BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI

Original Application No. 955/2024

In the matter of:

President Municipal Committee Thathri **Applicant**

Vs.

Union Territory of J&K **Respondents**

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Dated: 25.11.2024

Factual Report of the Joint Committee, in the matter of OA No. 955 of 2024; President Municipal Committee Thathri Versus Union Territory of J&K, in compliance to the orders of Hon'ble NGT dated 12/09/2024

1. Background:

The matter in Original Application No. 955 of 2024; President Municipal Committee Thathri Versus Union Territory of J&K has been registered suo moto based on a letter petition of President Municipal Committee Thathri, District Doda, Jammu & Kashmir, Union Territory. The complaint in the letter petition has been made regarding dumping of debris/muck in River Chenab, by M/s Megha Engineering and Infrastructure Ltd, the executing agency for construction of Rattle Hydro Electric Power Project Drabshalla District Kishtwar, Jammu & Kashmir, Union Territory. It is alleged by the petitioner that ***"the working agency is dumping debris/muck in river Chenab instead of storing and dumping the same at the location allotted by Revenue Department of Kishtwar. On account of unauthorized and illegal dumping of debris in river Chenab during rainy season heavy losses were suffered by the residents of Thathri due to flood situation caused in river Chenab. Thathri town is situated almost on the bank of river Chenab at zero distance".***

2. Orders of Hon'ble National Green Tribunal:

Hon'ble NGT has observed in the order dated 12/9/2024 that:

Para 03: "*Dumping of muck/debris of under construction project in river water is a serious environmental violation and the averments made in the application in our view do give rise to a substantial question relating to environment arising out of the implementation of Enactments mentioned in Schedule I of NGT Act, 2010"*

The following directions were issued by Hon'ble National Green Tribunal vide order dated 12/09/2024 (**Annexure-1**):

Para 06*: "Further, we find it appropriate to obtain a factual report for which we constitute a joint Committee comprising District Magistrate, Kishtwar; Member Secretary, J&K Pollution Control Committee; Integrated Regional Officer, Ministry of Environment, Forest and Climate Change, Jammu; and a representative Central Pollution Control Board (hereinafter referred to as CPCB) shall not be below rank of Director.*

Para 07*: The CPCB shall be nodal authority for coordination and compliance.*

Para 08*"The said Committee shall visit the site, collect relevant information and submit a factual report within one month".*

A progress report was filed by the Joint Committee, seeking more time to file the factual report, which was considered by Hon'ble NGT on 23/10/2024. While granting time to the Joint

Committee for filing the factual report, it was also observed by the Hon'ble NGT in its order dated 23/10/2024 (**Annexure -2**) that

Para 08: ***"A reply on behalf of respondent 5- M/s Megga Engineering and Infrastructure Ltd has been filed but it nowhere shows that muck is being disposed in compliance of Construction and Demolition Waste Rules, 2016. Further, photographs appended to reply shows clearly that the muck is being discharged in river directly and this is a gross violation of environmental laws. Hence, prima facie we are satisfied that here is a case where gross violation of environmental laws is virtually evident from own reply of respondent 5 and further execution of project should be stopped. However, before taking such a stringent action, we find it appropriate, and as also requested by learned counsel appearing for respondent 5, to have an additional reply placing its stand in respect of compliance to statutory rules in regard to disposal of muck."***

3. Compliance of the orders of Hon'ble NGT:

3.1. Constitution of the Joint Committee:

In compliance to the directions of the Hon'ble NGT, a joint committee comprising of the following members, was constituted:

i. Shri Rajesh Kumar Shavan, JKAS, Deputy Commissioner, Kishtwar, J&K
ii. Sh. Ghansham Singh, JKAS, Member Secretary, J&K Pollution Control Committee (J&KPCC)
iii. Dr. Khursid Alam Khan, Scientist 'C', Sub-Office Jammu (erstwhile Integrated Regional Office, Jammu) now Sub Office under Regional Office Chandigarh, Ministry of Environment, Forest and Climate Change (MoEF&CC)
iv. Dr. Narender Sharma, Scientist 'F'/Director, Central Pollution Control Board (CPCB), Regional Directorate, Chandigarh

3.2. Site visit and collection of relevant Information:

The Joint Committee carried out a site visit on 14/10/2024 in compliance to this order of Hon'ble NGT Tribunal to address the points raised in the letter petition. The Divisional Officer from Kishtwar, J&KPCC, and the Tehsildar of Kishtwar, J&K, were also present for assistance of the committee. It was informed by Tehsildar, Kishtwar that currently Municipal Committee, Thathri is not in place. The Joint Committee discussed the issue and perused all the relevant record.

The Joint Committee also inspected all three designated muck dumping sites outlined in the Environmental Management/Muck Management Plan. The Joint Committee captured photographs duding site inspection for inclusion in the factual report.

The Joint Committee also sought following details from M/s Rattle Hydroelectric Power Corporation Limited (RHPCL), M/s Megha Engineering and Infrastructure Ltd (MEIL), Sub Office, MoEF&CC, Jammu, Divisional Officer, Kishtwar, J&K and Tehsildar, Kishtwar, J&K:

and M/s Megha Engineering and Infrastructure Ltd (MEIL):

i. Muck Management Plan of the Rattle Hydroelectric Power Project.
ii. Copy of Environmental Management Plan submitted by the project proponent for obtaining Environmental Clearance
iii. Copy of half-yearly compliance report submitted by the project proponent to MoEF&CC regarding compliance of the conditions of Environmental Clearance.
iv. Copy of report of verification conducted by MoEF&CC regarding the compliance of the conditions of Environmental Clearance
v. Copy of Consent to Establish (CTE) granted by J&K PCC and violation reported in the past by the Division Office, Kishtwar, J&K PCC along with action taken report.
vi. Details of land allotted by Revenue Department, Kishtwar to project proponent for muck dumping, as mentioned in the letter petition.
vii. Status of muck generation and disposal as of October 14, 2024

The required information from the MoEF&CC was received on October 22, 2024. The information pertaining to Divisional Officer, Kishtwar, J&KPCC, M/s Rattle Hydroelectric Power Corporation Limited, M/s Megha Engineering and Infrastructure Ltd (MEIL) and the Tehsildar, Kishtwar, J&K, was received on November 14, 2024.

3.3.Discussion and Observations of the Committee :

Initial observations made by the Joint Committee during site inspection suggested that M/s Megha Engineering and Infrastructure Limited (the executing agency for the Rattle Hydro Electric Power Project in Drabshalla, District Kishtwar, Jammu & Kashmir) has improperly disposed of muck directly on the bank of the Chenab River, in violation of the guidelines of MoEF&CC (**Geo-tagged Photographs** attached as **Annexure-3**).

During site inspection the M/s Megha Engineering and Infrastructure Limited (the executing agency for the Rattle Hydro Electric Power Project in Drabshalla, District Kishtwar, Jammu & Kashmir) were asked to explain the dumping of Muck as pointed out.

The project executing agency, M/s Megha Engineering and Infrastructure Limited, asserted that all the muck has been disposed of in accordance with the Environmental Clearance issued by MoEF&CC and the approved muck management plan for the same.

The Joint Committee reviewed and considered the following documents to analyse the facts and draw the conclusion for preparing a factual report, as directed by Hon'ble National Green Tribunal :

i. Environmental Clearance granted for Ratle HEP (850MW) Project in Kishtwar District of Jammu & Kashmir to M/s GVK Ratle Hydro Electric Project Pvt. Ltd. by MoEF&CC vide No. J-12011/39/2010-IA-1 dated 12/12/2012 (**Annexure-4**).

ii. The above environmental clearance was later on transferred in the name of M/s Ratle Hydro Electric Power Corporation by MoEF&CC vide No. J-12011/39/2010-IA.1dated 27/09/2021(**Annexure-5**).

iii. Muck Management/Disposal Plan (**MMP**), submitted by the Project Proponent for obtaining Environmental Clearance (EC) from MoEF&CC (**Annexure-6**).

iv. Environment Management Plan (EMP) submitted by the Project Proponent for obtaining Environmental Clearance (EC) from MoEF&CC (**Annexure-7**).

v. Half yearly reports of compliance of the conditions of Environmental Clearance (EC) submitted by the Project Proponent for the period October 2022 to March 2023 (**Annexure-8**), April 2023 to September 2023 (**Annexure-9**), October 2023 to March 2024 (**Annexure-10**) and October 2024 (**Annexure-11**).

vi. MoEF&CC compliance verification report dated 16/08/2024 w.r.t conditions of Environmental Clearance granted to the Project Proponent (**Annexure-12**).

vii. Show Cause Notice issued by MoEF&CC to the Project Proponent vide No. IA-J-11014/257/2024/IA-1/ dated 22/10/2024 for the non-compliances observed during compliance verification inspection (**Annexure-13**).

viii. Letter No. RATLE/CEO/2022/GM (C-I)/330/ dated 27/09/2022 issued to M/s Megha Engineering and Infrastructure Limited by M/s Ratle Hydroelectric Power Corporation Limited regarding compliance of provisions pertaining to ecological balance-regarding disposal of muck at only designated sites (**Annexure-14**).

ix. Letter No. RATLE/GM(C)/2022/66 dated 07/11/2022 issued to M/s Megha Engineering and Infrastructure Limited by M/s Ratle Hydroelectric Power Corporation Limited regarding compliance of provisions pertaining to ecological balance-regarding disposal of muck at only designated sites (**Annexure-15**).

x. Letter No. RATLE/CEO/2024/798/ dated 26/07/2024 issued to M/s Megha Engineering and Infrastructure Limited by M/s Ratle Hydroelectric Power Corporation Limited regarding strict compliance of the condition pertaining to disposal of muck only at designated sites (**Annexure-16**).

xi. Letter No. MEIL/RHPCL/24/07/250 dated 30/07/2024 reply submitted by M/s Megha Engineering and Infrastructure Limited w.r.t strict compliance of the condition pertaining to disposal of muck only at designated sites (**Annexure-17**).

xii. Directions issued by J&K PCC to M/s Megha Engineering and Infrastructure Limited vide No. PCC//RDJ/GGC-20/2023/3026-29 dated 18/12/2023 in view of various observations including dumping of muck near water body and the company's failure to remove the muck despite directions J&K PCC (**Annexure-18**).

xiii. Legal notice issued by J&K Pollution Control Committee (J&KPCC) to M/s Megha Engineering and Infrastructure Limited vide No. PCC/RDJ/GGC-20/2024/1104-1109 dated 26/09/2024 for muck dumping near TRT on the right bank (downstream) going into the River Chenab in violation of Environmental Laws (**Annexure-19**).

xiv. Details of the muck generated/utilized in Ratle HE Project till 31/10/2024 (**Annexure-20**)

3.4. Analysis of the Documents / Facts:

From the above documents and the filed visit , following could be analysed:

1. The environmental clearance was granted with the condition that *"Consolidation and compilation of muck shall be carried out only in the designated muck dumping sites as submitted in the EIA/EMP report. As per the proposed muck disposal plan, out of 24.4 lakh m^3 of muck to be generated due to excavation, about 50% (i.e.12.2 lakh m^3 will be utilized for construction purpose and the remaining 12.2 lakh m^3 will be dumped at the 3 designated areas in an allocated area of 30.59 ha.* ***The identified muck dumping sites shall be at-least***

30m horizontally away from the edge of the river corresponding to high flood level (HFL)".

2. According to the Muck Management Plan submitted by the Project Proponent for obtaining Environmental Clearance from MoEF&CC, *"The following three sites were identified for use as dumping sites :*

   Zone I*: on the right bank of river Chenab u/s of village Thathri and d/s of the proposed Dam in an approximate length of 1350 m.*

   Zone II*: on the left of river Chenab d/s of the proposed Dam and at a lower level then the existing NH 1B in a length of 1400 m.*

   Zone III*: on the right bank of Kuligad nalla above NH 1B in a length of 450 m."*

3. It is also stated in the Muck Management Plan that *"The following points were considered and followed as guideline for finalization of the above 3 zones to be used as dumping sites:*
   - *i) The dumping sites were selected as close as possible to the project area to avoid long distance transport of muck.*
   - *ii) Standard distance between each dumping site and river bed is maintained as per MoEF&CC guidelines.*
   - *iii) The sites were free from active landslides or creep and care were taken that the sites should not have a possibility of toe erosion and slope instability.*
   - *iv) The dumping sites are either at higher level than the flood level or are away from the river course so that the possibility of muck falling into the river is avoided.*
   - *v) There is no active channel or stream flowing through the dumping sites.*
   - *vi) The sites were far away from human settlement areas.*

4. According to the Muck Management Plan*"In Ratle Hydro Electric Project, a very scientific approach and methodology was followed for identification of the dumping sites. All possible alternate sites were inspected and examined before rejecting or selecting any site. All the three finalised sites are:*
   - *i) With minimum possible forest cover: The area is mostly barren and rocky and covered with predominantly bushes. The total number of trees, poles and saplings is 872 out of which only 174 are trees while the rest all are poles and saplings.*

ii) *The populated /settlement areas are far away from the identified dump zones and therefore will be least impact on human life.*

iii) *Away from the river (30 m away from the HFL as per guidelines): The dumping sites are either at higher level than the flood level or are 30 m away from the river course to provide protection from high flood.*

iv) *The identified muck sites close to the project area to avoid hazards related to transport of muck to long distances.*

v) *With Retaining structures in the entire dumping area: Retaining wall have been suitably designed and proposed to be constructed all along the river bank which will prevent muck from falling into the river.*

vi) *With appropriate Restoration & Rehabilitation plan: all the three identified sites are proposed to be restored and re-habilitated in a very scientific manner and once completed will not only present an aesthetic view but will help the environment since the area which is rock and barren will be converted into forest cover because of the proposed plantation.*

5. As per Muck Management Plan submitted by the Project Proponent for obtaining Environmental Clearance from the MoEF&CC, the following Monitoring and Compliance schedule were submitted:

"MONITORING & COMPLIANCES:

i. *Muck shall be dumped from bottom in layers of 500- 700mm depending on size of boulders.*

ii. *Each layer shall be rolled compacted.*

iii. *A layer of soil shall be spread on top of it to make it suitable for plantation.*

iv. *Water testing facilities shall be set up for checking quality parameter of water.*

v. *Soil samples shall be regularly collected and tested for checking the level of contamination.*

vi. *Prescribed norms and approvals will be sought from PCB wherever necessary.*

vii. *All norms of Forest department, PCB and MoEF and their acts related to muck disposal shall be complied with.*

viii. *Design consultant shall be engaged for designing of retaining structures.*

ix. *Plantation shall be done on the reclaimed land and native variety of plants and trees shall be planted."*

6. It is mentioned in the Muck Management Plant that *"The capacity/volume of the muck dumping sites is more than the volume of the muck to be disposed. It may appear that the area requirement is in excess but the same is required for temporary storage of usable muck, traffic movement of dumpers and lifters. The spoil from various construction sites would be disposed of at designated sites in a controlled and orderly manner. All measures would be adopted to ensure that the dumping of muck does not cause injury or inconvenience to the people or the property around the area. The general topography of the disposal area is mild sloped. The spillage of muck into the river at any site would be prevented by making concrete retaining walls to retain the muck pile.* ***It shall be ensured that dumping is carried out at a minimum distance of 30 m away from the active river bank."***

7. It is mentioned in the Muck Management Plan that *"The total length of retaining wall proposed to be constructed along the river would be about 3200 meters."* It is further mentioned that ***"These retaining walls are proposed to be located at about 30.0m distance from the highest flood level."*** A typical sketch is also given in the plan.

8. It is mentioned in the Muck Management Plan that ***"The muck will be spread in layers of 500 700 mm thick layers."***

9. As per details of muck generated/disposed of till 31/10/2024 provided by the Project Proponent, the total muck generated so far is 12.80 lac cum. Out of this, 0.50 lac cum is dumped on the left bank and 1.26 Lac cum is dumped at right bank of the river. Remaining quantity has been utilized.

10. The total estimated cost of Muck disposal and rejuvenation of muck disposal sites would be Rs. 7500 lacs as per Muck Management Plan.

11. Half yearly reports of compliance of the conditions of the Environmental Clearance submitted by Project proponent in October, 2024 mentions that " The contactor has confirmed that temporarily stacked muck/muck dumped near the river will be suitably retrieved and relocated for use in the Project construction works. It is also mentioned that dumping of muck on the right bank of River Chenab has been stopped since July 2024 under intimation to the District Administration/GOJK and that an alternative location

within the acquired project land is now being utilized by the contractor for temporary storage/stacking of muck.

