Miscellaneous:

- xxvii. After 5 years of the commissioning of the project, a study shall be undertaken regarding impact of the project on the environment. The study shall be undertaken by an independent agency.
- xxviii. Bio-Gas plant shall be installed in the Project affected area for Utilizing Cattle waste (Cow Dung) into renewable source of fuel.
- xxix. PP should establish in house (at project site) environment laboratory for measurement of environment parameter with respect to air quality and water (surface and ground). A dedicated team to oversee environment management shall be setup which should comprise of Environment Engineers, Laboratory chemist and staff for monitoring of air, water quality parameters on routine basis.
- xxx. PP shall procure construction material only from those Organizations having all valid legal/statutory clearances/permissions or necessary permission to be obtained for quarrying construction materials for the project as per the EIA Notification, 2006 and as amended thereof.
- xxxi. An institutional mechanism to be developed to ensure the preference of jobs to PAFs and also a policy for preferential treatment for award of sundry works to the PAFs and their dependents.

Item No. 14.8:

Dangari Pumped Storage Hydro-electric Project (1400 MW) in an area of 499 ha in village Dangari, Madia and Rajpuri R F, Sub District Bagicha, District Jashpur, Chhattisgarh by M/s Chhattisgarh State Power Generation Company Limited – Terms of References (TOR) - reg.

[Proposal No. IA/CG/RIV/490945/2024; F. No. J-12011/25/2024-IA-I(R)]

14.8.1: The proposal is for grant of Terms of References (ToR) to Dangari Pumped Storage Hydro-electric Project (1400 MW) in an area of 499 ha in village Dangari, Madia and Rajpuri R F, Sub District Bagicha, District Jashpur, Chhattisgarh by M/s Chhattisgarh State Power Generation Company Limited.

14.8.2: The Project Proponent and the accredited Consultant M/s WAPCOS Limited, made a detailed presentation on the salient features of the project and informed that:

- i. The proposal is for ToR to the project for Dangari Pumped Storage Hydro-electric Project (1400 MW) in an area of 499 ha in village Dangari, Madia and Rajpuri R F, Sub District Bagicha, District Jashpur, Chhattisgarh by M/s Chhattisgarh State Power Generation Company Limited.
- ii. The proposed Dangari Pumped Storage Project is located in Dangari/Nawapara village of Jashpur district of Chhattisgarh, India. The upper reservoir falls in 23°10'56.40"N and 83°36'53.46"E and Lower Reservoir falls in 23°11'10"N and 83°35' 0.89" E respectively. It is located 115 KM towards North West direction from District headquarters Jashpur Nagar.
- iii. The proposed Upper and Lower reservoir are accessible through kachcha road at 23 km and 16 km from SH-12 respectively. Both the Dams falls under revenue/ cultivated land and as per preliminary information less habitation is observed.
- iv. The Dangari Pumped Storage Hydro-electric Project (1400 MW) envisages construction of Upper dam, intake, Head race tunnel, pressure tunnel, penstock, powerhouse, transformer hall, tail race tunnel, outlet and Lower dam.
- v. **Land requirement:**

Forest Land	80.03 Hectares
Submergence area/Reservoir area	305.89 Hectares
Land required for project components	401.74 Hectares

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

- Population: As of 2011, the population of Jashpur district was 851,669, The population density is 146 people per square Kilometer.
- Sex ratio: The sex ratio in Jashpur is 1004 females for every 1000 males.
- Literacy rate: The literacy rate in Jashpur is 68.6%.
- Urban vs rural: 8.92% of the population lives in urban areas, and 96% live in rural areas.
- Scheduled Castes and Scheduled Tribes: Scheduled Castes make up 5.73% of the population, and Scheduled Tribes make up 62.28%.

- vii. **Water requirement:**

Approx. 550 KLD During construction stage
Approx. 120 KLD During Operational stage

- viii. **Project Cost:** The cost of Project is Rs. 5110.07 Crores at PFR Stage.
- ix. **Project Benefit:** Total Employment will be 1350 persons as direct & 2662000 persons indirect after expansion.
- x. **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.
- xi. **MoU / any other clearance/ permission signed with State government: Yes**
- xii. **Resettlement and rehabilitation:** In Dangari site approx. 110 - 125 households are affected in the project area as per the preliminary study and the details are as below.
- a) U/R – 10-12 Households
b) L/R – 90-100 Households
c) WCS & PH – 08-10 Households
- xiii. **Alternative Studies:** Total Four (04) nos. Alternatives have been identified and studied
- xiv. **Project Cost:** The estimated project cost is ₹ **5,110.07 Crores** at Feb, 2023 price level. The preliminary cost estimate of the project has been prepared as per guidelines of CEA / CWC. The Abstract Summary of the cost estimates is given below:

Item	Estimated Cost (₹ Crores) (Feb. 2023)
Civil Works	₹ 2,942.20
Electro-mechanical Works	₹ 2,167.87
Total	₹ 5,110.07

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

• **Project Details:**

Name of the Proposal	Dangari Open-Loop Pumped Storage Hydro-electric Project (1400 MW)
Location (Including coordinates)	At Village Dangari, Madia and Rajpuri, Sub-district Bagicha, District Jashpur, Chhattisgarh, India The upper reservoir falls in 23°10'56.40"N & 83°36'53.46"E and Lower Reservoir falls in 23°11'10"N & 83°35' 0.89" E respectively.
Inter- state issue involved	No

Seismic zone	Zone-II
--------------	---------

• **Category Details:**

Category of the project	A
Provisions	-
Capacity / Cultural command area (CCA)	1400 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	-

• **Electricity generation capacity:**

Powerhouse Installed Capacity	4 units of 350 MW each
Generation of Electricity Annually	2895.67 GWh
No. of Units	4
Additional information (if any)	-

• **ToR/EC Details:**

Cost of project	Rs. 5110.07 Crores
Total area of Project	401.74 Hectares
(Height of Dam from deepest Foundation level (EL))	Upper dam - 19m Lower dam - 36m
Length of Tunnel/Channel	2920 m
Details of Submergence area	Non-Forest Land - 252.37 Hectare Forest Land – 53.52 Hectare
Types of Waste and quantity of generation during construction/ Operation	Sewage generated from Labour camps 400 KLD per day.
E-Flows for the Project	It is a pumped storage project; E flows will be released from lower dam which is a main storage dam.
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then	NA

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

- **Muck Management Details:**

No. of proposed disposal area/ (type of land- Forest/ Pvt. land)	15 hectares (approx.) non-forest land
Muck Management Plan	Shall be taken up as part of DPR
Monitoring mechanism for Muck Disposal	Shall be taken up as part of DPR

- **Land Area Breakup:**

Private land	321.71 Hectares (Non Forest land)
Government land/Forest Land	80.03 Hectares (Forest Land)
Submergence area/Reservoir area	305.89 Hectares
Land required for project components	401.74 Hectares
Additional information (if any)	-

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

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate/letter/Remarks
Reserve Forest/Protected Forest Land	(Yes)	Total Forest Land – 80.03 Ha (Protected Forest Land – 55.65 Ha Reserved Forest Land – 24.38 Ha)
National Park	No	
Wildlife Sanctuary	No	

- **Court Case Details:**

Court Case	NA
Additional information (if any)	-

- **Affidavit/Undertaking Details:**

Affidavit/Undertaking	-
Additional information (if any)	-

- **Miscellaneous:**

Particulars	Details
Details of consultant	M/s WAPCOS Limited
Project Benefits	Hydro-electric power and Employment generation
Status of other statutory clearances	-
R&R details	Yes (Total 110 - 125 Households) Upper Reservoir: 10-12 Households Lower Reservoir: 90-100 Households Water Conductor System & Power House: 8-10 Households
Additional detail (If any)	-

14.8.3 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 and observed that the proposal is for grant of terms of reference to the project for Dangari Pumped Storage Hydro-electric Project (1400 MW) in an area of 499 ha in village Dangari, Madia and Rajpuri R F, Sub District Bagicha, District Jashpur, Chhattisgarh by M/s Chhattisgarh State Power Generation Company Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

The EAC observed that as per kml and information submitted by the Project Proponent the project is proposed on Geor River, a small stream with marginal flow and doesn't seem perennial in nature. After visualization of the video of the project cover area which seems a good habitat from faunal and floral bio-diversity point of view with dominance of Sal trees. The obstruction in flow of stream may affect the water shed and overall productive of the eco-system.

The total land requirement for the project is 401.74 ha hectares, of which 80.03 hectares are forest land and 321.71 hectares are non-forest land. The application for Stage-I forest clearance has yet to be obtained. It was also noted that the Project Proponent has signed a Memorandum of Understanding (MoU) with the State Government on 06.10.2023.

14.8.4 The EAC based on the information submitted and as presented during the meeting, **recommended** the proposal for grant of Specific ToR issued by the Ministry for Open Loop Pumped Storage Projects vide OM dated 14.08.2023 for conducting EIA study to the project for Dangari Pumped Storage Hydro-electric Project (1400 MW) in an area of 499 ha in village Dangari, Madia and Rajpuri R F, Sub District Bagicha, District Jashpur, Chhattisgarh by M/s Chhattisgarh State Power Generation Company 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 and water sheds, local populations need.
- ii. Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 80.03 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 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 (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. 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 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.
- xxxii. Drone video of project site shall be recorded and to be submit.
- xxxiii. 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.
- xxxiv. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.
- xxxv. 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.

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

Agenda Item No. 14.9

Juni Bavli Pumped Storage Hydro Electric Project (450 MW) in an area of 240Ha in village Amode, Umarda, Untavad, etc, Sub District Nizar, Uchchhal and Songadh, District Tapi, Narmada, and Nandurbar, Gujarat by M/s Gujarat State Electricity Corporation Limited – Terms of References (TOR) - reg.

[Proposal No. IA/GJ/RIV/484012/2024; F. No. J-12011/23/2024-IA-I(R)]

14.9.1: The proposal is for grant of Terms of References (TOR) to the project for Juni Bavli Pumped Storage Hydro Electric Project (450 MW) in an area of 240 Ha in village Amode, Umarda, Untavad, etc, Sub District Nizar, Uchchhal and Songadh, District Tapi, Narmada, and Nandurbar, Gujarat by M/s Gujarat State Electricity Corporation Limited.