3.4.1. Regulatory Mechanism adopted for addressing environmental non-compliances:

i. According to verification of the compliance of the conditions of Environmental Clearance, conducted by Sub Office of MoEF&CC, Jammu on 16/08/2024, the observation with regard to non-compliance has been made on 14 points, which also include that ***"Project Proponent has dumped the muck in the River at several places. Moreover, the designated site is less than 30 meters horizontally away from the edge of the river."***

ii. MoEF&CC has also issued show cause notice to M/s Ratle Hydro Electric Power Corporation Limited vide No. IA-J-11014/257/2024/IA-1/ dated 22/10/2024, for violation of various conditions of Environmental Clearance ***including muck dumping in the river at several places against the stipulated condition.***

iii. The Project Proponent namely M/s Ratle Hydro Electric Power Corporation Limited has asked the project executing agency namely M/s Megha Engineering and Infrastructure Ltd (MEIL) vide letters dated 27/09/2022, 07/11/2022 and 26/07/2024, ***for not dumping the muck and debris properly at designated sites,*** stating that ***"this non-compliance of environmental clearance condition is a matter of serious concern and the violation of norms and may attract the penal action in terms of provisions contained in Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981, EPA, 1986 and the guidelines issued by Hon'ble NGT, CPCB, JKPCC etc. in this regard."***

iv. J&K Pollution Control Committee has also issued Directions and legal notice vide No. dated 18/12/2023 and 26/09/2024, for i) ***dumping of muck near water body and the company's failure to remove the muck despite directions*** and ii)***muck dumping near TRT on the right bank (downstream) going into the River Chenab in violation of Environmental Laws, respectively.***

3.5. Findings/Factual report of the Joint Committee:

1. There are following 03 muck disposal sites in District Kishtwar, designated as per Environmental Management Plan/Muck Management Plan and also mentioned in the Environmental Clearance granted to the Project Proponent for proper disposal of muck arising out of the construction activities of Ratle Hydro Electric Project (RHPC). The details of the above 03 sites, as shared with the Joint Committee are reproduced below:

   Site 1: Right bank of River Chenab downstream of proposed Dam with approx. length 1350 m (designated site is part of forest land diverted for use vide Govt. of Jammu and Kashmir order No. 234-FST of 2012 dated 27.04.2012 and subsequently, forest clearance transferred in favour of RHPCL vide MoEF&CC communication No. 15-01/2021-Jammu dated 08.03.2022) ;

   Site 2: Left bank of River Chenab downstream of proposed Dam with approx. length 1400 m (Khasra No. 2879/265/185 Min. and 293/232 Min. in village Dugga of Tehsil Drabshalla; land stands acquired in 2012 by JKPDC, one of the Promoters of RHPC)

   Site 3: Right bank of Kuligad nalla with approx. length 450 m (Khasra No. 171 Min and 172 Min. in village Khori of Tehsil Drabshalla; land stands acquired in 2012 by JKPDC, one of the Promoters of RHPC) .

2. It has been found that Site 1 and Site 2 are being used, ***while the , Site 3 has not yet been used for muck disposal due to its infeasibility, as informed by the project proponent.***

3. The Joint Committee was informed that M/s Ratle Hydro Electric Power Corporation Limited (RHPCL) has also provided an alternative site to the executing agency namely M/s Megha Engineering and Infrastructure Ltd (MEIL) near Joshana village, within the acquired Project land for temporary stacking of muck (Khasra No. 317/308/209 Min) and M/s MEIL has started translocating the muck from the dumping site II at the aforementioned alternative site, without intimating to MoEF&CC and without obtaining consent/permission from J&KPCC. In this regard, an email was sent to M/s Ratle Hydro Electric Power Corporation Limited by the nodal agency (CPCB) on 17/11/2024, asking to provide *i) The capacity of the alternate site provided by RHPCL, ii) Approval of the above site from the concerned authority (MoEF&CC/J&KPCC)/Approval of revised Muck Management Plan, if any and iii) The quantity of the muck dumped on the above site as on date.* The response of M/s

Ratle Hydro Electric Power Corporation Limited (RHPCL), as received via Email dated November 18, 2024 (Annexure-21), is reproduced as follows:

i. *Capacity of the alternative site : The alternative site(s) near Joshana village which fall within the acquired Project land (acquired in 2012) and situated far away from the river (approx. 8km), can accommodate more than 18.0 Lakh CuM of muck approx.*

ii. *Approval of the above site from the concerned Authority: In order to avoid any spillage of muck, the dumping of muck on right bank of river has been stopped since July 2024 under intimation to the District Administration/GoJK. Subsequently, an alternative site has been provided to MEIL near Joshana village, within the acquired Project land (acquired in 2012). The said alternative site is far away from river (approx. 8 Kms). This alternative site (acquired land of Project) has been provided to MEIL as a measure for temporary stacking/storage of muck and its further utilization/ processing for use in the Project construction activities later on. The providing of aforementioned alternative site has also been intimated to MoEF&CC and J&K Pollution Control Committee in October 2024 for kind information.*

iii. *Quantity of muck dumped on the above site as on date: As submitted by M/s MEIL, approx. 65000 CuM of muck has been relocated/stacked at this alternative site.*

4. As per Environmental Clearance granted for the above project, *"**The identified muck dumping sites shall be at-least 30m horizontally away from the edge of the river corresponding to high flood level (HFL)",*** Further, as per Muck Management Plan of the Project ***"It shall be ensured that dumping is carried out at a minimum distance of 30 m away from the active river bank." (Ref: Annexure 6:*** *Muck Management Plan; Figure 7.10: Muck Disposal Area (Zone-I)* However, it was observed by the Joint Committee that ***Project proponent has not complied with this condition of the Environmental Clearance and Muck Management Plan***.

5. The Project Executing Agency namely M/s Megha Engineering and Infrastructure Ltd (MEIL) is dumping muck directly on the banks of the Chenab River, allowing it to flow into the river, in violation of conditions of the Environmental Clearance. This has also been witnessed by Sub Office of MoEF&CC, Jammu during verification of the compliance of the conditions of the environmental clearance on 16/08/2024 and a show cause notice has been issued by MoEF&CC to M/s Ratle Hydro Electric Power Corporation Limited vide No. IA-J-11014/257/2024/IA-1/ dated 22/10/2024, for

violation of 14 conditions of Environmental Clearance including muck dumping in the river at several places against the stipulated condition.

6. Additionally, J&K Pollution Control Committee has also issued directions and legal notice 18/12/2023 and 26/09/2024, for **i)** ***dumping of muck near water body and the company's failure to remove the muck despite directions*** **and ii)** ***muck dumping near TRT on the right bank (downstream) going into the River Chenab in violation of Environmental Laws, respectively****. The status of further action taken by J&KPCC subsequent to Directions and Legal Notice is awaited from J&KPCC. However, the Joint Committee was informed that District Magistrate has asked the Tehsildar to monitor progress of removal of muck from Site No. 2 on weekly basis.*

7. The Project Proponent, M/s Ratle Hydro Electric Power Corporation Limited has also issued letters to the project executing agency namely M/s Megha Engineering and Infrastructure Ltd (MEIL) on 27/09/2022, 07/11/2022, and 26/07/2024, highlighting violations of the Environmental Clearance conditions concerning muck disposal. This indicates that the project executing agency has consistently failed to comply with the environmental conditions. In response to the letter dated 26/07/2024, the executive agency, M/s Megha Engineering and Infrastructure Ltd, informed the Project Proponent (RHPCL) that the designated area for muck dumping is not sufficient after maintaining a 30-meter distance from the river edge. Additionally, the muck dumping site III (Kulligadh) does not provide adequate space for dumping and unfortunately, they are unable to locate any land nearby that meets their requirements (**Annexure-17**)

8. The project proponent ***has not complied with the Monitoring and Compliance conditions*** mentioned in its Muck Management plan, which was submitted for obtaining the Environmental Clearance from MoEF&CC namely ***Muck shall be dumped from bottom in layers of 500- 700mm depending on size of boulders; Each layer shall be rolled compacted; Water testing facilities shall be set up for checking quality parameter of water; Prescribed norms and approvals will be sought from PCB wherever necessary; All norms of Forest department, PCB and MoEF and their acts related to muck disposal shall be complied with.*** *However, it was informed that 04 samples quarterly are being tested.* Three tankers of water sprinkling were found en-route on the site for sprinkling of water for containing the dust pollution.

9. The project proponent has also not complied with the condition of the Muck Management Plan that ***"The total length of retaining wall proposed to be constructed along the river would be about 3200 meters."*** *and that* ***"These retaining walls are proposed to be located at about 30.0m distance from the highest flood level." A typical sketch is also given in the plan****. It was observed that* The project proponent has raised certain retaining walls also to contain the spills but not as per stipulated criteria of 30.0 m distance from the highest flood level. As a result, the muck was observed to be overflowing these retaining structures.

In view of the above and the facts reported in Section 3.4 of this report, it may be concluded that concerns raised in the original application by the applicant appear to be factually correct and the project proponent has not complied with the guidelines for muck disposal despite financial provision of Rs. 75 Crores made in the project for proper and scientific disposal of muck.

3.6. Recommendations:

It was informed that :

i. The District Magistrate has sought weekly compliances regarding removal of debris, sprinkling of water and water quality checks and its monitoring on weekly basis through Tehsildar.

ii. The forest Division has also been asked by the District Magistrate, to get all conditions implemented for plantation, checks dams, steep plantation etc and start the work for these activities immediately.

It is recommended that:

i. The project is executed by only following the conditions of environmental clearance granted to the project proponent, to ensure that no environmental damaged is caused due to unscientific disposal of muck and debris. Detailed records of the removal process, including the volume or weight of muck cleared, the disposal locations, and the methods used to be maintained.

ii. The muck deposited along the banks of the River Chenab is promptly cleared to prevent it from entering the river during the rainy season.

iii. The MoEF&CC and J&K PCC may take appropriate action regarding violations of the environmental clearance conditions issued by the MoEF&CC. J&K Pollution Control Committee has issued directions and legal notice to Project Proponent on 18/12/2023 and 26/09/2024. MoEF&CC has also already issued a show cause notice to M/s Ratle Hydro Electric Power Corporation Limited vide No. IA-J-11014/257/2024/IA-1/ dated 22/10/2024

iv. The project proponent must obtain approval for the new muck disposal site to ensure its utilization in accordance with the recommended measures.

v. J&K PCC may ensure regular monitoring of the compliance of the conditions of Environmental clearance and Consent to Establish (CTE) Consent to Operate (CTO).

The draft factual report of the Joint Committee was shared with its members to solicit their comments before finalizing the report. The Deputy Commissioner, Kishtwar has provided additional signed comments on the draft report, supplementing the Joint Committee's factual findings. The signed draft report with additional comments, as received from Deputy Commissioner, Kishtwar, is attached as **Annexure-22** for the consideration of the Hon'ble National Green Tribunal.

The above factual report is being submitted to the Hon'ble National Green Tribunal in compliance to the orders dated 12/09/20254 and 23/10/2024, which may kindly be taken on record. The Joint Committee will abide by further directions of the Hon'ble NGT, in this matter.

Dr. Khursid Alam Khan
Scientist 'C'/Deputy Director
Sub Office, MoEF&CC, Jammu

21/11/2024

Dr. Narender Sharma
Scientist 'F'
CPCB, Regional Directorate, Chandigarh

Ghansham Singh, JKAS
Member Secretary, J&K PCC, J&K

Rajesh Kumar Shavan, JKAS,
Deputy Commissioner, Kishtwar, J&K
(Signed Draft Report with additional Comments attached as Annexure-22)

Dated: November 21, 2024

Item No. 03 Court No. 2

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 955/2024

President Municipal Committee Thathri Applicant

Versus

Union Territory of J&K Respondent

Date of hearing: 12.09.2024

CORAM: HON'BLE MR. JUSTICE SUDHIR AGARWAL, JUDICIAL MEMBER
HON'BLE DR. AFROZ AHMAD, EXPERT MEMBER

ORDER

1. The Original Application has been registered under Sections 14 and 15 of the National Green Tribunal Act, 2010 (hereinafter referred to as 'NGT Act, 2010') in exercise of *suo motu* jurisdiction in view of the law laid down by Supreme Court in ***Municipal Corporation of Greater Mumbai vs. Ankita Sinha, (2022) 13 SCC 401***on a letter petition, sent by President Municipal Committee Thathri, District Doda, Jammu & Kashmir, Union Territory on 25.11.2023.

2. The complainant has said that Rattle Hydro Electric Power Project Drabshalla District Kishtwar, Jammu & Kashmir, Union Territory is under construction/execution by M/s Megga Engineering and Infrastructure Ltd. The working agency is dumping debris/muck in river Chinab instead of storing and dumping the same at the location allotted by Revenue Department of Kishtwar. On account of unauthorized and illegal dumping of debris in river Chinab during rainy season heavy losses were suffered by the residents of Thathri due to flood situation

caused in river Chinab. Thathri town is situated almost on the bank of river Chinab at zero distance.

3. Dumping of muck/debris of under construction project in river water is a serious environmental violation and the averments made in the application in our view do give rise to a substantial question relating to environment arising out of the implementation of Enactments mentioned in Schedule I of NGT Act, 2010.

4. We accordingly implead following as Respondents:-

1. Jammu & Kashmir, Union Territory, through Chief Secretary, Government of Jammu and Kashmir, Civil Secretariat, Jammu/Srinagar, Jammu & Kashmir.
2. Principal Secretary/ Additional Chief Secretary, Ministry of Environment, Forest and Climate Change, Civil Secretariat, Jammu/Srinagar, Jammu & Kashmir Union Territory.
3. Pollution Control Committee, Jammu & Kashmir, Union Territory , through its Member Secretary, 2nd Floor, S. P. College, Srinagar, Jammu & Kashmir.
4. M/s Rattle Hydro Power Project Drabshall, District Kishtwar, Jammu & Kashmir, Union Territory through its Managing Director.
5. M/s Megga Engineering and Infrastructure Ltd. 1st Floor, 4, Bhatia Complex, Near Gurdwara, Jammu, Jammu & Kashmir.
6. Jammu & Kashmir, Union Territory State Power Development Corporation, st Floor, S. S. D. Building, Exhibition Road, Jammu, Jammu & Kashmir.

7. National Hydro Power Corporation (NHPC) through is ChairmanNHPC Office Complex, Sector 33, Faridabad - 121003, Haryana.

5. The Registry shall issue notices to the above Respondents and Respondents may file their responses within two weeks after receipt of the Notice.

6. Further, we find it appropriate to obtain a factual report for which we constitute a joint Committee comprising District Magistrate, Kishtwar; Member Secretary, J&K Pollution Control Committee; Integrated Regional Officer, Ministry of Environment, Forest and Climate Change, Jammu; and a representative Central Pollution Control Board (hereinafter referred to as CPCB) shall not be below rank of Director.

7. The CPCB shall be nodal authority for coordination and compliance.

8. The said Committee shall visit the site, collect relevant information and submit a factual report within one month.

9. List on 23.10.2024.

10. A copy of this order along with complaint be sent to District Magistrate, Kishtwar; Member Secretary, J&K Pollution Control Committee, Integrated Regional Officer, Ministry of Environment, Forest and Climate Change, Jammu and CPCB for necessary action.

Sudhir Agarwal, JM

Dr. Afroz Ahmad, EM

September 12, 2024

O.A. No. 955/2024
A

Item No. 11 Court No. 2

BEFORE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 955/2024

President Municipal Committee Thathri Applicant

Versus

Union Territory of J&K Respondent(s)

Date of hearing: 23.10.2024

CORAM: HON'BLE MR. JUSTICE SUDHIR AGARWAL JUDICIAL MEMBER
HON'BLE DR. AFROZ AHMAD, EXPERT MEMBER

Applicant: None

Respondents: Mr. Narender Pal Singh and Ms. Deepshikha, Advocates for respondent No. 4 and 7
Mr. Varun Chugh and Ms. Ipsita, Advocates for Respondent No. 5
Mr. Mohit Singhal Advocate for CPCB(through VC)
Mr. Ghansham Singh, MS JKPCC (through VC)

ORDER

1. The Original Application has been registered under Sections 14 and 15 of National Green Tribunal Act, 2010 (hereinafter referred to as '**NGT Act, 2010'**) in exercise of *suo motu* jurisdiction in view of the law laid down by Supreme Court in *Municipal Corporation of Greater Mumbai vs. Ankita Sinha, (2022) 13 SCC 401* on a letter petition, sent by President Municipal Committee Thathri, District Doda, Jammu & Kashmir, Union Territory on 25.11.2023.

2. Tribunal considered the matter on 12.09.2024 and observed that dumping of muck/debris of under-construction project in river water is a serious environmental violation. In view thereof, Tribunal impleaded following respondents:-

1. Jammu & Kashmir, Union Territory, through Chief Secretary, Government of Jammu and Kashmir, Civil Secretariat, Jammu/Srinagar, Jammu & Kashmir.

2. Principal Secretary/ Additional Chief Secretary, Ministry of Environment, Forest and Climate Change, Civil Secretariat, Jammu/Srinagar, Jammu & Kashmir Union Territory.

3. Pollution Control Committee, Jammu & Kashmir, Union Territory, through its Member Secretary, 2nd Floor, S. P. College, Srinagar, Jammu & Kashmir.

4. M/s Rattle Hydro Power Project Drabshall, District Kishtwar, Jammu & Kashmir, Union Territory through its Managing Director.

5. M/s Megga Engineering and Infrastructure Ltd. 1st Floor, 4, Bhatia Complex, Near Gurdwara, Jammu, Jammu & Kashmir.

6. Jammu & Kashmir, Union Territory State Power Development Corporation, st Floor, S. S. D. Building, Exhibition Road, Jammu, Jammu & Kashmir and

7. National Hydro Power Corporation (NHPC) through is Chairman NHPC Office Complex, Sector 33, Faridabad - 121003, Haryana.

3. Tribunal also found it appropriate to obtain a factual report and thus constituted a Joint Committee comprising District Magistrate, Kishtwar; Member Secretary, J&K Pollution Control Committee; Integrated Regional Officer, Ministry of Environment, Forest and Climate Change,

Jammu; and a representative a Central Pollution Control Board (hereinafter referred to as '**CPCB'**), not below the rank of Director.

4. CPCB was made nodal authority for coordination and compliance.

5. Committee was required to submit factual report within one month.

6. Learned counsel appearing for CPCB stated that information has been collected and he requires some more time to file report.

7. Let report be filed within one month.

8. A reply on behalf of respondent 5- M/s Megga Engineering and Infrastructure Ltd has been filed but it nowhere show that muck is being disposed in compliance of Construction and Demolition Waste Rules, 2016. Further, photographs appended to reply shows clearly that the muck is being discharged in river directly and this is a gross violation of environmental laws. Hence, *prima facie* we are satisfied that here is a case where gross violation of environmental laws is virtually evident from own reply of respondent 5 and further execution of project should be stopped. However before taking such a stringent action, we find it appropriate, and as also requested by learned counsel appearing for respondent 5, to have an additional reply placing its stand in respect of compliance to statutory rules in regard to disposal of muck.

9. Sh. Narender Pal Singh, Advocate has put in appearance on behalf of respondent 4 and 7. He also prays for and allowed a month's time to file reply.

10. No reply has been filed by respondents 1, 2, 3 and 6 and none has also appeared on their behalf. We direct the said respondents to file their

response also before the next date failing which we will have to summon Officer In Charge of above respondents in person.

11. List on 27.11.2024.

Sudhir Agarwal, JM

Dr. Afroz Ahmad, EM

October 23, 2024
Original Application No. 955/2024
AB

Annexure 3

Photographs taken by the Joint Committee during site visit

OA No 955 of 2024 Kishtwar
14.10.2024 10.54
33.16822, 75.80548 (±26m)
Altitude: 1058m
NH244, Lass
W

OA No 955 of 2024 Kishtwar
14.10.2024 10.55
33.16823, 75.80547 (±10m)
Altitude: 1058m
NH244, Lass
N

J-12011/39/2010-IA-1
Ministry of Environment & Forests
Government of India
(IA Division)

Par;avaran Bhawan
CGO Complex, Lodhi Road,
New Delhi-110003

Dated 12, December, 2012

To,

The Director (Design & Engineering)
M/s Ratle Hydro Electric Project Pvt. Ltd.
GVK Technical & Consultancy Services Pvt. Ltd.,
2nd Floor, Tower-C Building No.10
DLF Cyber City, Phase-II,
Gurgaon- 122 002, Haryana.

Subject: **Ratle HEP (850MW) Project in Kishtwal District of Jammu & Kashmir by M/s Ratle Hydro Electric Project Pvt. Ltd. - for Environmental Clearance Regarding.**

Sir,

This has reference to your letter no. Nil Dt.17.5.2012 on the above mentioned subject.

2. It is noted that the proposed project is a run of the river scheme near village Drabshala in Kishtwar District of Jammu & Kashmir. The project envisages construction of a Concrete Gravity Dam of 133m high concrete gravity dam from the deepest foundation level across Chenab River near Drabshal Village to generate 850 MW of hydropower. The catchment area of the project is 14,209 Sq.km. Total land requirement is 567.21 ha. Out of which 373.29 ha State land, 55 ha is Private land and 138.93 ha is forest land. Total land coming under submergence is 203 ha. A total 240 families are likely to be affected due to this project. An underground powerhouse is proposed on the right bank of the river with 4 units of 205 MW each + one additional unit of 30 MW to ensure continuous ecological release at the downstream. No National Park/wildlife Sanctuary/Biosphere Reserve/Historical Monuments/Religious, places etc. exists

within 10 km radius of the project. The estimated cost of the project is Rs.5353.82 Crores out of which 262.35 Crores will be for Environmental Management Plan (EMP) and will be constructed will be completed in 60 months.

3. The Project proposal was considered by the Expert Appraisal Committee (EAC) for River Valley & Hydroelectric Power Projects in its 59th meeting held on 20th -20st July 2012. Public Hearing for the project was conducted on 7.4.2012 at Drabshala in Kishtwar District of Jammu & Kashmir. Forest Clearance for diversion of 138.93 ha of forest land has been approved by Govt. of Jammu & Kashmir on 27.4.2012.

4. The Expert Appraisal Committee (EAC), after due consideration of the relevant documents submitted by the project proponent and clarification furnished in response to its observation, have recommended for grant of Environmental Clearance for the project mentioned above. Accordingly, the Ministry of Environment and Forest hereby accords necessary Environmental Clearance for the above project as per the provisions of Environmental Impact Assessment Notification, 2006 and its subsequent amendment in 2009 subject to compliance of the following conditions:

Part A : Specific Conditions

(i) The Catchment Area Treatment (CAT) Plan as proposed in the EIA/EMP Report shall be undertaken in consultation with the State Forest Department and major work shall be completed before impounding of reservoir.

Item	I Year	II Year	III Year	IV Year	Total
Biological Measures					
Afforestation (ha)	2243	1747	923	-	4913
Enrichment Plantation (ha)	-	112	79	-	191
Pasture Development	-	376	195	-	591
Nursery Development (Nos)	3	-	-	-	3

Watch & ward (Ls)	240	240	240	240	960
Egineering Measures					
Contour Bunding (h)	434	409	324	171	1338
Check Dams (Ns)	50	25	30	20	125

(ii) All the commitments made during the public hearing shall be fulfilled completely.

(iii) The details of land holding of project affected persons whose land is being acquired shall be submitted to this ministry. The R&R benefits for the land losing households will be as per the National Rehabilitation and Resettlement Policy, 2007 (NRRP,2007) or as per the State Rehabilitation and Resettlement Policy, whichever is higher. Adequate publicity of the compensation package shall be made in the affected villages.

(iv) A Monitoring Committee for R&R shall be constituted which must include representatives of project affected persons from SC/ST category and a women beneficiary.

(v) Consolidation and compilation of muck shall be carried- out only in the designated muck dumping sites as submitted in the EIA/EMP report. As per the proposed muck disposal plan, out of 24.4 lakh m^3 of muck to be generated due to excavation, about 50% (i.e.12.2 lakh m^3) will be utilized for construction purpose and the remaining 12.2 lak m^3 will be dumped at the 3 designated areas in an allocated area of 30.59 ha. The identified muck dumping sites shall be at-least 30m horizontally away from the edge of the river corresponding to high flood level (HFL).

(vi) Muck dumping sites should be handed over to Forest Department only after restoration including plantations etc.

(vii) A provision of an additional unit of 30 MW has been made in the project, which will be running for 24 hours continuously to maintain a minimum discharge of 33.43, cumecs/sec, during the lean season from November-February (About 27% of lean season) at the downstream, shall be strictly adhered-to. Monsoon flow shall be at least 30% of the Monsoon discharge.

(viii) An Auto mechanism/by pass arrangement in dam design shall be made to ensure release of environmental flow water in event of the 30 MW turbine or when it is put under maintenance.

(ix) Continuous Monitoring system for environmental flow measurement shall be installed and data shall be displayed at appropriate site for information of civil society, stake holders and regulators. Six monthly results shall be submitted to the regional Office of the Ministry and SPCB.

(x) Real time telemetry and data acquisition system including all weather hydro metrological stations shall be installed for in-flow monitoring and advance flood warning. Advance flood warning and advance communication systems shall be installed in consultation with the downstream District Authorities.

(xi) As proposed in the EMP, the compensatory Afforestation Programme on 277.84 ha of land with 13 plant species shall be undertaken in consultation with the State Forest Department. Native species should be preferred in plantation. The allocated grant of Rs.1467.59 lakhs for this purpose shall be fully utilized and not to be diverted for any other purpose.

(xii) Greenbelt development along the approach roads, residential areas, office complex, dam site and other working areas shall be undertaken. The allocated budget of Rs.73 lakhs for this purpose shall be fully utilized and not to be diverted to any other purpose.

(xiii) As proposed in the EMP, the Biodiversity Conservation and Wildlife Management Plans shall be taken up and implementation shall be included in the sixth monthly compliance report to be submitted to the Ministry, including its Regional Office.

(xiv) Indigenous plant species should be used for implementation of Biodiversity Management Plan and for Compensatory Afforestation. Expertise from R&D centers may be used for propagation techniques. Provision should also be made to include researchers to implement these plans and carrying out plantation.

(xv) Equipment likely to generate high noise levels shall meet the ambient noise standards as notified under the noise Pollution (Regulation and Control) Rules 2000, as amended in 2010 under Environment Protection Act (EPA), 1986. For this, necessary insulation arrangement etc. to be ensured.

(xvi) A provision of Rs. 30 Crores earmarked towards the Local Area Development Activities (LADA) shall be fully utilized and not to be diverted for any other purpose. The implementation of activities as submitted to the Ministry shall be taken up as soon possible. In addition, a grant of Rs. 30 Crores earmarked for Corporate Social Responsibility

(CSR) and Rs.30 Crores for skill development purpose shall also be duly utilized and not to be diverted for any other purpose.

(xvii) LADA activities may be undertaken by M/s Ratle Hydro Electric Project Pvt. Ltd to enhance delivery mechanism for operational point of view.

(xviii) Tie-ups shall be made with existing city hospitals for disposal of Bio-medical waste in case district hospital at Kishtwar does not have the facility for handling biomedical waste as proposed in the report.

(xix) Any other clearance from other organization/department, if required, shall be obtained before commencement of the project.

Part-B General Conditions

(i) Adequate arrangement for providing free fuel like kerosene/wood/LPG shall be made at project cost for the labour engaged in the construction work so that indiscriminate felling of trees is prevented.

(ii) Medical facilities as well as recreational facilities shall also be provided to labourers.

(iii) All the labourers to be engaged for construction works shall be thoroughly examined by health personal and adequately treated before issuing them work permit.

(iv) No fugitive dust emissions should be observed at the construction sites. Water sprinkling arrangements should be made to suppress the fugitive emissions.

(v) Potable drinking water and proper sanitary facilities shall be provided for the labour force and the local area people.

(vi) Restoration of construction area including dumping site of excavated materials shall be ensured by leveling, filling up of burrow pits, landscaping etc. The area should be properly treated with suitable plantation.

(vii) Environmental parameters shall be monitored regularly and six monthly reports shall be submitted to the regional Office of the Ministry and State Pollution Control Board for review.

(viii) The project proponent shall also submit six monthly compliance reports of the stipulated EC conditions (both hard copies as well as by e-mail) to the respective Regional Office of MoEF and state Pollution Control Board. Monitoring report and compliance report shall be up-loaded on the web-site of project proponent.

5 The Project Proponent shall provide full cooperation and all required documents, data and access to the Officials of Regional Office of MoEF who would be monitoring the implementation of environmental safeguards.

6 Besides the above stated conditions, M/s Ratle hydro Electric Project Pvt. Ltd and Government of Jammu & Kashmir shall also implement all other environmental safeguards, as proposed in the EIA/EMP report and other reports from time to time. The J & K Government may also like to monitor implementation of EMP at regular interval.

7. Any change in the scope of the project shall be intimated to the Ministry and fresh approval, if required, shall be taken from the Ministry.

8. The Ministry reserve the right to add additional safeguard measures subsequently, if found necessary and to take action including revoking of the clearance under the provisions of the Environment (Protection) Act, 1986 to ensure effective implementation of the suggested safeguards measure in a time-bound and satisfactory manner.

9. This clearance letter is valid for a period of 10 years from the date of issue of this letter for commencement of construction work.

10. A Multi-disciplinary committee for monitoring the implementation of environmental safe guards during construction shall be constituted by the Project Proponent in consultation with the Ministry as early as possible. The Proponent shall suggest the members and their profile for approval of the Ministry. Proponent shall organize six monthly meetings of the committee and submit the monitoring report to the Ministry.

11. A copy of the clearance letter shall be sent by the Proponent to local Panchayat, Zila parishad/Municipal Corporation, Urban local body and local NGO, if any, from whom suggestations/representations were received while processing the proposal. The clearance letter shall also be put on its web-sites by the project proponent.

12. The proponent should advertise at least in two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned informing that the project has been accorded environmental clearance and copies of clearance letter are available with the State Pollution Control Board/committee and may also be seen at Website of the Ministry of Environment and Forests at http://www.envfor.nic.in.

13. After 5 years of the commissioning of the Project, a study shall be undertaken regarding impact of the project on the environment and downstream ecology. The study shall be undertaken by an independent agency, to be decided in consultation with the Ministry.

14. The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) including the respective Regional office of MoEF and Zonal Office of CPCB and SPCB.

15. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days from the date of issue, as prescribed under Section 10 of the National Green Tribunal Act, 2010.

Yours faithfully,

(B.B. Barman)
12.12.12 **Director**

Copy to:

1. The Secretary, Ministry of Power, Shram Shakit Bhawan, Rafi Marg, New Delhi-1
2. The Advisor (Power), Planning Commission, Yozna Bhawan, New Delhi-110 001
3. Special Secretary, Power Development Department, Government of Jammu & Kashmir, Civil, Secretariat Jammu, Jammu & Kashmir.
4. Secretary, Department of Environment & Forests, Government of Jammu & Kashmir, Jammu.
5. The Chief Engineer, Project Appraisal Directorate, Central Electricity Authority, Sewa Bhawan, R.K.Puram, New Delhi- 110 066
6. The Regional Office, Ministry of Environment & Forests, Chandigarh.
7. Member Secretary J&K State Pollution Control Board, Super Bazar Building, III Floor, Jammu.
8. EI- Division, Minstry of Environment & Forests, New Delhi- 110 003
9. PS to JS (AT)/ Dir (BB)/ P.V. S. Rao (Scientist 'B')
10. Guard File

(B.B.Barman)
12.12.12 Director

Annexure-5

F. No. J-12011/39/2010-IA.I
Government of India
Ministry of Environment, Forests & Climate Change
(Impact Assessment Division)

Indira Paryavan Bhavan
2nd Floor, Vayu Wing
Aliganj, Jor Bagh Road
New Delhi – 110 003

Dated: 27th September, 2021

To,

Shri Deepak Saigal
The General Manager (Civil)
M/s Ratle Hydroelectric Power Corporation Limited,
Room no. 8, Block no. 02, NHPC regional office,
JDA Commercial Complex no. 01, Narwal
Jammu – 249 0974 (Jammu and Kashmir)

Sub: Ratle Hydroelectric Project (850MW) located at Village Drabshala, District Kishtwar, Jammu & Kashmir – Transfer of Environment Clearance from M/s GVK Ratle Hydro Electric Project Pvt. Ltd. to M/s Ratle Hydroelectric Power Corporation Ltd. - reg.

Sir,

The undersigned is directed to refer your online application no. IA/JK/RIV/218510/2021 dated 3rd September, 2021 and documents submitted for transferring the Environmental Clearance (EC) dated 12th December, 2012 of Ratle Hydroelectric Project (850MW) located at Village Drabshala, District Kishtwar, Jammu & Kashmir from "M/s Ratle Hydroelectric Project Pvt. Ltd." to "M/s Ratle Hydroelectric Power Corporation Ltd."

2. It has been noted that the Environmental Clearance was granted to Ratle Hydroelectric Project (850MW) located at Village - Drabshala, District - Kishtwar, Jammu & Kashmir vide Ministry's letter dated 12th December, 2012 to M/s GVK Ratle Hydroelectric Project Pvt. Ltd.

3. Presently, it has been informed that the company ownership has been transferred from M/s GVK Ratle Hydro Electric Project to M/s Ratle Hydroelectric Power Corporation Ltd. (CIN: U40105JK2021GOI012380).

4. The documents as submitted by the applicant are listed as under:

i. 'No Objection Certificate' submitted by Jammu and Kashmir State Power Development Corporation (JKSPDC).
ii. Memorandum of Understanding (MoU) dated 3rd February, 2019 signed between Hon'ble Governor of Jammu & Kashmir State through Commissioner/ Secretary to Government, Jammu and Kashmir State Power Development Corporation Limited (JKSPDC) and NHPC on Non- Judicial Stamp.
iii. Certificate of Incorporation dated 1st June 2021 signed by Asst. Registrar of Companies of M/s Ratle Hydroelectric Power Corporation Ltd.

iv. Undertaking on non-judicial stamp vide certificate no. IN-JK21215012518114T dated 3rd September 2021 by M/s Ratle Hydroelectric Power Corporation Ltd. as stated below:

Ratle Hydroelectric Power Corporation Ltd. (RHPCL), a Joint Venture Company of NHPC and JKSPDC, undertakes to comply, w.e.f. 01.06.2021 (date of taking over of the company) to all conditions stipulated in the environment clearance letter of MoEF&CC no. J-12011/39/2010-IA.I dated 12th December, 2012 in favor of the previous owner.