14.9.2: The Project Proponent and the accredited Consultant M/s Aarvee Associates, Architects, Engineers and Consultants Private Limited, made a detailed presentation on the salient features of the project and informed that:

- i. Juni Bavli Pumped Storage Project (JPSP) is an Off-Stream Open Loop Pumped Storage development, proposed with an installed capacity of 450MW/2880 MWH.
- ii. The project is located near Juni Bavli village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°17'23.44"N and longitude 73°38'5.15"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°16'20.08"N and longitude 73°38'17.83"E.
- iii. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 18.78 MCM (0.663 TMC) & 7552.83 MCM (266.728 TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 67.61 m (from foundation level). The scheme of operation for the project is with 6.40 Hours of peak hour generation per day and 7.46 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.
- iv. The proposed PSP is Off stream open loop PSP. Water will be recycled between the two reservoirs, hence no consumptive use of water has been envisaged for power generation.

v. Alternative Study for the selection of Project Layout of Juni Bavli PSP

Based on Reservoir optimisation study it is proposed with option 5 with FRL as 237.00m and MDDL as 226.00m with a gross storage of 18.78 MCM (0.663 TMC) and live storage of 8.847 MCM (0.312 TMC). The live storage capacity for pumped storage scheme required is 8.847 MCM (0.312 TMC). The proposed project will generate 450 MW of power by utilizing net rated head of 130.39 m. The water from the upper reservoir will be diverted through Powerhouse and TRT to the lower reservoir. The water will be pumped back to the upper reservoir through TRT-Reversible Turbines-pressure shaft to upper reservoir.

vi. Total land required for the construction of proposed activities is approximately 240.25 Ha. break up of land required for different components is given below. The bifurcation of land is given in table below:

S.No	Component	Private Land (Ha)	Forest Land (Ha)	Total Area (Ha)
1	Upper Reservoir Including Intake		139.41	139.41
2	Penstocks		6.36	6.36
3	Power House		4.83	4.83
4	Tail Race Tunnel		13.94	13.94
5	Lower Reservoir including intakes	13.38		13.38
6	ADITS & Roads		22.23	22.23
7	Site Office	3.1		3.1
8	Magazine Area			
9	Labour Camp			
10	Colony Area			
11	Muck Disposal	37.00		37.00
	Total	53.48	186.77	240.25

vii. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site.

viii. **Cost and Benefits of the Scheme:** The total estimated cost of the project including direct and indirect charges excluding Interest during construction is Rs. 2078.77 Cr. For the installed capacity of 450 MW, the cost per MW of installed capacity (Excluding IDC) works out to be Rs. 4.62 Cr

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

Source:	Construction Camps/ Labour Camps	
Quantity (TPA):	365	
Mode of disposal:	Nearest Municipal Dumping yards operated and maintained by the respective Municipalities	
Mode of transport:	Road	
	Calculation of Solid Waste	
	Waste generated per person in kg/day	0.5
	No. of labours=	675
	Total waste generated per day in kg	337.5
	Total waste generated per day in Tonnes	0.3375
	Total waste generated per day in Tonnes per Annum	123.18

Quantity of muck =	2590224.73 Cum (for 3 years)
density of muck =	1500 kg/m ³
Quantity of muck in kg =	3885337395 kg for 3 years
	1295112465 kg for 1 year
	1295112.46 TPA

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

- Project details:**

Name of the Proposal	Juni Bavli Hydro-Electric Pumped Storage Project (450 MW)
Location (Including coordinates)	The project is located near Juni Bavli village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°17'23.44"N and longitude 73°38'5.15"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°16'20.08"N and longitude 73°38'17.83"E.
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project area lies in the seismic zone-III which falls in moderate zone.

- Category details:**

Category of the project	Category A
Provisions	Pumped Storage Project

Capacity / Cultural command area (CCA)	450 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

• **Electricity generation capacity:**

Powerhouse Installed Capacity	450 MW
Generation of Electricity Annually	998.57 MU
No. of Units	3 (Each of 150 MW)
Additional information (if any)	Nil

• **ToR/EC Details:**

Cost of project	Total Hard Cost of the project is Rs. Rs. 207877.00 Lakhs (2078.77 Cr).
	Total cost of the project including IDC is Rs 234237.00 Lakhs (2372.37 Cr)
Total area of Project	240.25 Ha
Height of Dam from Riverbed (EL)	14.67 m for Upper reservoir dam and Lower Reservoir is Existing
Length of Tunnel/Channel	3 nos; 5.6 m dia Main Pressure Shaft – 540.36 m (L) 3 nos; 7.4 m dia Main TRT – 350 m (L)
Details of Submergence area	The Submergence area of the proposed project upper reservoir area lies in forest area of 82.626 Ha.
Types of Waste and quantity of generation during construction/ Operation	Sewage and solid waste generated at the construction staff colony/ project colony shall be adequately treated/ disposed to avoid water pollution and associated public health problems. Adequate measures will be undertaken to dispose the sewage and waste generated from the labour camps. Appropriate management measures will be recommended as a part of the Comprehensive EIA study.
E-Flows for the Project	Stream flow is not disturbed by the project. The proposed project is an off-stream Open loop project with an installed capacity of 450MW/2880 MWH.
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If	N/A

yes, then 1. 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)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 26 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 37 Ha has been earmarked for the Muck Dumping area.
Monitoring mechanism for Muck Disposal	The project authorities have identified suitable muck disposal sites which are not located near the riverbanks.

- **Land Area Breakup:**

Private land	53.48 Ha
Government land/Forest Land	0 Ha/186.77 Ha
Submergence area/Reservoir area	The Submergence area of the proposed project upper reservoir area lies in forest area of 82.626 Ha. The proposed project is an off stream Open loop project with an installed capacity of 450 MW/2880 MWH. The land required for the proposed upper reservoir and upper intake is 139.41 ha and the land required for the proposed lower reservoir and intake is 13.38 ha.
Land required for project components	240.25 Ha
Additional information (if any)	Nil

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

Forest Land/ Protected	Yes/No	Details of Certificate/ letter/

Area/ Environmental Sensitivity Zone		Remarks
Reserve Forest/Protected Forest Land	Yes	Under process
National Park	No	
Wildlife Sanctuary	No	

• **Court case details:**

Court Case	Nil
Additional information (if any)	Nil

• **Affidavit/Undertaking details:**

Affidavit/Undertaking	The undertaking by GSECL is provided along with this document.
Additional information (if any)	Nil

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

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	N/A
Status of Stage- I FC	Under process
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Under process

• **Miscellaneous**

Particulars	Details
Details of consultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad
Project Benefits	<p>The following benefits are anticipated from the project construction and operation phases:</p> <ul style="list-style-type: none"> • The availability of alternative resources provided by developer in the rural areas will reduce the dependence of the locals on natural resources such as forest. • A number of marginal activities and jobs would be available to the locals during construction phase. • Developer bringing large scale investment to the area will also invest in local area development and benefit will be reaped by locals.