5. The Ministry has examined the application. In view of the above, the Ministry hereby accords approval for grant of Transfer of Environmental Clearance transfer as proposed from "M/s GVK Ratle Hydroelectric Project Pvt. Ltd." to "M/s Ratle Hydroelectric Power Corporation Ltd." subject to following additional conditions:

(i) Any change in scope of work will attract the provisions of the Environment (Protection) Act, 1986 and Environmental Impact Assessment Notification, 2006 in conjunction with the subsequent amendments/ circulars.
(ii) All conditions stipulated in the EC letter No. J-12011/39/2010-IA.I dated 12th December, 2012 shall remain unchanged.
(iii) The project proponent shall be liable, if any, for any act of violation of the EP Act, 1986/ EIA Notification 2006/ subsequent amendments and circulars which it has inherited during the transfer.
(iv) The project proponent shall be liable for compliance of all court directions, if any.

6. The name of the addressee with respect to above mentioned project in the Environmental Clearance dated 12th December, 2012 shall be substituted by the following:

M/s Ratle Hydroelectric Power Corporation Limited,
Room no. 8, Block no. 02, NHPC regional office,
JDA Commercial Complex no. 01, Narwal
Jammu – 249 0974
Jammu and Kashmir

7. This issues with the approval of the Competent Authority.

Yours faithfully,

27.09.2021

(Yogendra Pal Singh)
Scientist 'E'

Copy to:

1. The Secretary, Ministry of Power, Shram Shakti, Bhawan, Rafi Marg, New Delhi-1.
2. The Secretary, Ministry of Jal Shakti, Shram Shakti Bhawan, Rafi Marg, New Delhi -3.
3. The Chief Engineer, Project Appraisal Directorate, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi- 110 066.

4. The Secretary, Department of Power, Government of Jammu and Kashmir, Civil Secretariat, Jammu, Jammu & Kashmir.
5. The Secretary, Department of Forest, Environment & Wildlife Management, Government of Jammu and Kashmir, Civil Secretariat, Jammu, Jammu & Kashmir.
6. The DDG of Forests (Central), Ministry of Environment, Forest & Climate Change, Regional Office (NZ), Bays No. 24-25, Sector 31 A, Dakshin Marg, Chandigarh - 160030.
7. The Member Secretary, Jammu and Kashmir State Pollution Control Board, Parivesh Bhawan, Forest Complex, Gladni, Narwal, transport Nagar, Jammu, Jammu and Kashmir – 180 004.
8. NIC Cell – for uploading in MoEFCC's website.
9. Guard File.

21.09.2021

(Yogendra Pal Singh)
Scientist 'E'

7 MUCK DISPOSAL PLAN

7.1 INTRODUCTION

Ratle HEP is a run-of-river scheme on River Chenab near Drabshala village in Kishtwar District of J&K, being developed by GVK Ratle Hydro Electric Project Pvt. Ltd. (GVKRHEPPL). The proposed layout of the project and design of civil engineering structures have been so carried out as to utilize the hydro power potential optimally.

Apart from the land for facilitating and construction of project components, land is also required for dumping of the muck which will be generated during construction of the project. A significant quantity of muck is expected to be generated as a result of excavation activities at Dam site, tunneling, underground Power House & other appurtenant works and other developmental activities etc. Muck generated from excavation of any project component needs to be disposed off in a planned manner so that it occupies least possible space and is disposed off an a environment friendly manner by creating terracing, planting trees etc. The dumping sites need to be rehabilitated in the environmentally sound and scientific manner. In the case of Ratle HEP it will be endeavored to use excavated muck in construction as much as possible and only remaining muck is to be disposed off in identified/approved dumping areas. The muck disposal sites will be rehabilitated as soon as these are full completely so as to minimize the impact on environment and visual aesthetics of the area.

7.2 MUCK GENERATION & ITS USE IN THE PROJECT

Total quantity of muck generated from surface as well as underground excavations is estimated as 24.4 lakh cum. The possibility of using excavated rock material for producing coarse and fine aggregates for use in civil works was examined. Six samples were collected from four drifts of dam site – 2 on right bank and 2 on left bank and tested. Based on test results, the excavated material was found suitable to use as coarse as well as fine aggregate in concrete. Further, suitability of rock material from the excavated muck of Pressure Shaft and Power House will continue to be tested on continuous basis during execution of the project and depending upon test results, its usage in production of aggregate and sand will be maximized Besides, concrete production, the muck would be utilized for coffer dams, upstream guide bunds and embankments at diversion site, roads (filling material), retaining walls, other protection works etc.

About 50% of the total muck generated 12.2 lac m^3 will be used for the construction/ protection works and the balance muck generated from all the components will be 12.2

lac m^3 and with 63% swelling factor, the total quantity of muck to be disposed off will be about 20 lac m^3.

The total muck generated and to be disposed off are given in **Table 7.1.**

Table 7.1: Muck to be generated from various project activities

S. No.	Item of Work	Excavation Quantity (Cum)	Qty. of muck to be utilized (50%) (Cum)	Qty. of muck unutilized (Cum) (Col.3-Col.4)	Total Qty. of Muck to be disposed assuming 63% swelling factor(Cum) (1.63x Col.5)
1	2	3	4	5	6
1	Concrete Dam and Plunge Pool	1130545	565273	565273	921394
2	River Diversion Works	344452	172226	172226	280728
3	Intake	89500	44750	44750	72943
4	Pressure Shaft and Adits	54590	27295	27295	44491
5	Power House and Transformer Cavern	268874	134437	134437	219132
6	D/S Surge Tank	124061	62031	62031	101110
7	TRT	205950	102975	102975	167849
8	P.H Access Tunnels & Adits	50869	25435	25435	41458
9	Pothead Yard	171000	85500	85500	139365
	Total	**24,39,841**	**12,19,921**	**12,19,921**	**19,88,471**

7.3 DUMPING SITES

For selection of probable dumping sites, several traverses of the entire project area and the near vicinity were taken. Area at higher elevation in the u/s side of the Dam (i.e. in the Reservoir area) was also investigated. The populated and vegetated areas were not considered suitable as the dump trucks would have required traversing through the populated areas. The available dumping sites were selected after detailed examination of environmental, economic and social aspects.

7.3.1 Alternatives Studied

The following alternate sites were investigated to examine the possibility of dumping of muck.

a) Alternate-1

A possible site approximately 4.0 km downstream of the proposed dam was examined (see Figure 7.1). Both the banks of river Chenab were inspected. The site is downstream of village Thathri.

Figure 7.1: A site on the left bank of river 4 km d/s of proposed dam site

Figure 7.2: Dumping site on the right bank of river 4 km d/s of proposed dam site

As can be seen in the photograph (Figure 7.1), the left bank has very steep slopes and thus will accommodate very less quantity of muck. The right bank has got many trees at

the lower level where as the higher level has steep slopes and has also got many trees (Figure 7.2). In addition, a road will be required to be constructed all along the right bank and this road will also require a bridge to cross over the river opposite village Thathri. There are also small streams and rivulets traversing the area. Further, on the right bank the muck will have to be transported through populated village of Thathri. The demerits of this Alternative-1 site are summarised below:

De-merits:

1. Steep slopes and therefore will accommodate less muck than the earlier recommended area.
2. Visibly more trees and plants compared to the earlier recommended area.
3. There are small streams and rivulets traversing through the area which is not recommended by MoEF
4. If the dumping site is selected on the right bank, a new road and a bridge would be required to be constructed. Besides, the dump trucks will be required to traverse through Thathri village.

b) Alternate-2

This site is approximately 10 km downstream of the proposed dam site on the right bank of river Chenab (Figures 7.3 & 7.4). As can be seen in the photo below, there is a RBM terrace at the lower level while the level above HFL has steep to moderate slopes. The area has moderate vegetation cover. The area is dissected by many streams and rivulets. Besides the bridge, the road which will be required to be constructed to utilise this site will traverse through populated areas. The area which can be utilised for dumping lies in the flood zone and therefore huge protection works shall be required.

Figure 7.3: Dumping Site on the right bank of river 10 km d/s of proposed dam site

Figure 7.4: Another view of dumping site on the right bank of river 10 km d/s of proposed dam site

The demerits of this Alternative site are summarized below:

De-merits:

i. Area available above HFL is more forested than the area recommended area earlier.
ii. Long road will be required to be constructed which might involve more forest land than the recommended land. In addition, a bridge will also be required.
iii. There are small streams and rivulets traversing through the area which is not recommended by MoEF
iv. The area is in the flood zone and therefore would require huge protection works.

c) Alternate-3

This site is approximately 15 km downstream of the proposed dam site (Figure 7.5).

Figure 7.5: Alternate dumping site-3 on the right bank of river 15 km d/s of proposed dam site

Figure 7.6: Alternate dumping site-3 view of the land at higher elevation

The area above HFL has moderate slopes. The area at higher elevation has villages, streams, rivulets and systematic plantation as can be seen in Figures 7.5 & 7.6. The road which will be required to be constructed to utilise this site will be passing through populated and forested areas.

De-merits:

i. The area has systematic plantation.

ii. Long road will be required to be constructed which might involve more forest land than that in the earlier recommended areas.

iii. There are small streams and rivulets traversing through the area which is not recommended by MoEF, Government of India.

iv. The area is populated.

Finally following three sites were identified for use as dumping sites **(See Figures 7.7 - 7.8)**.

Zone -I: on the right bank of river Chenab u/s of village Thathri and d/s of the proposed Dam in an approximate length of 1350 m.

Zone-II: on the left of river Chenab d/s of the proposed Dam and at a lower level then the existing NH-1B in a length of 1400 m.

Zone-III: on the right bank of Kuligad nalla above NH-1B in a length of 450 m.

The following points were considered and followed as guideline for finalization of the above 3 zones to be used as dumping sites:

i) The dumping sites were selected as close as possible to the project area to avoid long distance transport of muck.

ii) Standard distance between each dumping site and river bed is maintained as per MoEF guidelines.

iii) The sites were free from active landslides or creep and care were taken that the sites should not have a possibility of toe erosion and slope instability.

iv) The dumping sites are either at higher level than the flood level or are away from the river course so that the possibility of muck falling into the river is avoided.

v) There is no active channel or stream flowing through the dumping sites.

vi) The sites were far away from human settlement areas.

The muck is proposed to be disposed at designated sites, where a capacity of 23.8 lakh m^3 is available. Most of the excavated material is proposed to be dumped at three suitable locations identified specifically for this purpose. These proposed locations are spread over land area of 30.58 ha comprising forest land, state land as well as private land. The capacity of each muck dumping site is given in **Table 7.2.**

Table 7.2: Details of muck dumping sites

Description	Area (ha)	Capacity (Lakh cum)
Zone –I (Right Bank of river Chenab)	14.81	12.8
Zone –II (Left bank of river Chenab)	11.95	7.6
Zone –III (Right Bank of Kuligad Nala)	3,82	3.4
Total	**30.58**	**23.8**

The Designated Dumping areas were jointly inspected by the Forest officials, JKSPDC Officials and Project officials. The number of Trees, Poles and Saplings were enumerated in each dumping site (Zone-I)and are given in **Table 7.3**.

Table 7.3: Details of trees, poles & saplings in the dumping area

S. No.	Project Component	Number				
		Conifer trees	Broad Leaved trees	Broad Leaved poles	Broad Leaved Saplings	TOTAL
1	Dumping Site (Zone-1)	46	128	303	395	872

As is evident from the above, the total number of trees, poles and saplings in Zone-I is 872 out of which only174 numbers are trees while the rest of them are either poles or saplings.

Figure 7.7: Zone-I: Right bank of river Chenab

Figure 7.8: Zone-II: left bank of river Chenab

7.4 METHODOLOGY OF DUMPING REHABILTATION OF DUMPING SITES

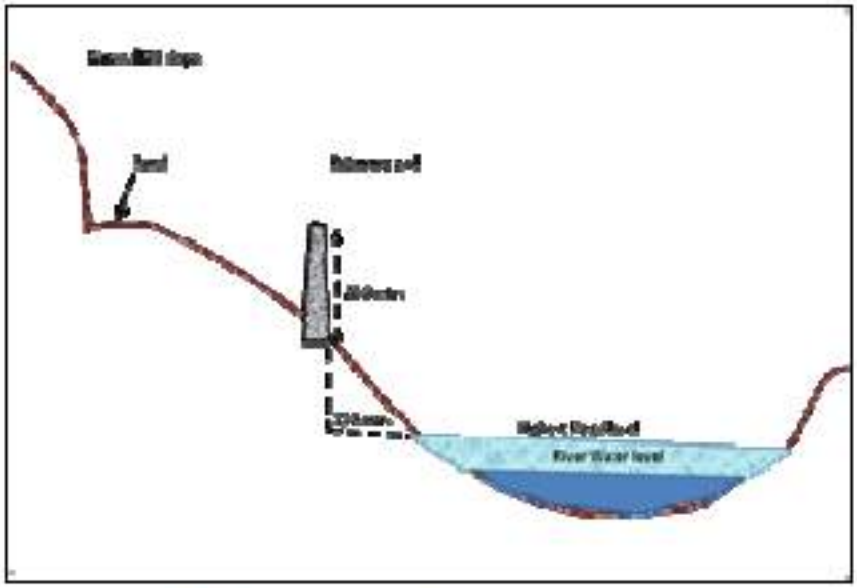
The generated muck will be carried in dumper trucks covered with heavy duly tarpaulin properly tied to the vehicle in tune with international practice. All precautionary measures will be followed during the dumping of muck. All dumpers will be well maintained to avoid any chances of loose soil being fallen during the transportation. All routes will be wetted prior to the movement of dump trucks. Dumping would be avoided during the high speed wind, so that suspended particulate matters (SPM) level could be maintained. Further, the dumping will be avoided during heavy traffic. After the dumping the surface of dumps will be wetted with the help of sprinklers and compacted.

The Rehabilitation plan of muck dumping sites includes engineering and biological measures. Most of the total unused excavated muck would be placed at an angle of repose to avoid any slippage of the muck at the proposed dumping sites. Besides, required quantity would be stacked along the roads, which would be utilised either in widening of the road or in newly constructed roads. In the former case slopes would be broken up by creating benches across the slope. This will be done to provide stability to the slopes and also to provide ample space for planting of trees which would further help in holding and consolidating the material stacked at different sites. As stated earlier, efforts will be made to disposed off the muck within short distances from sites of its generation.

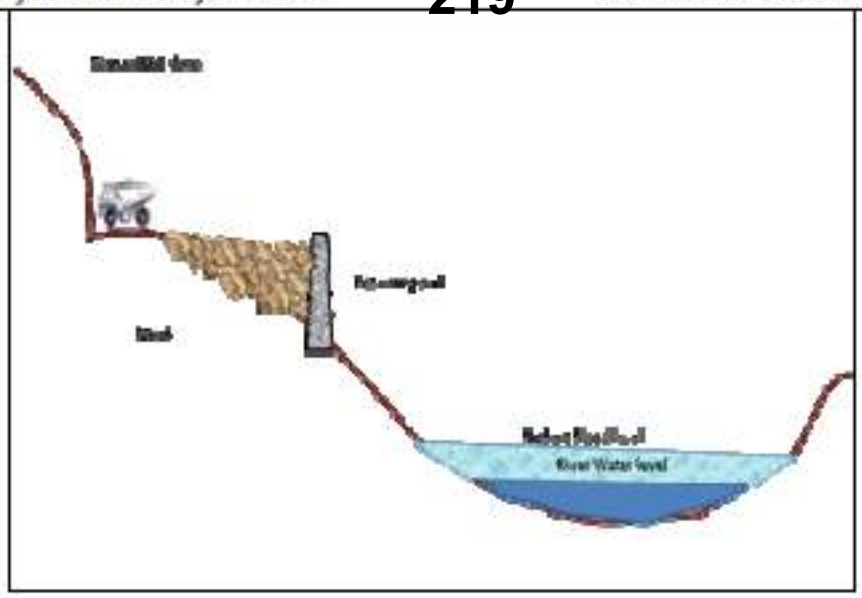
The capacity/volume of the muck dumping sites is more than the volume of the muck to be disposed. It may appear that the area requirement is in excess but the same is

required for temporary storage of usable muck, traffic movement of dumpers and lifters. The spoil from various construction sites would be disposed off at designated sites in a controlled and orderly manner. All measures would be adopted to ensure that the dumping of muck does not cause injury or inconvenience to the people or the property around the area. The general topography of the disposal area is mild sloped. The spillage of muck into the river at any site would be prevented by making concrete retaining walls to retain the muck pile. It shall be ensured that dumping is carried out at a minimum distance of 30 m away from the active river bank. The top surface would be leveled and graded after the capacity of any dumping site is exhausted. The top surface will be covered with soil and grass seeding will be ensured to promote vegetation cover (**See Figure 7.9**).