	<ul style="list-style-type: none"> • Education, medical, transportation, road network and other infrastructure will improve. • With increased availability of electricity, small-scale and cottage industries are likely to come up in the area.
Status of other statutory clearances	N/A
R&R details	N/A
Additional detail (If any)	Nil

14.9.3 The EAC during deliberations noted the following:

- The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of terms of reference to the project for Juni Bavli Off-Stream Open Loop Pumped Storage Hydro Electric Project (450 MW) in an area of 240Ha in village Amode, Umarda, Untavad, etc, Sub District Nizar, Uchchhal and Songadh, District Tapi, Narmada, and Nandurbar, Gujarat by M/s Gujarat State Electricity Corporation Limited.
- The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.
- The total land requirement for the project is 240.25 ha hectares, of which 186.77 hectares are forest land and 53.48 hectares are non-forest land. The application for Stage-I forest clearance has yet to be obtained. It was also noted that the Project Proponent has submitted a letter no. EPCD/0457/08/2024 dated 29.08.2024 issued by Under Secretary (Power) Energy & Petrochemicals Department, Govt. of Gujarat regarding in principle approval to setup Pumped Storage Project at Ukai, District Tapi, Gujarat.

14.9.4 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 Juni Bavli Pumped Storage Hydro Electric Project (450 MW) in an area of 240Ha in village Amode, Umarda, Untavad, etc, Sub District Nizar, Uchchhal and Songadh, District Tapi, Narmada, and Nandurbar, Gujarat By M/s Gujarat State Electricity Corporation Limited, under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR.

[A] Environmental Management and Biodiversity Conservation:

- Explore the possibilities for reducing the Forest land requirement. The application for obtaining Stage I FC for 186.77 Ha of forest land involved in the project shall be submitted.
- 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 source.

Agenda Item No. 14.10

Satkashi Pumped Storage Hydro Electric Project (330 MW) in an area of 254.2Ha in village Satkashi, Sub District Songadh, District Tapi, Gujarat By M/s Gujarat State Electricity Corporation Limited – Terms of References (TOR) - reg.

[Proposal No. IA/GJ/RIV/484051/2024; F. No. J-12011/21/2024-IA-I(R)]

14.10.1: The proposal is for grant of Terms of References (TOR) to the project for Satkashi Pumped Storage Hydro Electric Project (330 MW) in an area of 254.2Ha in village Satkashi, Sub District Songadh, District Tapi, Gujarat by M/s Gujarat State Electricity Corporation Limited.

14.10.2: The Project Proponent and the accredited Consultant M/s. Aarvee Associates, Architects, Engineers and Consultants Private Limited, made a detailed presentation on the salient features of the project and informed that:

- i. Satkashi Pumped Storage Project (STKPSP) is an Off-Stream Closed Loop Pumped Storage development, proposed with an installed capacity of 330 MW/2030.96 MWh.
- ii. The project is located near Satkasi village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper reservoir is at latitude 21°20'12.29"N and longitude 73°37'57.20"E. Similarly, the geographical coordinate of lower reservoir is at latitude 21°19'55.79"N and longitude 73°38'47.79"E.
- iii. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 5.672 MCM (0.200 TMC) & 6.367 MCM (0.225TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 46.00m (from deepest bed level) to create the desired storage capacity while the lower reservoir will have maximum height of 34.00 m (from bed level) constructed at the downhill.
- iv. The one-time filling of the PSP will be carried out from Ukai reservoir, which is about 3.00 Kms from the proposed lower reservoir. The scheme of operation for the project is with 6.15 Hours of peak hour generation per day and 7.19 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.
- v. Alternative studies carried out for various major components of the project and final choice

of the project parameters.

A detailed alternative studies have been carried out to identify five numbers of potential PSP sites on the right bank of Ukai reservoir. Summary of the alternatives considered is as follows:

- ❖ In the current studies, a total of 21 reservoir locations were selected in the initial phase and 23 Alternatives with different combinations of these reservoirs were studied.
- ❖ Alternatives with different combinations of these reservoirs were studied.
- ❖ Reservoirs- 14 & 17 (R- 14 & R- 17) were observed with high R&R issues and hence the alternat - ives formed with these two reservoirs (Alternative- 16, 18, 19 & 20) were not considered for further studies.
- ❖ Alternatives- 2, 3, 4, 5, 7, 8, 10, 14, 15, & 23 were observed with very high L/H ratio and therefore were not considered for further studies.
- ❖ Alternatives- 1, 6, 11, 12, 13, 17, 21 & 22 were studied on their Techno- Commercial Feasibility and top 5 Alternatives were selected based on technical ranking.
- ❖ Final selected alternatives are- Alternative 1, 6, 13, 17 & 22

Further, on selected Alternative, Two options of powerhouse have been studied.

- **Alternative- A:** With Surface Powerhouse
- **Alternative-B:** With Underground Powerhouse.

Possibility of **Alternative A** are studied and found not suitable due to negative pressures in the WCS in transient analysis. So finally **Alternative -B** is Selected.

- vi. Total land required for the construction of proposed activities is approximately 254.20 ha. break up of land required for different components is given below.

Sl.No	Component	Private Land (Ha)	Forest Land (Ha)	Total Area (Ha)
1	Upper Reservoir including intake	-	86.31	86.31
2	Lower Reservoir including intake	-	103.31	103.31
3	Penstock	-	1.31	1.31
4	Powerhouse	-	4.29	4.29
5	Tail Race Tunnel(including Batching plant)	-	3.85	3.85
6	Adits	-	22.93	22.93
7	Area for water filling	-	1	1
8	Muck disposal areas	27.9	-	27.9

9	Site office	3.3	-	3.3
10	Magazine area			
11	Labour camp and colony area			
	TOTAL	31.20	223	254.20

- vii. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site.
- viii. Details of Solid waste/ Hazardous waste generation/ Muck and its management.

Source:	Construction Camps/ Labour Camps	
Quantity (TPA):	365	
Mode of disposal:	Nearest Municipal Dumping yards operated and maintained by the respective Municipalities	
Mode of transport:	Road	
Calculation of Solid Waste		
	Waste generated per person in kg/day	0.5
	No. of labours=	496
	Total waste generated per day in kg	248
	Total waste generated per day in Tonnes	0.248
	Total waste generated per day in Tonnes per Annum	90.52

Quantity of muck =	2697396.72 Cum (for 3 years)
density of muck =	1500 kg/m ³
Quantity of muck in kg =	4046095080 kg for 3 years
	1348698360 kg for 1 year
	1348698.36 TPA

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

- Project details:**

Name of the Proposal	Satkashi Hydro-Electric Pumped Storage Project (330 MW)
Location (Including coordinates)	The project is located near Satkashi village in Songadh Taluka of Tapi District, Gujarat. The geographical coordinate of upper

	reservoir is at Latitude 21°21'1.53"N, and longitude 73°38'13.91"E.. Similarly, the geographical coordinate of lower reservoir is at Latitude 21°20'49.59"N and longitude 73°38'53.25"E
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project area lies in the seismic zone-III which falls in moderate zone.

• **Category details:**

Category of the project	Category A
Provisions	Pumped Storage Project
Capacity / Cultural command area (CCA)	330 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

• **Electricity generation capacity:**

Powerhouse Installed Capacity	330 MW
Generation of Electricity Annually	704.24 MU
No. of Units	2 (Each of 165 MW)
Additional information (if any)	Nil

• **ToR/EC Details:**

Cost of project	Total Hard Cost of the project is Rs. Rs. 164749.00 Lakhs (1647.49 Cr).
	Total cost of the project including IDC is Rs 184305.00 Lakhs (1843.05 Cr)
Total area of Project	254.20 Ha
Height of Dam from Riverbed (EL)	30 m for Upper reservoir dam and 56.07 m for Lower reservoir dam
Length of Tunnel/Channel	2 nos; 5.8 m dia Main Pressure Shaft – 333.51 m (L) 2 nos; 7.6 m dia Main TRT – 356.18 m (L)
Details of Submergence area	The Submergence area of the proposed project area lies in forest area of 87.7 Ha.
Types of Waste and quantity of generation during construction	Sewage and solid waste generated at the construction staff colony/ project colony shall be adequately treated/

Operation	disposed to avoid water pollution and associated public health problems. Adequate measures will be undertaken to dispose the sewage and waste generated from the labour camps. Appropriate management measures will be recommended as a part of the Comprehensive EIA study.
E-Flows for the Project	Stream flow is not disturbed by the project. The proposed project is an off-stream closed loop project with an installed capacity of 330MW/2030.96 MWH.
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 N/A /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)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 26.97 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 27.90 Ha has been earmarked for the Muck Dumping area.
Monitoring mechanism for Muck Disposal	The project authorities have identified suitable muck disposal sites which are not located near the riverbanks.

• **Land Area Breakup:**

Private land	31.20 Ha
--------------	----------

Government land/Forest Land	0 Ha/223 Ha
Submergence area/Reservoir area	The Submergence area of the proposed project area lies in forest area of 87.7 Ha. The proposed project is an off stream closed loop project with an installed capacity of 330MW/2030.96 MWH. The land required for the proposed upper reservoir and upper intake is 86.31 ha and the land required for the proposed lower reservoir and intake is 103.31 ha.
Land required for project components	254.20 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	Yes	Under process
National Park	No	
Wildlife Sanctuary	No	

- Court case details:**

Court Case	Nil
Additional information (if any)	Nil

- Affidavit/Undertaking details:**

Affidavit/Undertaking	The undertaking by GSECL is provided along with this document.
Additional information (if any)	Nil

- Previous EC compliance and necessary approvals:**

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	N/A
Status of Stage- I FC	Under process
Additional detail (If any)	Nil

Is FRA (2006) done for FC-I	Under process
-----------------------------	---------------

- **Miscellaneous**

Particulars	Details
Details of consultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad
Project Benefits	<p>The following benefits are anticipated from the project construction and operation phases:</p> <ul style="list-style-type: none"> • The availability of alternative resources provided by developer in the rural areas will reduce the dependence of the locals on natural resources such as forest. • A number of marginal activities and jobs would be available to the locals during construction phase. • Developer bringing large scale investment to the area will also invest in local area development and benefit will be reaped by locals. • Education, medical, transportation, road network and other infrastructure will improve. • With increased availability of electricity, small-scale and cottage industries are likely to come up in the area.
Status of other statutory clearances	N/A
R&R details	N/A
Additional detail (If any)	Nil

14.10.3 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 and observed that the proposal is for grant of terms of reference to the project for Satkashi Off-Stream Closed Loop Pumped Storage Hydro Electric Project located at Satkashi Village in Tapi District by M/s Gujarat State Electricity Corporation Limited.
- The project is listed at S.N.1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).
- It was observed that one season data will not give the clear picture about the ecological and biological profile of the region, as after monsoon season there may be high biological

activities being the project site located at the tip of Western Ghats. The EAC also assessed the need of study for worst case scenario and critical mineral assessment along with risk analysis.