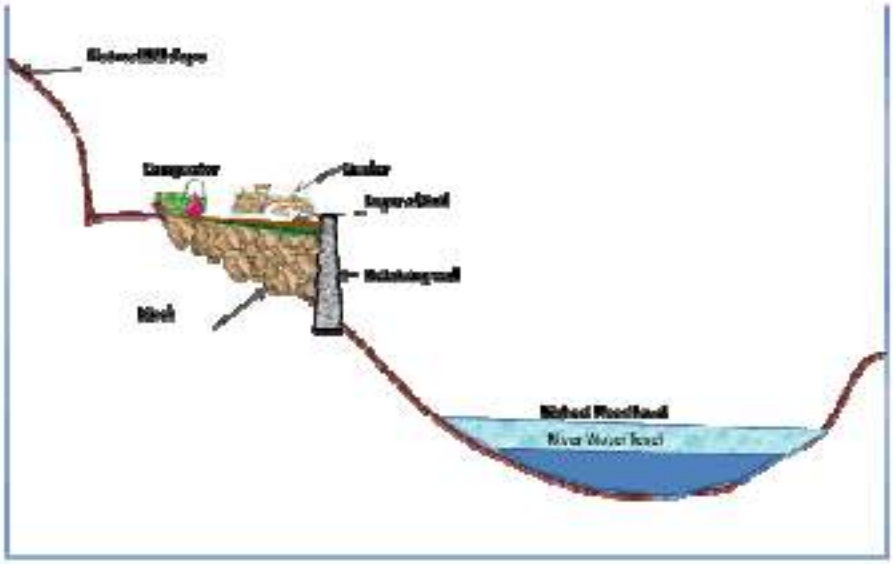
The following measures shall be adopted:



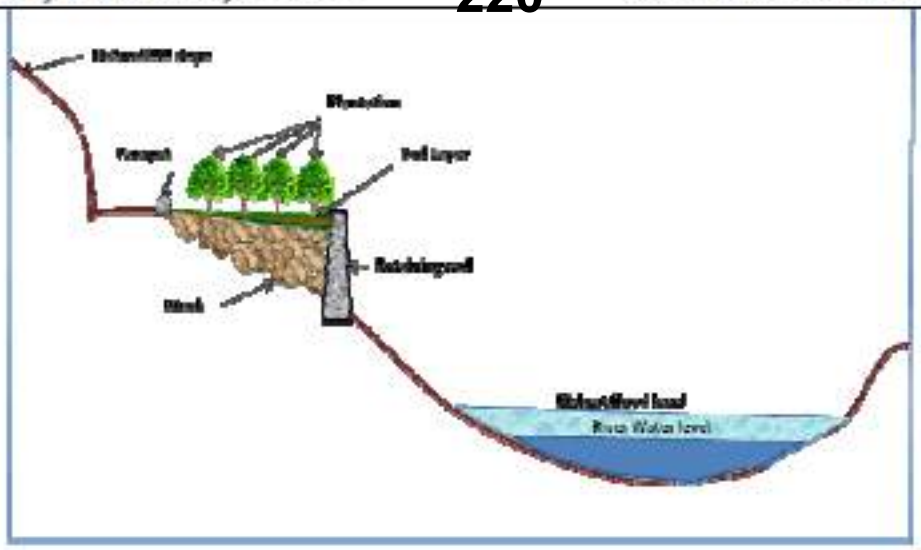
Stage-1: Construction of Retaining wall



Stage-2: Dumping of muck in layers



Stage-3: Layer of soil & Compaction



Stage-4: Plantation

Figure 7.9: Methodology of Dumping

A) ENGINEERING MEASURES

i) Retaining Walls

Total area for the dumping of muck is 30.58 ha which can accommodate about 23.8 lakh cum of muck whereas only 20 lakh cum muck is required to be disposed. The total length of retaining wall proposed to be constructed along the river would be about 3200 meter. The height of these retaining walls including MSE wall panels will be approximately 20m. The angle of repose would be 35^0 to 40^0. These retaining walls are proposed to be located at about 30.0m distance from the highest flood level. A typical sketch of the retaining wall is given in Figure 7.16. Total financial outlay for the retaining walls is ` 5725.00 lakhs, given in Table 7.4.

Table 7.4: Cost estimates for different measures at the dumping sites

S. No	Particular	Volume (cum)	Rate in ₹ per cum	Cost in Lakhs
1	Earth work excavation for foundation	6250	400.00	25.00
2	Cement concrete for retaining wall	6240	8000.00	500.00
3	MSE Wall Panel with Ribbed	18000	20000.00	3600.00

	Steel Strips			
4	Approach Road to Muck Dumping Site	4 km	400.00 Lakh /km	1600.00
	Total			**5725.00**

ii) Compaction

Compaction is an engineering measure, which would reduce bulk density of the muck thereby optimising the use of muck disposal area and would make it suitable for the plantation and other biological measures. Top surface would be levelled and graded to make the alternative use. The muck will be spread in layers of 500-700mm thick layers. Top surface would be levelled and graded to make the alternative use. On top a layer of soil would be spread to make the land suitable for plantation. The total cost for the process of compaction is **₹ 1000.00 lakhs**

iii) Fencing

Fencing is a bio-engineering measure. After rehabilitation of muck the dumping areas need protection for some time from disturbing by human and domestic animals. For this reason fencing over the muck deposits is required. Barbed wire strands with two diagonal strands, clamped to wooden/ concrete posts placed at 3 m distance are proposed around the dumping piles. Project authorities will establish temporary wind barriers around 3 sides of dumps in close of settlement area. Total budget for the fencing would be **₹100.00 lakhs**.

B) BIOLOGICAL MEASURES

Top surfaces and slopes of all dumping areas would be left with a total area of about 20 ha. These areas will be treated for the purpose of plantation. Vegetation cover controls the hydrological and mechanical effects on soils and slopes. Therefore, biological measures to stabilize the loose slope are essential. In order to implement the biological measures in dumping areas the following activities would be taken into account. The biological measures include the following:

i) Soil treatment

Muck dumped at various sites is not considered to be nutrient rich as it is excavated from tunnels and other structures. In order to make it suitable for the plantation it will be provided bio treatment. The work plan will be formulated for re-vegetation of the dumping sites through Integrated Biotechnological Approach.

ii) Plantation

The selected species will be planted after their nurseries have been developed. The dumping areas are very small therefore; separate nursery would not be

required. The nurseries developed for the implementation of CAT plan can be used for the rehabilitation of dumping areas. Nearly 1-2 years old saplings would be used for the plantation. The plantation can be carried out in lines across the slopes. Grass and herb species would be used in the inter space of tree species. They will help in providing the continuous chain of support in retaining debris, reinforcing soil and increasing the infiltration capacity of the area.

After the process of compaction total area of about 20 ha will be available for the plantation. About 50,000 plant saplings will be planted at different dumping sites. Total budget for the biological measures would be **₹ 675.00 lakhs**. Detailed financial outlay for the biological measures is given in **Table 7.5**.

Table 7.5: Total financial outlay for the biological measures at dumping sites

S. No	Particulars	Quantity	Rate (in `)	Amount (in Lakhs)
1	Rolling of Muck	Lump sum		100.00
2	Pitting (size: 0.45 m x 0.45 m x 0.45 m)	50,000 pits	100.00/pit	50.00
3	Raising of plants (including nursery cost, manure, transport etc.)	50,000 plants	50.00/plant	25.00
4	Maintenance, watering, transport, etc	Lump sum		500.00
	Total			**675.00**

In Ratle HEP a very scientific approach and methodology was followed for identification of the dumping sites. All possible alternate sites were inspected and examined before rejecting or selecting any site. All the three finalised sites are:

i) With minimum possible forest cover: The area is mostly barren and rocky and covered with predominantly bushes. The total number of trees, poles and saplings is 872 out of which only 174 are trees while the rest all are poles and saplings.

ii) The populated /settlement areas are far away from the identified dump zones and therefore will be least impact on human life.

iii) Away from the river (30 m away from the HFL as per guidelines): The dumping sites are either at higher level than the flood level or are 30 m away from the river course to provide protection from high flood.

iv) The identified muck sites close to the project area to avoid hazards related to transport of muck to long distances.

v) With Retaining structures in the entire dumping area: Retaining wall have been suitably designed and proposed to be constructed all along the river bank which will prevent muck from falling into the river.

vi) With appropriate Restoration & Rehabilitation plan: all the three identified sites are proposed to be restored and re-habilitated in a very scientific manner and once completed will not only present an aesthetic view but will help the environment since the area which is rock and barren will be converted into forest cover because of the proposed plantation.

7.5 MONITORING & COMPLIANCES

i. Muck shall be dumped from bottom in layers of 500-700mm depending on size of boulders.

ii. Each layer shall be rolled compacted.

iii. A layer of soil shall be spread on top of it to make it suitable for plantation.

iv. Water testing facilities shall be set up for checking quality parameter of water.

v. Soil samples shall be regularly collected and tested for checking the level of contamination.

vi. Prescribed norms and approvals will be sought from PCB wherever necessary.

vii. All norms of Forest department, PCB and MoEF and their acts related to muck disposal shall be complied with.

viii. Design consultant shall be engaged for designing of retaining structures.

ix. Plantation shall be done on the reclaimed land and native variety of plants and trees shall be planted.

Figure 7.10: Muck Disposal Area (Zone– I) (Right Bank of River Chenab)

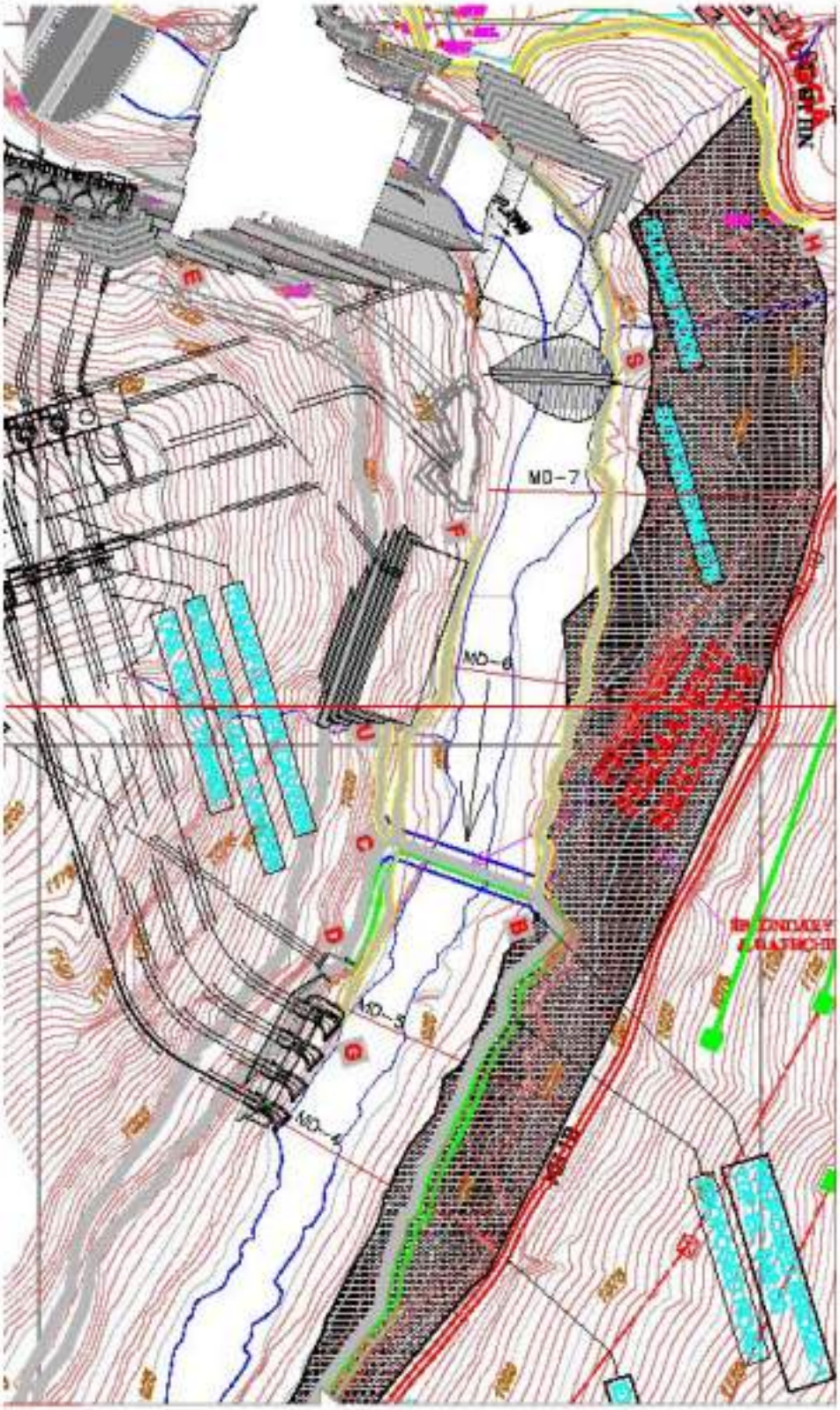


Figure 7.11: Muck Disposal Area (Zone– II) (Left Bank of River Chenab)

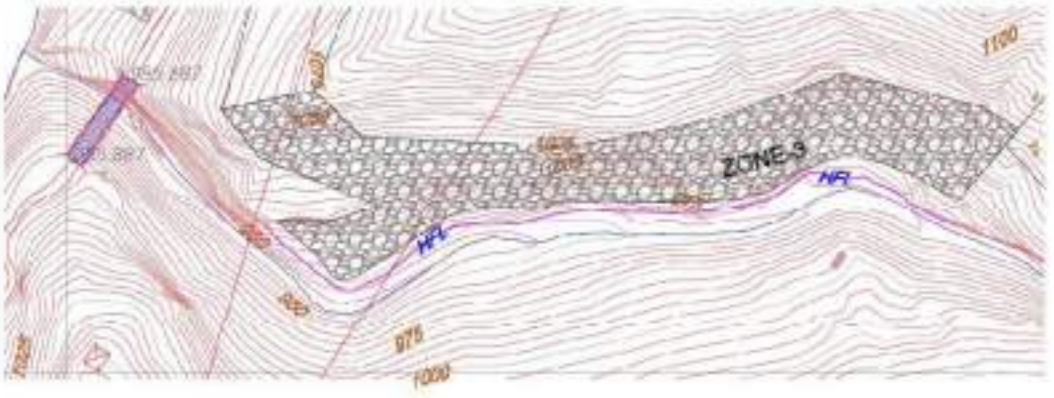


Figure 7.12: Muck Disposal Area (Right Bank of Kuligad Nalla)

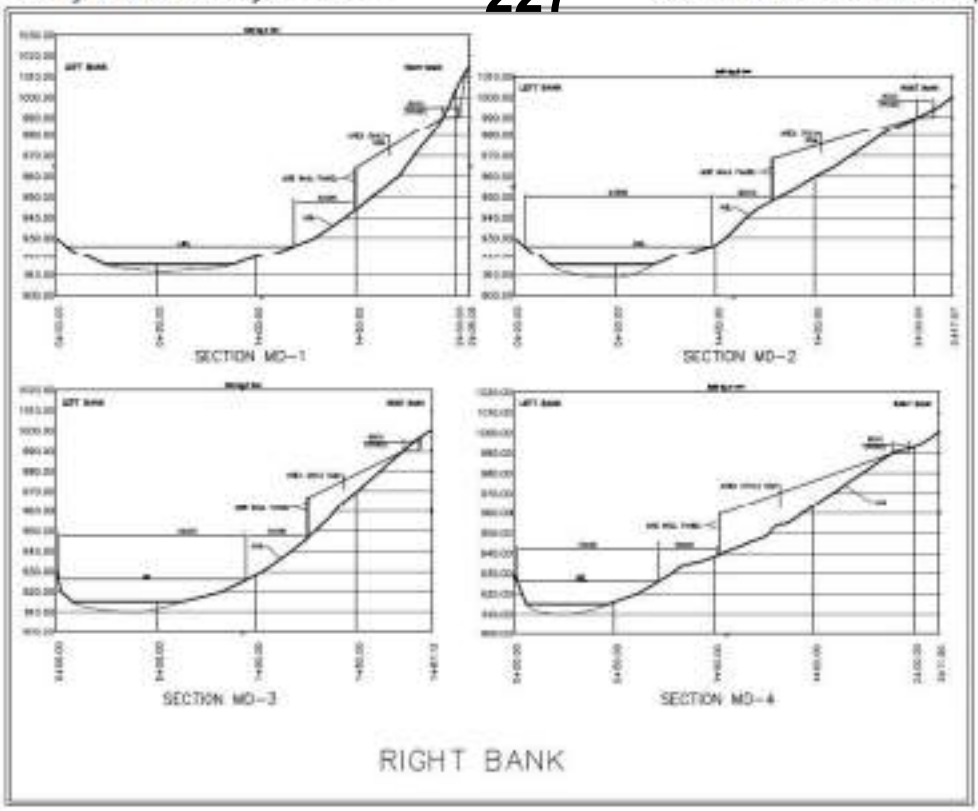


Figure 7.13: Cross Sections of Muck Disposal Area – Zone –I (Right Bank)