- The total land requirement for the project is 254.20 ha hectares, of which 223 hectares are forest land and 31.20 hectares are non-forest land. The application for Stage-I forest clearance has yet to be obtained. It was also noted that the Project Proponent has submitted a letter no. EPCD/0457/08/2024 dated 29.08.2024 issued by Under Secretary (Power) Energy & Petrochemicals Department, Govt. of Gujarat regarding in principle approval to setup Pumped Storage Project at Ukai, District Tapi, Gujarat.

14.10.4 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 for Satkashi off stream closed loop Pumped Storage Hydro Electric Project located at Satkashi Village in Tapi District by M/s Gujarat State Electricity Corporation 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 223 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. 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.
- vii. 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.
- viii. 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.

- ix. 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.
- x. The baseline data collection will cover the changes in biological and ecological profile of the region after monsoon with worst case scenario study and critical mineral assessment.
- xi. 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 source.

Agenda Item No. 14.11

Kandhaura Pumped Storage Project (1680 MW) in an area of 584.57Ha in village Sashnai, Markuri & Cherue, Taluka Obra and Robertsganj District Sonbhadra, Uttar Pradesh By M/s JSW Energy PSP Six Limited – Amendment in Terms of Reference (TOR) - reg.

[Proposal No. IA/UP/RIV/488779/2024; F. No. J-12011/62/2023-IA.I (R)]

14.11.1: The proposal is for grant of amendment in Terms of References (TOR) to the project for Kandhaura Pumped Storage Project (1680 MW) in an area of 584.57Ha in village Sashnai, Markuri & Cherue, Taluka Obra and Robertsganj District Sonbhadra, Uttar Pradesh By M/s JSW Energy PSP Six Limited.

14.11.2: The Project Proponent and the accredited Consultant J.M. EnviroNet Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

- i. Proposed Pumped Storage Project (PSP) is Off-Stream Closed Loop pumped storage development proposed with an installed capacity of 1680 MW/10214.40 MWH. The Project comprises of upper & lower reservoirs with a gross storage capacity of 13.30 MCM (0.470 TMC) & 15.40 MCM (0.544 TMC) respectively, out of which upper reservoir to be constructed on the hill top with main dam maximum dam height of 35 m (from deepest foundation level) to create the desired storage capacity while the lower reservoir will have maximum height of 34.20 m (from deepest foundation level) constructed at the downhill.
- ii. The scheme of operation for the project will be 6.08 Hours of peak hour generation per day and 6.86 Hours for pumping back the water to the upper reservoir. Being a closed

loop project, proposed one time filling of the reservoir will be taken from Sone River and water will then be used cyclically for energy storage and discharge. Evaporation losses, if any will be recouped periodically.

- iii. A Surface powerhouse of 172.00 m(L) X 24.00 m(W) X 55.10 m(H) housing seven vertical shaft reversible fixed speed Francis turbines and generator unit (5 units of 280 MW each and 2 units of 140 MW each).
- iv. The Terms of Reference granted by the Ministry vide letter dated 16.04.2024 for the project Proposed Kandhaura Pumped Storage Project (1680 MW) at village: Sashnai, Taluka: Obra, and Villages: Markuri & Cherue, Taluka: Robertsganj, District: Sonbhadra, Uttar Pradesh in favour of M/s JSW Energy PSP Six Limited.
- v. The project proponent has requested for amendment in the ToR with the details are as under;

S. No.	Para of ToR issued by MoEF&CC dated 16.04.2024	Details as per the ToR dated 16.04.2024	To be revised/ read as	Reason for Amendment in ToR
1.	Total area of the Project. (Subject, Para 1, Page 1; Para 3, 8, 9, Page 2; Point vii, Page 20; Point xiv, Page 22)	756.89 Ha	584.57 Ha	As per Specific ToR point no. 1(A) (1.1) "Explore the possibilities for reducing the Forest land requirement the application for obtaining Stage I FC for 713.72 of forest land (after rationalising the requirement of forest land) involved in the project shall be submitted." In this connection, the company has re-evaluated the proposal w.r.t. area & layout and reduced the project area from
2.	Muck Disposal Area (Para 8, Page no. 2; Specific ToR Point No. 1(A) (1.6), Page no. 3; Point No. xiv, Page no. 23)	132.31 Ha	54.88 Ha	
3.	Area of Forest Land (Specific ToR Point 1(A) (1.1), Page no. 3. Point No. vii, Page no. 20; Point No. xiv, Page no. 24)	713.72 Ha	493.51 Ha	