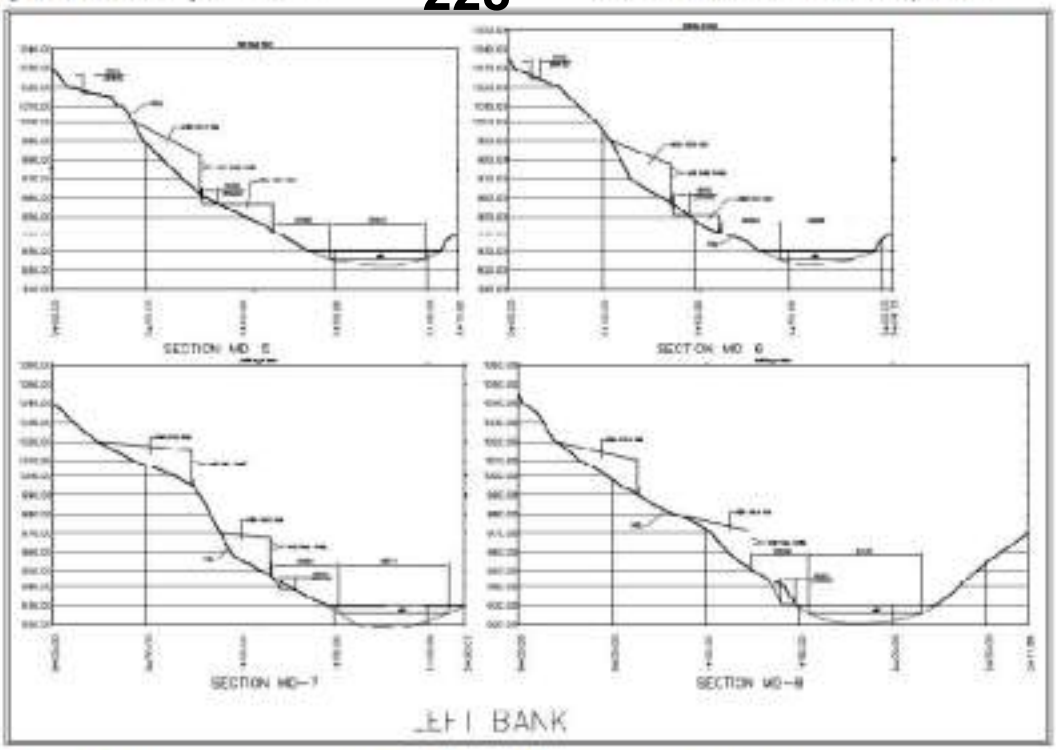


Figure 7.14: Cross Sections of Muck Disposal Area – Zone –II (Left Bank)

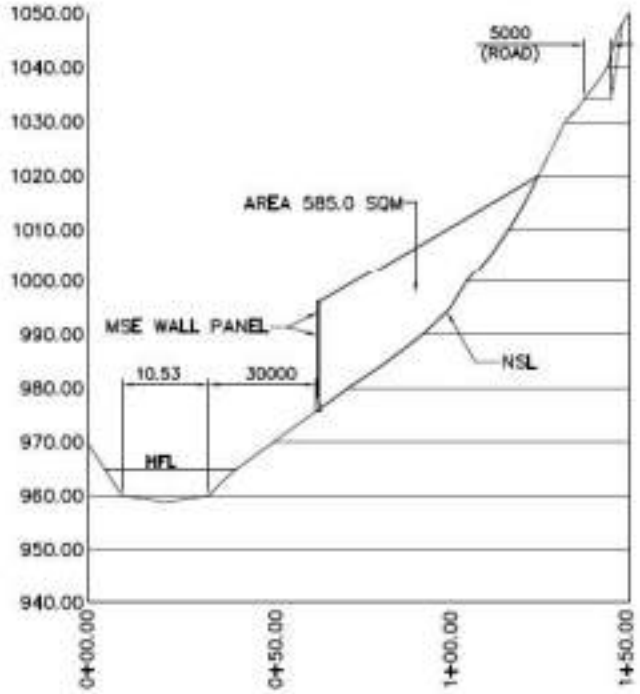


Figure 7.15: Cross Sections of Muck Disposal Area – Zone –III (Right Bank of Kuligad Nalla)

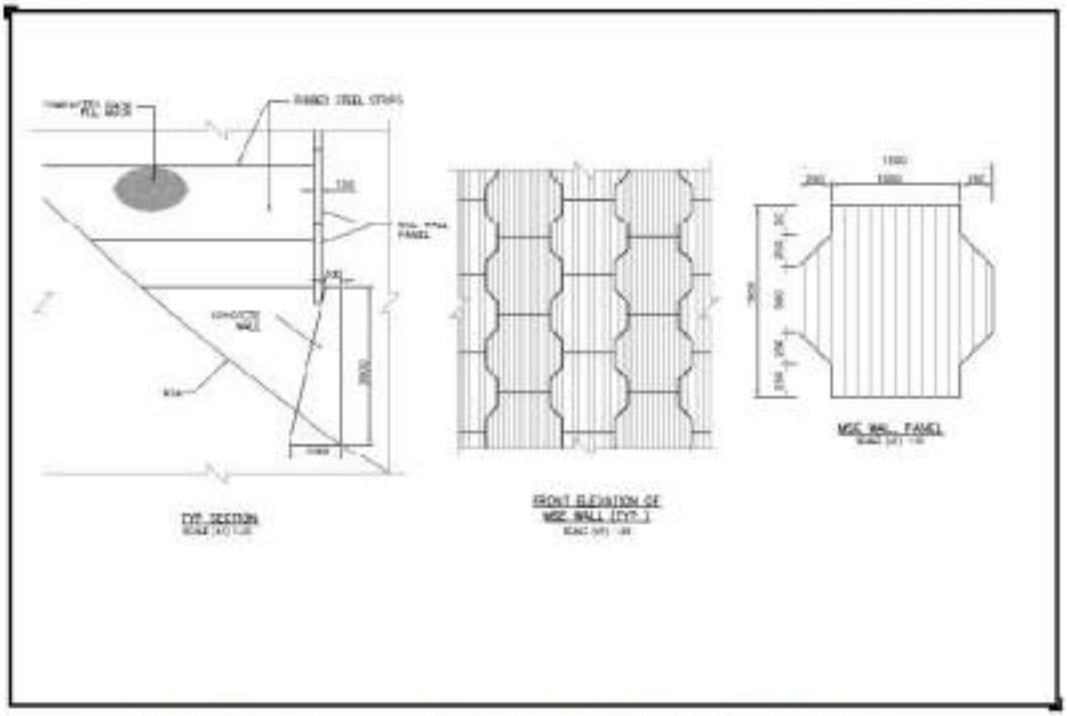


Figure 7.16: Typical Section of Retaining wall with MSE Wall Panel

7.6 FINANCIAL REQUIREMENT

The total estimated cost of the muck disposal & rejuvenation of muck disposal sites would be ` 7500.00 lakhs and is given in **Table 7.6**.

Table 7.6: Financial requirements for implementation of Muck Disposal Plan

S. No.	Item	Amount (₹ in lakh)
1.	Engineering Measures	5725.00
2.	Compaction	1000.00
3	Fencing	100.00
4	Biological Measures	675.00
	Total	**7500.00**

DRAFT REPORT

ENVIRONMENT MANAGEMENT PLAN OF RATLE HEP

February 2012

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1 BIODIVERSITY MANAGEMENT PLAN

1.1 INTRODUCTION

During the construction period various activities like road construction, blasting, excavation for tunnels, quarrying, dumping of excavated material and human population pressure on land and biological resources are likely to exert pressure on the resources of the region.

Even though no rare, endangered and endemic plant or animal species were recorded from the study area the project construction activities and submergence will have negative impact on the remaining natural ecosystems like Chir pine and Oak forests in the study area. These areas need protection and further strengthening of ongoing conservation efforts being implemented by the state Forest Department. In order to augment the conservation efforts, policies and measures and additional mitigation measures have been formulated for the proposed project. Adequate funding support has been provided to strengthen these efforts in the area.

The main objective of Biodiversity Conservation and Management Plan is sustainable use of natural resources which involves scientific management of natural wealth vis-à-vis developmental activities that are likely to affect these resources. The threats to natural terrestrial and aquatic ecosystems generally arise due to construction and associated activities like congregation of migrant labour in the project during implementation of the proposed Ratle H.E. Project. The plan therefore has been formulated keeping in mind the ecological values of terrestrial vegetation, wildlife including mammals and birds found in the study area.

The main objectives of the plan are:

- Habitat improvement
- Conservation of existing natural ecosystems in the project area
- Creating all round awareness regarding conservation and ensuring people's participation in the conservation efforts and minimizing man animal conflict
- Forest protection measures like checking of poaching, etc.

1.2 HABITAT IMPROVEMENT

The baseline studies undertaken for making an assessment of terrestrial biodiversity composition (which include forest, mammals and birds) of the Direct Impact Area as well

as the Indirect Impact Area of Ratle project have shown that most of the area is of little biodiversity value, and it contains few species of particular conservation interest. The main strategy for improvement or at least halting of the present negative development will be through the implementation of the Catchment Area Treatment plan and Compensatory Afforestation Plan, which will improve the habitat quality for key species.

1.3 CONSERVATION MEASURES

Only one or two patches in the proximity of the project site have been identified as an area with relatively undisturbed forest i.e. Chir Pine forest and an area where few wildlife species of conservation importance are assumed to be found. These are on the higher forested slopes along the ridges like Gua Dhar and Nag Dhar immediately upstream of dam on right bank of Chenab river. This will hopefully safeguard the future of the natural Chir Pine forest and the habitats for wildlife species remaining in the area.

The hill slopes on the left bank are partly disturbed by exploitation from the villages on the foot of the hills and the presence NH-1B on this bank. It is proposed that efforts should be taken for the protection of areas in the higher reaches of the catchments of Shalamar nala, Khanderu nala and Gahan nala on left bank. Detailed regulations have to be developed for the management and protection of this area, and the border should be properly fenced. An amount of ` 50.00 lakh has been earmarked for undertaking these measures.

1.4 FOREST PROTECTION/MITIGATION MEASURES

Considering the limited wildlife populations in the most of the project area at present, and the likely large and partly uncontrolled influx of people, mitigation measures should also be taken for the larger area. The following measures are proposed:

- Control on poaching.
- Awareness campaigns aimed at creating awareness towards respecting the habitat protection in general and the protection of wildlife species in particular.

Under this programme, various activities viz. training, publishing of pamphlets, brochures, hoardings, etc. shall be carried out during the construction phase of the project. Training would be imparted to the school teachers in the project area for introduction of environmental education among the school children and exchange of knowledge on environment and ecology. The basic purpose of this is to create awareness among young generation and also among the local villagers so as to preserve and protect the existing biodiversity in the area.

The following activities are planned under this programme:.

Observance of Wildlife Week: The wildlife week will be celebrated every year in the month of March to assess all the tasks set aside for wildlife management. Under this

programme, seminars, art competitions and awareness campaigns are also proposed to be held.

Nature Club: Under this activity nature clubs shall be constituted at Higher secondary and High school level. They will be imparted education by means of audio-visual aids so as to brief them about importance of wildlife conservation.

Involvement of Village Panchayats and NGOs: The Panchayats of affected villages and active NGOs in the project area would be involved to disseminate the knowledge about the benefits of the proposed project and ensuring greater participation in the conservation efforts and safeguard the environment of the area.

For the implementation of above mentioned activities/ measures Eco-development Committees (EDC) shall be formed. These EDCs will help in implementation of the various schemes and plans visualised under this programme. These EDCs will guidance from Biodiversity Conservation Committee (BCC) setup to review the progress and implementation of various activities.

For implementing various mitigation measures an amount of ` 75.00 lakh has been allocated in the budget.

The mitigation measures that would be undertaken during the implementation of the project are described In **Table 1.1.**

Table 1.1: Suggested mitigation measures

S. No.	Issues	Impact	Mitigation Measures
I.	**Construction Phase**		
1.	Clearance and Loss of Vegetation in the construction sites	Loss of forest vegetation	Forest and vegetation will be felled only to the required by pegging the area and numbering the trees
			Compensatory Afforestation for the felled local tree species as per Forest (Conservation) Act 1980 will be carried out in consultation with the District Forest Officer at the project costs
2.	Loss of Wildlife and Wildlife Habitats	Loss of wildlife habitat and disturbance to rare animal species	Forest and vegetation will be felled only to the required by pegging the area and numbering the trees
			Night time blasting operations will be avoided as far as possible
			The project staff and workforce will be strictly instructed not to visit the forested areas
3.	Influence of Project Internal Roads and	Illegal poaching of wildlife by construction workforce and loss in wildlife habitat	The project staff and workforce will be strictly instructed not visit the forested areas

S. No.	Issues	Impact	Mitigation Measures
	Workforce on the Wildlife and Wildlife Habitats		Outside workforce and staff found in illegal poaching of wildlife will be terminated from project jobs
			Meat of wildlife in the construction camps and colonies will be strictly prohibited
4.	Impact on Forested Area	Illegal trespassing through the forested area and collection of NTFP, other forest products and poaching of wildlife by construction workforce and loss in wildlife habitat	The project staff and workforce will be strictly instructed not to visit forested areas
			Meat of wildlife in the camps will be strictly prohibited
			Outside workforce and staff found in illegal poaching of wildlife will be terminated from project jobs and handed to the regulatory authorities for further action
			Conservation training, establishment of anti poaching units, and support to the conservation area
5.	Increased access to Forested areas		The project staff and workforce will be strictly instructed not to visit the forested areas
II.	**Operation Phase**		
1.	Micro level changes in forest and vegetation patterns	Arrival of water loving vegetation along the reservoir in a long run may be possible	Regular monitoring of vegetation dynamics, and formulation of action plans accordingly
2.	Impact on Forested areas	Drowning of wildlife in the reservoir area	Fencing of the dam site and possible accessible areas to protect wildlife movement to the dam/ construction areas
3.	Increased access to forests	Illegal trespassing through the forested area by the project staff, and involvement in NTFP collection and other forest products and poaching of wildlife	The project staff and workforce will be strictly instructed not visit illegally the
			Strict action and penalties would be levied on Staff found in illegal poaching of wildlife/ illicit felling of trees like termination from project jobs

Monitoring is an important part of the Biodiversity Conservation & Management Plan and key to success of any management plan. All the activities of BCMP will be closely and regularly monitored in terms of physical, financial progress and quality by the Biodiversity Conservation Committee (BCC) constituted for the purpose. The Committee shall be setup under the aegis of the State Government and shall review and oversee the conservation work to be undertaken. The Chairman of the committee will have the right

to assign various activities to various members for proper functioning and achieving the tasks. The suggested composition is as under:

Chief Wildlife Warden/ Principal Chief Conservator of Forests, Jammu & Kashmir	Chairman
Manager (Environment), Ratle HE Project	Member Secretary
DFO (Wildlife) of the concerned Division	Member
Two experts form University or renowned R & D Institutions	Member
Representatives from at least 2-3 villages on a rotational basis	Member
Representative of a local NGO	Member

1.5 COST FOR IMPLEMENTATION

The estimated cost of implementation of various activities envisaged in the management plan would be ₹ **183.00 lakh**. The details are given in **Table 1.2**.

Table 1.2: Cost estimated for implementation of Biodiversity Management plan

Particulars	**Amount (₹ in lakh)**
Habitat improvement (Cost covered under Compensatory Afforestation and CAT plan)	
Conservation measures	50.00
Forest protection/Mitigation measures	75.00
Monitoring and evaluation	30.00
Miscellaneous expenditure for 7 years @ ` 4.00 lakh	28.00
Total (₹ in lakh)	**183.00**

2 CATCHMENT AREA TREATMENT PLAN

2.1 NEED FOR CATCHMENT AREA TREATMENT

It is a well-established fact that reservoirs formed by dams on rivers are subjected to sedimentation. The process of sedimentation embodies the sequential processes of erosion, entrainment, transportation, deposition and compaction of sediment. The study of erosion and sediment yield from catchments is of utmost importance as the deposition of sediment in reservoir reduces its capacity, and thus affects the water availability for the designated use. The eroded sediment from catchment when deposited on streambeds and banks causes braiding of river reach. The removal of top fertile soil from catchment adversely affects the agricultural production. Thus, a well-designed Catchment Area Treatment (CAT) Plan is essential to ameliorate the above-mentioned adverse process of soil erosion.

Soil erosion may be defined as the detachment and transportation of soil. Water is the major agent responsible for this erosion. In many locations, winds, glaciers, etc. also cause soil erosion. In a hilly catchment area, as in the present case, erosion due to water is a common phenomenon and the same has been studied as a part of the Catchment Area Treatment (CAT) Plan. Soil erosion leads to:

- loss in production potential
- reduction in infiltration rates
- reduction in water-holding capacity
- loss of nutrients
- increase in tillage operation costs
- reduction in water supply

The Catchment Area Treatment (CAT) plan highlights the management techniques to control erosion in the catchment area of a water resource project. The life span of a reservoir is greatly reduced due to erosion in the catchment area. Adequate preventive measures are thus needed for the treatment of catchment for its stabilization against future erosion.

In the present study, Catchment Area Treatment Plan has been formulated for the free draining catchment till the proposed diversion site. The total area of the free draining catchment is 1123 sq km.

The catchment area treatment involves

- Understanding of the erosion characteristics of the terrain and,
- Suggesting remedial measures to reduce the erosion rate.

In the present study `**Silt Yield Index' (SYI)**, method has been used. In this method, the terrain is subdivided into various watersheds and the erodibility is determined on relative basis. SYI provides a comparative erodibility criteria of catchment (low, moderate, high, etc.) and do not provide the absolute silt yield. SYI method is widely used mainly because of the fact that it is easy to use and has lesser data requirement. Moreover, it can be applied to larger areas like sub-watersheds, etc.

2.2 RATLE CATCHMENT

2.2.1 Drainage System

River Chenab, a major river of Jammu & Kashmir, originates from snow melt of Bara Lacha pass in Lahaul & Spiti district of Himachal Pradesh. Flowing through Jammu & Kashmir it enters the plains of Punjab and Pakistan.

The two major rivers draining within the free draining catchment of proposed Ratle HE project are river Chenab and river Marusudar. River Marusudar joins river Chenab near Bindraban Village. In the initial stretch of river Chenab from the dam site several tributary streams joins it on either bank. The major tributaries joining on the left bank are Gahan Nala, Khanderu Nala and Kainag and on the right bank the tributaries that join the river are Macholi Nala, Kurnag Nala, Runa Gad and Bhandin Nala. The drainage system of free draining catchment of Ratle HEP is given in **Figure 2.1.**

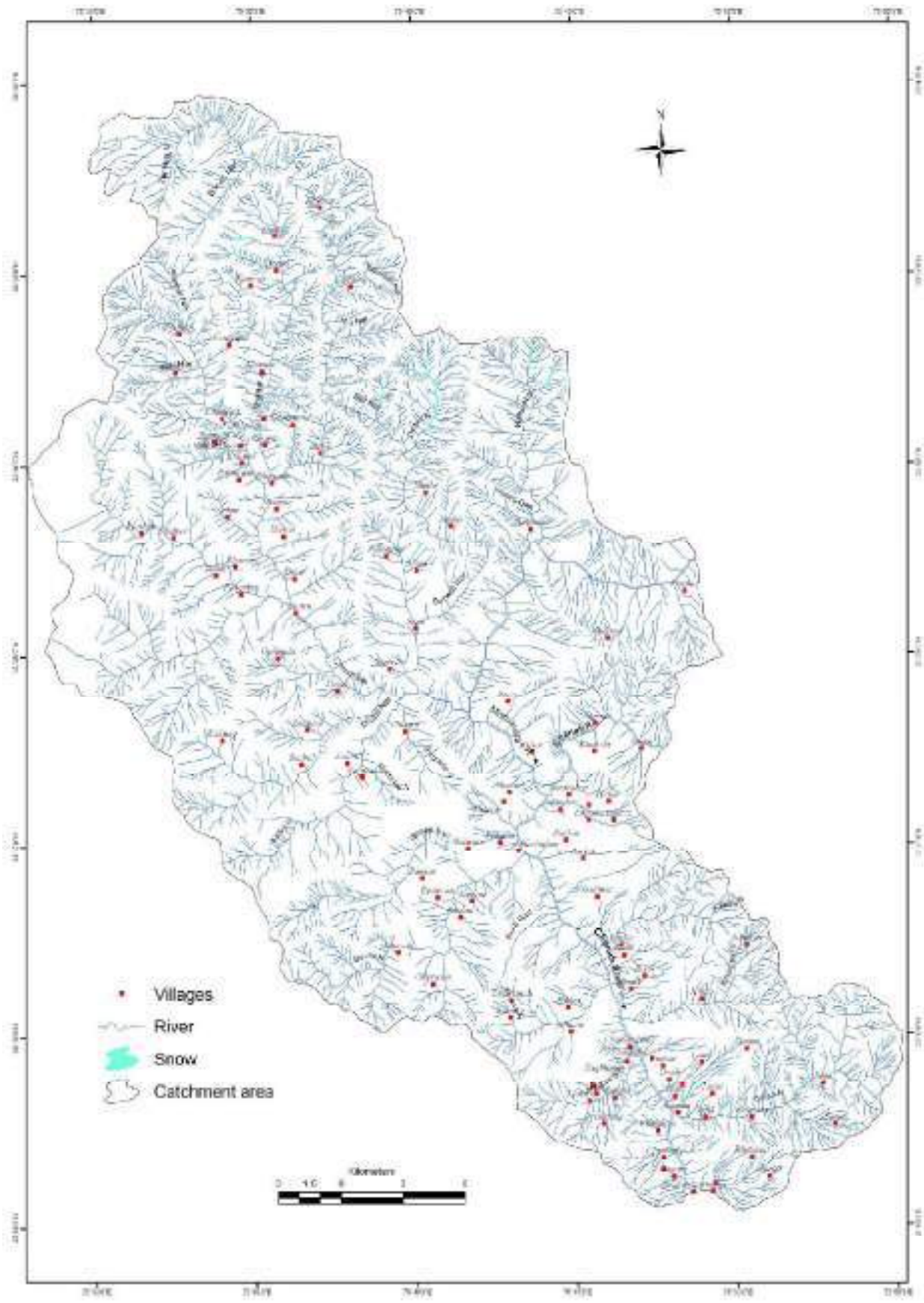


Figure 2.1: Drainage System for Free Draining Catchment of Proposed Ratle HE Project

2.2.2 Delineation of Sub-Watersheds

As per the Watershed Atlas of India (Soil & Land Use Survey of India), Indus Basin is the water resource region for Ratle Catchment. The basin and sub-basin for the catchment is Chenab basin (1D1) and Chenab sub-basin, respectively. The catchment treatment plan has been limited to free-draining catchment of Ratle H.E. Project up to the dam site of Dul Hasti HE project on Chenab river and dam site of Pakal-Dul HE project on Marusudar river, a tributary of Chenab river joining d/s of Dul Hasti dam till the dam site of the Ratle H.E.Project. Therefore, for the preparation of CAT plan, part of Ratle catchment (1D1C2 as per Soil & Land Use Survey of India) comprising the free-draining catchment area has been delineated into twenty one sub-watersheds (**Figure 2.2 & Table 2.1**) on 1:50,000 Survey of India toposheets of the project area.

Table 2.1: Names and codes of Sub-watersheds delineated in the Free Draining Catchment of Ratle H.E. Project

S.No.	Sub-Watershed Code	Sub-Watershed Name	Sub-Watershed Area (ha)
1.	RAAG	Agral	4205
2.	RABA	Balur	6189
3.	RABH	Bhandin	4399
4.	RABO	Borpathar	4297
5.	RACH	Chhatra	6500
6.	RADA	Dangar	5942
7.	RADR	Drubil	6548
8.	RAGA	Gahan	7019
9.	RAKH	Khawur	7044
10.	RAKE	Keshwan	7095
11.	RAKU	Kurnag	2755
12.	RAKI	Kishtwar	4166
13.	RAMA	Macholi	3535
14.	RANA	Naidgam	5510
15.	RAPA	Pantsalmarg	4073
16.	RAPR	Paribagh	8251
17.	RASH	Shalamar	3467
18.	RASI	Singpor	6476
19.	RASA	Sat Kol	3637
20.	RASM	Simbol	4027
21.	RASR	Sarwal	7130
		Total Area (ha)	**1, 12, 265**

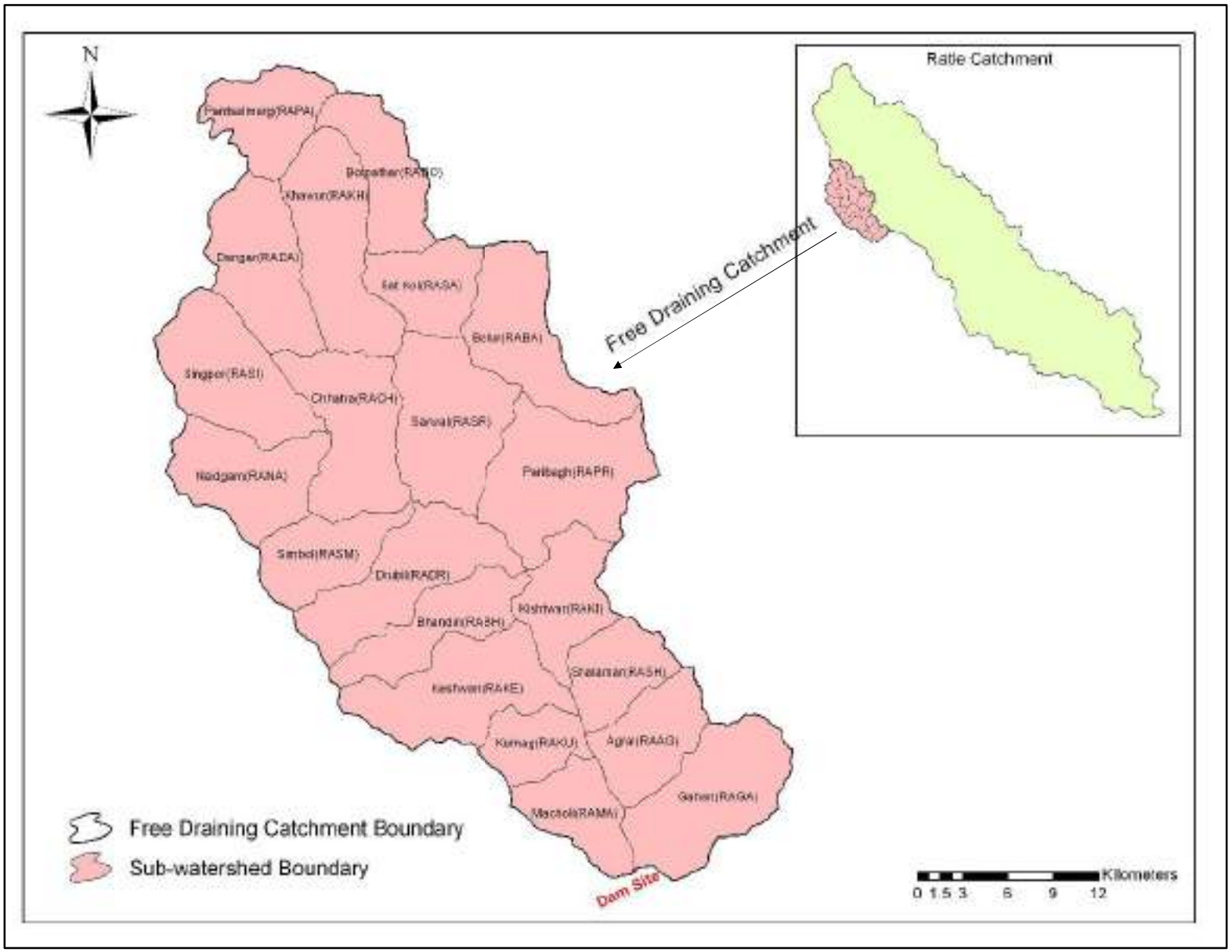


Figure 2.2: Sub-watersheds delineated in the Free Draining Catchment of the proposed Ratle HE Project

2.3 APPROACH FOR THE STUDY

A detailed database on natural resources, terrain conditions, soil type of the catchment area, socio-economic status, etc. is a pre-requisite to prepare treatment plan keeping in view the concept of sustainable development. Various thematic maps have been used in preparation of the CAT plan. Geographic Information System (GIS) is a computerized resource data base system, which is used to store, analyze and display various spatial data. GIS has a capacity to perform numerous functions and operations on the various spatial data because of its special hardware and software characteristics. In order to ensure that latest and accurate data is used for the analysis, satellite data has been used for deriving land use data. Ground truth studies, too, have been conducted.

The various steps, covered in the study, are as follows:

- Definition of the problem
- Data acquisition and preparation
- Output presentation

The above mentioned steps are briefly described in the following paragraphs:

2.3.1 Definition of the Problem

The requirements of the study were defined and the expected outputs were finalized. The various data layers of the catchment area to be used for the study are as follows:

- Catchment Area Map
- Land use Classification Map
- Slope Map
- Soil Map

2.3.2 Data Acquisition and Preparation

The data available from various sources has been collected. The ground maps, contour information, etc. were scanned, digitized and registered as per the requirement. Data was prepared depending on the level of accuracy required and any corrections required were made. All the layers were geo-referenced and brought to a common scale (real co-ordinates), so that overlay could be performed. A computer program using standard modeling techniques was used to estimate the soil loss. The formats of outputs from each layer were formed to match the formats of inputs in the program. Ground truthing and data collection was also included in the procedure.

2.3.3 Land Use/ Land Cover

For the present study, IRS P6-LISS III digital satellite data of Path 93 and Row 46 (24-Oct-2005) was used for interpretation & classification **(Figure 2.3)**. The data has been procured in raw digital format and has been geo-referenced using Survey of India topographical sheets with the help of standard data preparation techniques in standard image processing software. The interpretation of geo-referenced satellite data has been done using standard enhancement techniques, ground checks and experiences of qualified professionals. A detailed ground truth verification exercise has been undertaken as a part of field survey to enrich the image interpretation process. The classified land use map of the free draining catchment area, considered for the study, is shown as **Figure 2.4**. The land use pattern of the free draining catchment area is summarized in **Table 2.2**. The land use/ land cover map of the free draining catchment of Ratle HE Project can be classified into seven classes. Out of these seven classes the percentage area of dense forest is the highest while settlement in the area is least.

Table 2.2: Land Use/ Land Cover Classification for Free Draining Catchment

S.No.	Landuse/Landcover	Area (%)	Area (sq km)
1.	Dense Forest	51.63	579.82
2.	Open Forest	5.25	58.90
3.	Agriculture	4.87	54.69
4.	Barren Land	36.25	407.05
5.	Settlement	0.07	0.82
6.	Snow Cover	0.89	10.03
7.	Water Bodies	1.04	11.69
	Total	**100.00**	**1123.00**

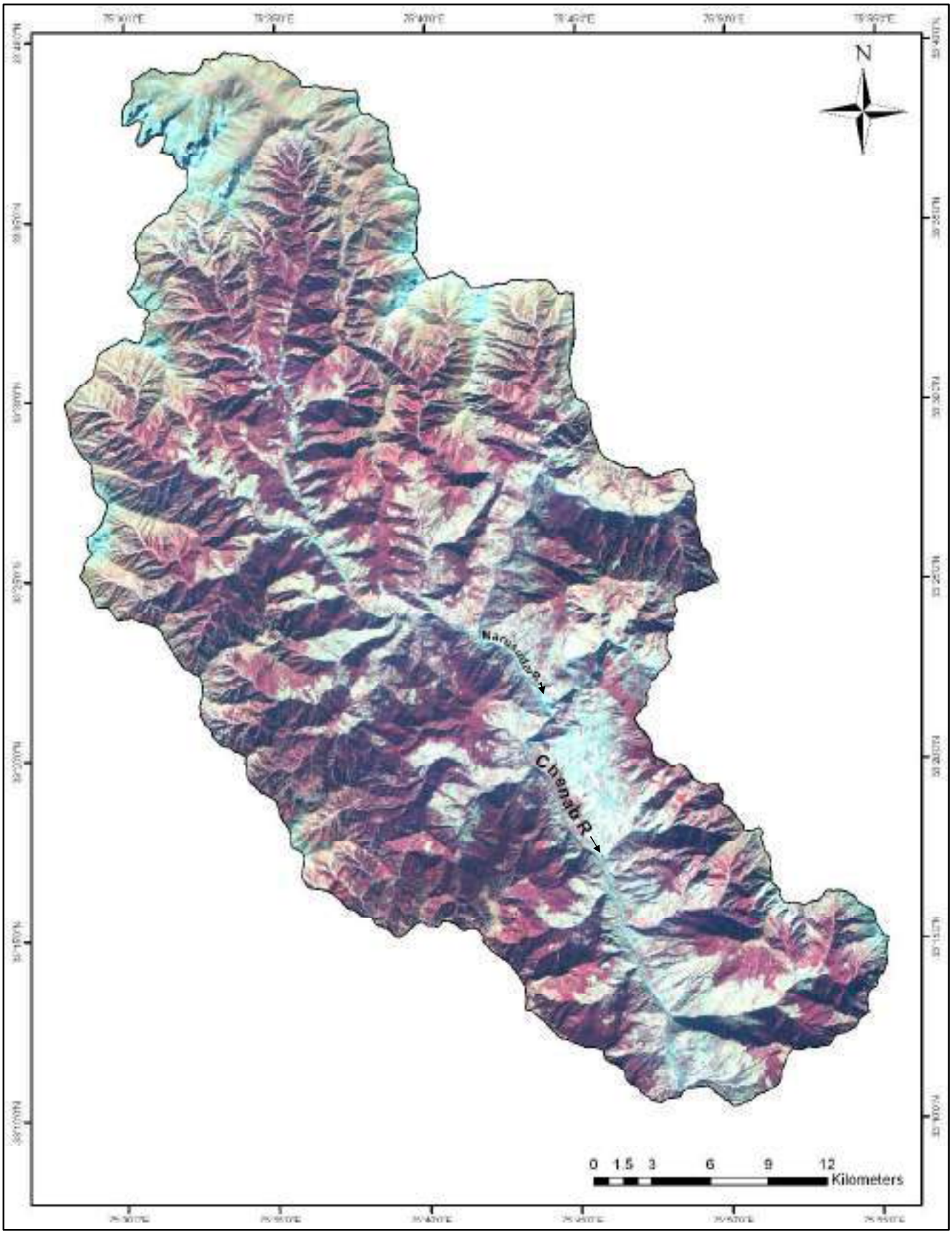


Figure 2.3 : Satellite Imagery of Free Draining Catchment of Proposed Ratle HE Project