S. No.	Para of ToR issued by MoEF&CC dated 16.04.2024	Details as per the ToR dated 16.04.2024	To be revised/ read as	Reason for Amendment in ToR
4.	Govt. Land & Private land (Point No. vii, Page no. 20; Point No. xiv, Page no. 24)	36.48 Ha Govt. Land & 7.69 Ha Pvt. Land	14.14 Ha Govt. Land & 76.92 Ha Pvt. Land	756.89 ha (including 713.72 ha Forest land, 36.48 ha Govt. Land & 7.69 ha Pvt. Land) to 584.57Ha (including 493.51 ha forest land, 14.14 Ha Govt. Land, 76.92 Ha Pvt. Land).
5.	Greenbelt / plantation area (Point No. vii, Page no. 20)	14.53 Ha will be covered under greenbelt / plantation area	22.17 Ha will be covered under greenbelt / plantation area.	Due to change in the project area and layout
6.	Reservoir Area (Point No. xiv, Page no. 24)	Reservoir Area: 397.2 Ha	Reservoir Area: 392.68 Ha	The reservoir area and capacity has been reduced due to optimisation of the Project Layout.
7.	Water availability (Point No. iv, Page no. 20)	The Project will utilize 1860 MW to pump 12.62 MCM (0.42 TMC) of water to the upper reservoir in 6.93 hours.	The Project will utilize 1860 MW to pump 12.41 MCM (0.438 TMC) of water to the upper reservoir in 6.86 hours.	The water availability has been revised as per reassessment of technical parameters.
8.	Total Submergence Area: 1. Forest Land 2. Private (Point No. xiv, Page no. 22; Point No. xiv, Page no. 24)	Total Submergence Area: 209.1 Ha 1. Forest Land: 201.44 Ha 2. Private Land: 6.7 Ha 3.	Total Submergence Area: 179.92Ha 1. Forest Land: 176.52 Ha 2. Private Land: 3.41 Ha 3.	Due to change in the project area and layout

S. No.	Para of ToR issued by MoEF&CC dated 16.04.2024	Details as per the ToR dated 16.04.2024	To be revised/ read as	Reason for Amendment in ToR
		Government Land: 0.96 Ha	Government Land: 0.00 Ha	
9.	Gross Storage Capacity of Upper & Lower Reservoir (Point No. 3, Page no. 20)	The Project comprises of upper & lower reservoirs with a gross storage capacity of 13.30 MCM (0.47 TMC) & 16.91 MCM (0.56 TMC) respectively.	The Project comprises of upper & lower reservoirs with a gross storage capacity of 13.30 MCM (0.47 TMC) & 15.40 MCM (0.544 TMC) respectively.	The reservoir area and capacity has been reduced due to optimisation of the Project Layout.
10.	Maximum dam height of Upper & Lower Reservoir (Point No. 3, Page no. 20; Point No. xiv, Page no. 22)	Upper reservoir: 38.5 m Lower reservoir: 40 m	Upper reservoir: 35 m Lower reservoir: 34.20 m	Maximum Dam Height has been reduced due to optimisation of the Project Layout.
11.	Location (Including coordinates) (Point No. xiv, Page no. 21)	Latitude: 24°28'44.22" N to 24°31'53.92" N Longitude: 83° 8'2.81" E to 83°11'49.31" E	P1: North (24°31'37.46" N 83° 7'53.65"E) P2: West (24°31'11.32" N 83° 7'26.71"E) P3: East (24°30'2.57"N 83°11'44.56"E) P4: South (24°28'13.08" N 83°10'1.14"E)	Due to change in the project area from 756.89 ha to 584.57Ha

S. No.	Para of ToR issued by MoEF&CC dated 16.04.2024	Details as per the ToR dated 16.04.2024	To be revised/ read as	Reason for Amendment in ToR
12.	Standard Terms of Reference for River Valley/irrig (Annexure 1, Page no. 6 to 18)	Standard Terms of Reference for (River Valley/Irrigation projects)	Specific Terms of Reference (ToRs) issued by the MOEFCC, New Delhi vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Closed Loop Pumped storage projects for preparation of EIA/ EMP report.	As per specific ToR Point no. 5(E) 5.6 “Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pumped storage projects shall be used for preparation of EIA/ EMP reports.” In this connection EIA/ EMP report has been prepared as per MoEFCC OM dated 14.08.2023. Intimation letter regarding the same had been submitted to MOEFCC, New Delhi vide letter no. JSW/PSP-Kandhaura/TOR/2024-25/01 dated 30th April 2024. However, EIA/EMP report comply additional/specific ToR as mentioned in Annexure 1, Page no. 3 to 6.
13.	Used Oil & grease (Point No. xiv, Page no. 23)	6.6 TPA	5.6 TPA	Revised as per reassessment of technical parameters.

S. No.	Para of ToR issued by MoEF&CC dated 16.04.2024	Details as per the ToR dated 16.04.2024	To be revised/ read as	Reason for Amendment in ToR
14.	Generation of Electricity Annually	3636.99 MU Energy generation	3542.62 MU Energy generation	The scheme of operation has been revised as per reassessment of technical parameters.
15.	Scheme of operation (Point No. iii, Page no. 20)	The scheme of operation for the project is with 6.24 Hours of peak power per day and 6.93 Hours for pumping back of the water to the upper reservoir.	The scheme of operation for the project is with 6.08 Hours of peak power per day and 6.86 Hours for pumping back of the water to the upper reservoir.	The scheme of operation has been revised as per reassessment of technical parameters.

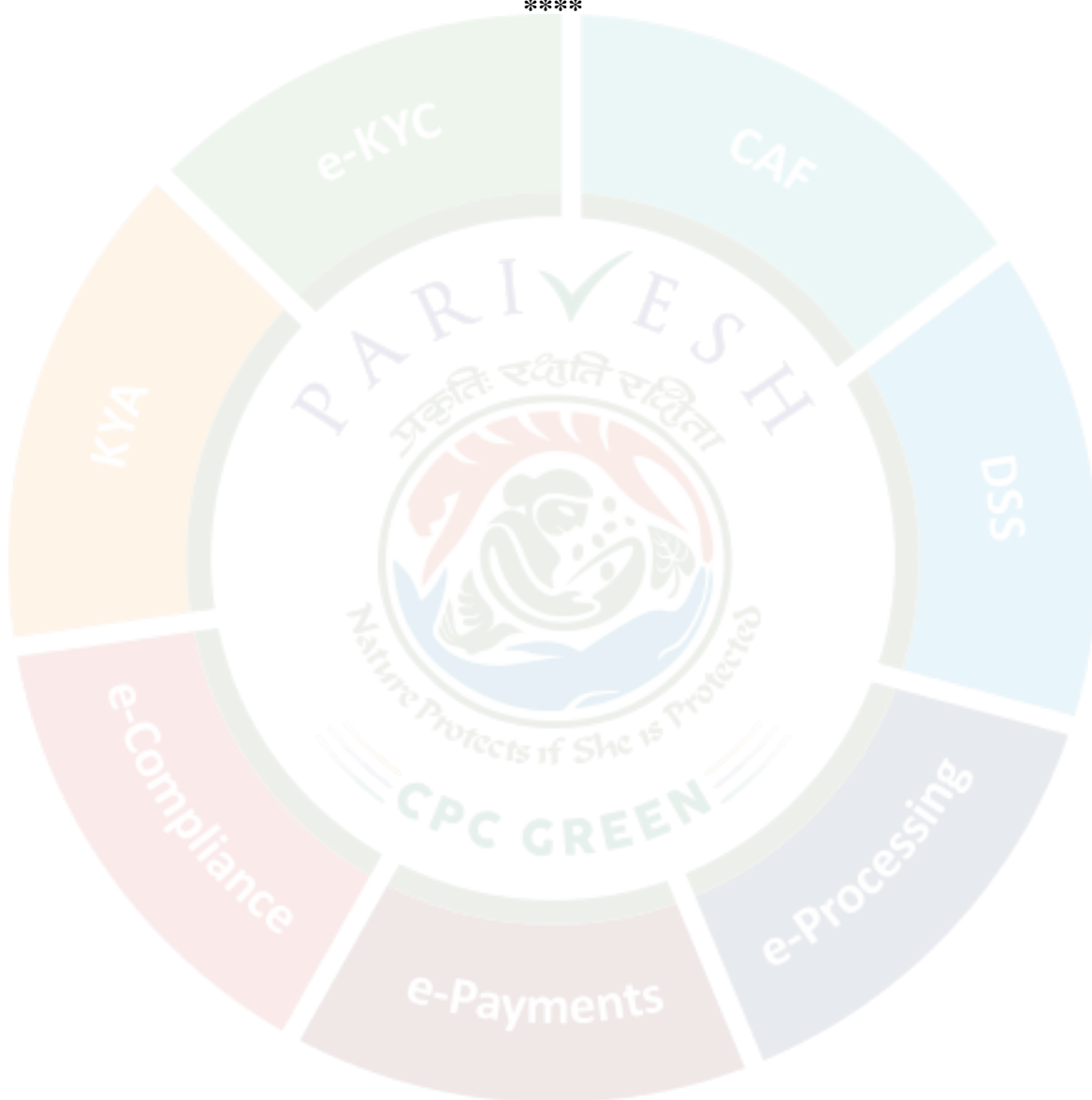
14.11.3 The EAC during deliberations noted the following:

- The proposal is for grant of amendment in Terms of References (TOR) to the project for Kandhaura Pumped Storage Project (1680 MW) in an area of 584.57Ha in village Sashnai, Markuri & Cherue, Taluka Obra and Robertsganj District Sonbhadra, Uttar Pradesh by M/s JSW Energy PSP Six Limited.
- The project is listed at S.N.1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).
- The Terms of Reference granted by the Ministry vide letter dated 16.04.2024 for the project Proposed Kandhaura Pumped Storage Project (1680 MW) at village: Sashnai, Taluka: Obra, and Villages: Markuri & Cherue, Taluka: Robertsganj, District: Sonbhadra, Uttar Pradesh in favour of M/s JSW Energy PSP Six Limited.

14.11.4 The EAC after examining the information submitted and detailed deliberations **recommended** the proposal grant of amendment in Terms of References as proposed by the PP to Kandhaura Pumped Storage Project (1680 MW) at village: Sashnai, Taluka Obra, and Villages Markuri & Cherue, Taluka Robertsganj, District Sonbhadra, Uttar Pradesh in favour of M/s JSW Energy PSP Six Limited, under the provisions of EIA Notification, 2006 and as amended with subject to the following additional conditions:

- i. All ToR points mentioned in the ToR letter dated 16.04.2024 shall remain unchanged.
- ii. EIA/EMP, collection of baseline data, other statutory clearance and the public hearing shall be carried out as per revised layout.

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

APPROVAL OF THE CHAIRMAN

===== Forwarded message =====

From: <govind.chakrapani@es.iitr.ac.in>

To: "Yogendra Pal Singh" <yogendra78@nic.in>

Date: Wed, 11 Sep 2024 11:03:55 +0530

Subject: Re: Fwd: Re: Draft minutes of 14th EAC meeting held on 30.08.2024 - 31.08.2024 - reg.

===== Forwarded message =====

Approved.
Chakrapani

On 11-Sept-2024 11:02, Yogendra Pal Singh <yogendra78@nic.in> wrote:

Dear Sir,

As suggested on Whatsapp, the MOM has been corrected and attached herewith for kind approval please.

With Regards,

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