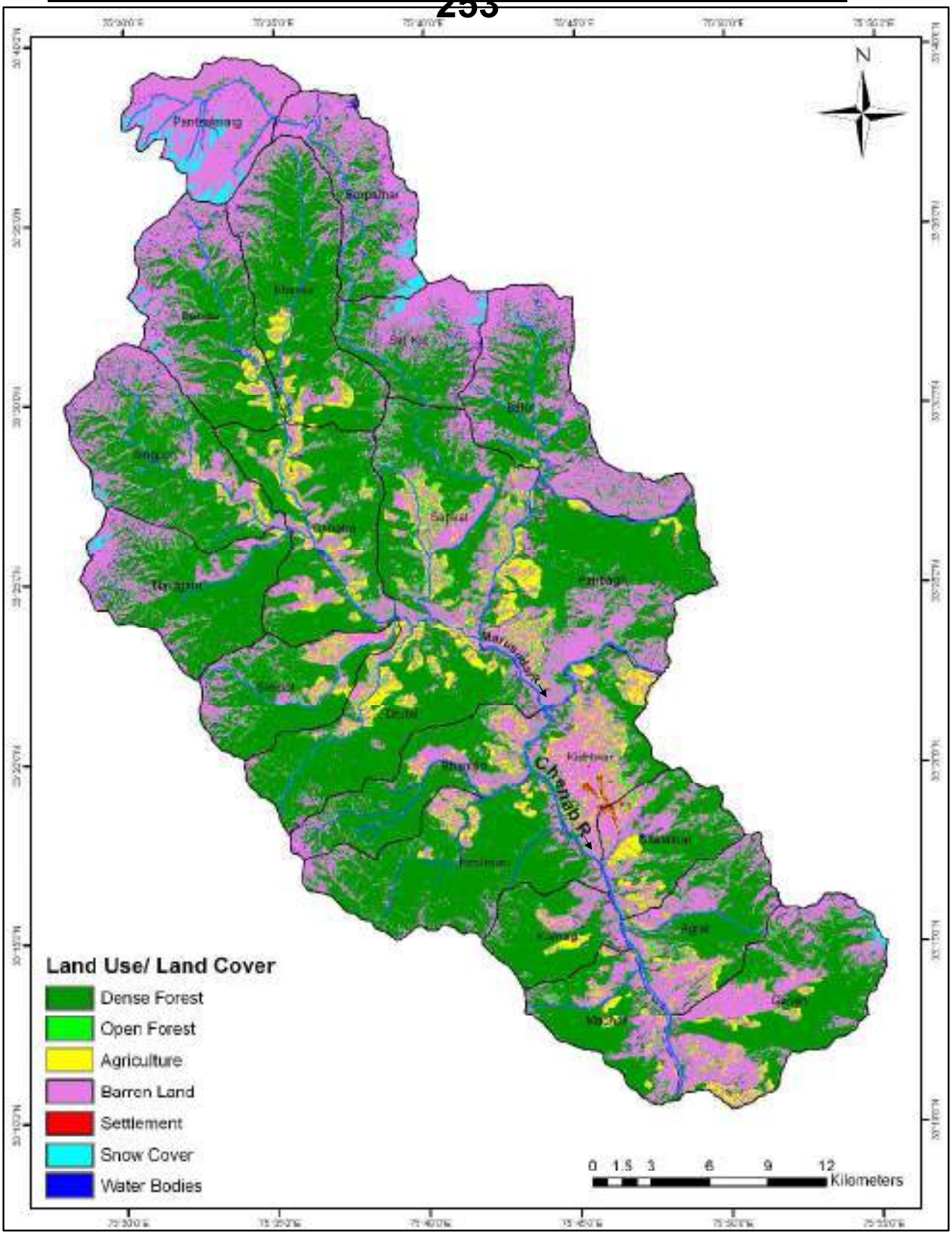


Figure 2.4 : Land Use/Land Cover Classification of Free Draining Catchment of Proposed Ratle HE Project

2.3.4 Slope

Derived contours from topographical maps were used for preparation of Digital Elevation Model (DEM) of the catchment area and to prepare a slope map. The first step in generation of slope map is to create surface using the elevation values stored in the form of contours or points. After marking the catchment area, all the contours on the topographical maps were derived. The output of the digitization procedure was the contours as well as points contours in form of x, y & z points. (x, y - location and z - their elevation). All this information was in real world co-ordinates (latitude, longitude and height in meters above mean sea level).

A Digital Terrain Model (DTM) of the area was then prepared, which was used to derive a slope map. The slope was divided in classes of slope percentages. The areas falling under various standard slope categories have been tabulated below in **Table 2.3**. The slope map is shown as **Figure 2.5**.

Table 2.3 : Areas falling under different slope categories

Slope in %	Slope Category	Area (%)	Area (sq km)
0-15	Gently sloping	29.55	331.01
15-30	Moderately sloping	3.65	40.91
30-45	Strongly sloping	20.96	234.79
45-60	Steeply sloping	18.40	206.05
60-75	Very Steeply sloping	10.96	122.80
> 75	Extremely sloping	16.47	184.48
Total		**100.00**	**1123.00**

2.3.5 Soil

Soil map has been digitized and produced using soil maps collected from National Bureau of Soil Survey & Land Use Planning, Regional Centre, New Delhi. Various layers, thus prepared, were used for modeling. Soil map has been shown in **Figure 2.5.** The legend for soil classes has been given in **Table 2.4**.

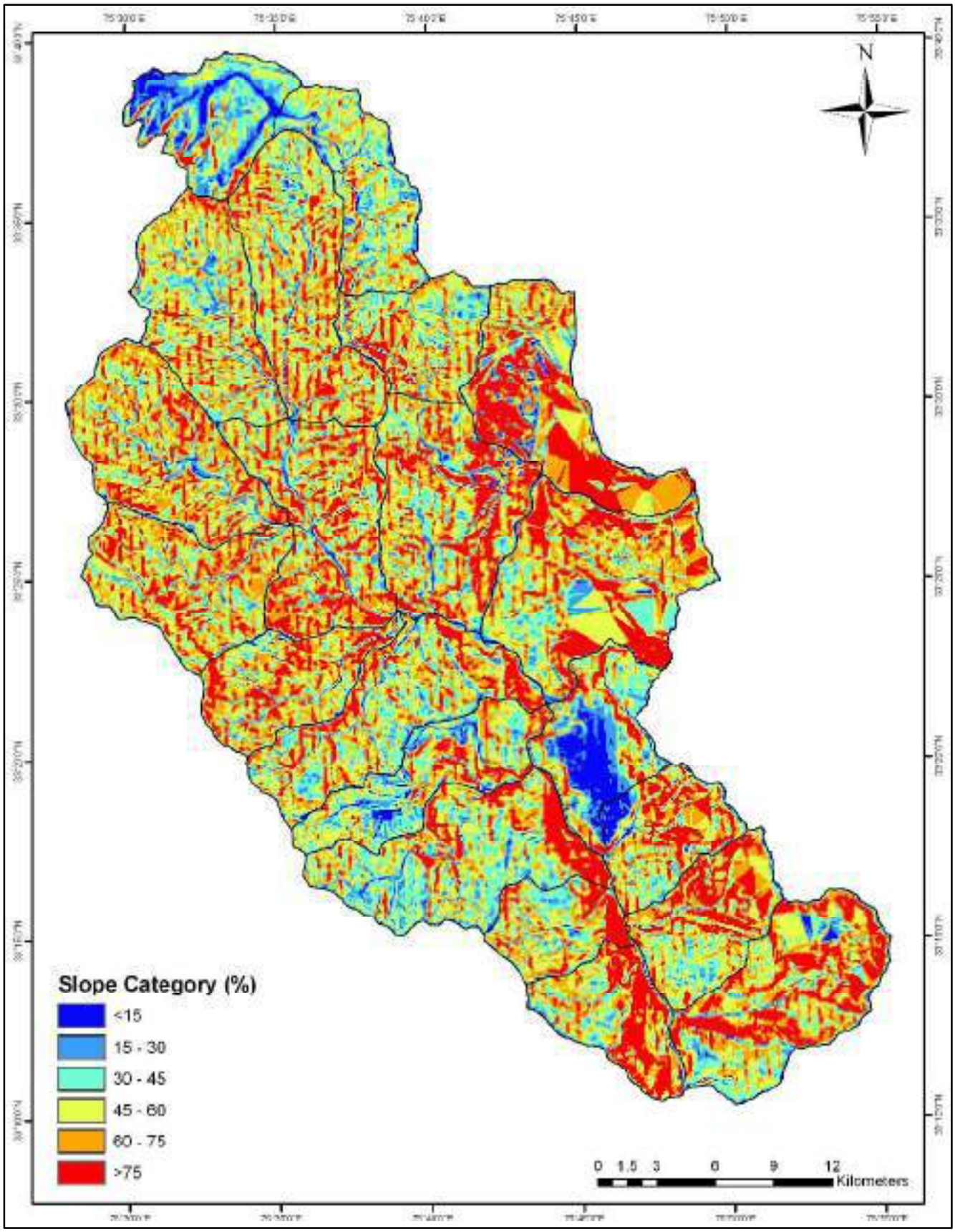


Figure 2.5 : Slope Map of Free Draining Catchment Area of Proposed Ratle HE Project

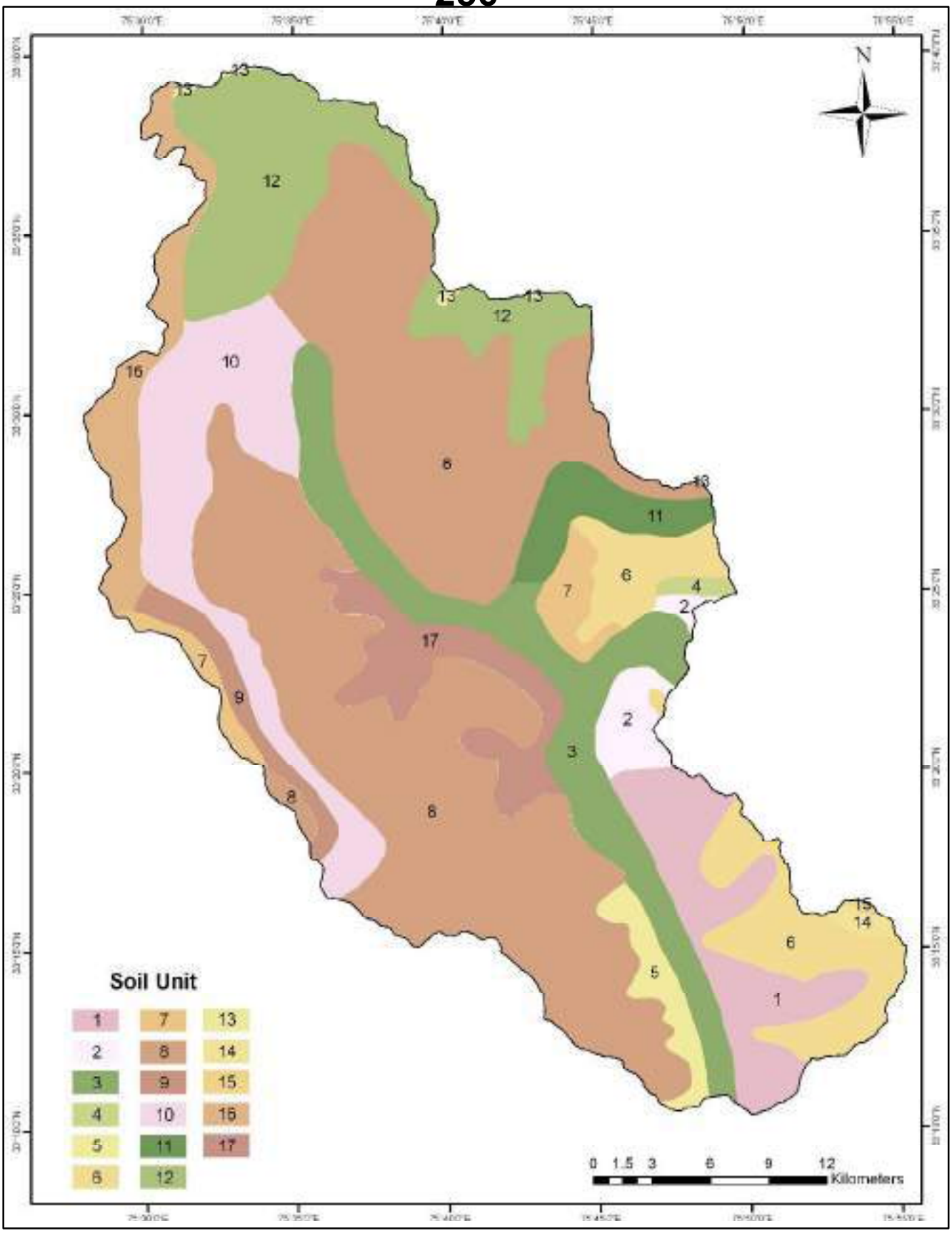


Figure 2.6 : Soil Map of Free Draining Catchment Area of Proposed Ratle HE Project (Description of Soil Unit is given in Table 2.4)

Table 2.4: Description of Soil Units in Free Draining Catchment Area of Ratle HE Project

Soil Unit	Soil Description		Area (sq km)	Area (%)
1	**Dystric Eutrochrepts**	**Typic Udorthents**	**67.1**	**6**
	Deep, somewhat excessively drained, coarse-loamy soils on steep slopes with loamy surface, moderate erosion and slight stoniness; associated with:	Medium deep, excessively drained, coarse-loamy soils on steep slopes with loamy surface, severe erosion and moderate stoniness.		
2	**Dystric Eutrochrepts**	**Typic Eutrochrepts**	**18.7**	**1.7**
	Medium deep, well drained, fine-loamy soils on gentle slopes with loamy surface and slight erosion; associated with:	Deep, well drained, fine-loamy, calcareous soils with loamy surface and slight to moderate erosion.		
3	**Typic Eutrochrepts**	**Typic Udifluvents**	**104.6**	**9.3**
	Deep, somewhat excessively drained, fine-loamy, calcareous soils on moderate slopes with loamy surface, moderate erosion and slight stoniness; associated with:	Deep, somewhat excessively drained, coarse-loamy soils with loamy surface, moderate erosion and moderate stoniness.		
4	**Typic Udorthents**	**Lithic Udorthents**	**3.6**	**0.3**
	Medium deep, somewhat excessively drained, fine-loamy soils on moderate slopes with loamy surface, moderate erosion and slight stoniness; associated with: Rock outcrops	Shallow, somewhat excessively drained, loamy soils with loamy surface, severe erosion and strong stoniness.		
5	**Dystric Eutrochrepts**	**Lithic Udorthents**	**17.9**	**1.6**
	Medium deep, well drained, fine-loamy soils	Shallow, excessively drained, loamy soils on		

	on moderate slopes with loamy surface and moderate erosion; associated with:	very steep slopes with loamy surface, moderate erosion and strong stoniness		
6	**Typic Udorthents**	**Dystric Eutrochrepts**	**78.9**	**7.0**
	Medium deep, somewhat excessively drained, coarse-loamy soils on steep slopes with loamy surface, severe erosion and moderate stoniness; associated with :	Deep, well drained, fine-loamy soils with loamy surface and moderate erosion		
7	**Typic Udorthents**		**22.8**	**2.0**
	Medium deep, somewhat excessively drained, fine-loamy soils on moderately steep slopes with loamy surface, moderate erosion and moderate stoniness; associated with: Rock outcrops			
8	**Lithic Udorthents**	**Typic Udorthents**	**457.2**	**40.7**
	Shallow, excessively drained, loamy soils on very steep slopes with loamy surface, severe erosion and moderate stoniness; associated with:	Medium deep, excessively drained, coarse-loamy soils with loamy surface, moderate erosion and moderate stoniness.		
9	**Lithic Cryorthents**		**17.8**	**1.6**
	Dominantly rock outcrops associated with: Shallow loamy, calcareous soils on steep to very steep slopes with loamy surface, strong stoniness and severe erosion.			
10	**Typic Cryochrepts**		**97.4**	**8.7**
	Medium deep, excessively			

	drained, coarse-loamy, calcareous soils on steep slopes with loamy surface, severe erosion and moderate stoniness; associated with: Rock outcrops			
11	**Typic Cryochrepts**	**Fluventic Cryochrepts**	**26.6**	**2.4**
	Deep, somewhat excessively drained, coarse-loamy soils on moderate slopes with loamy surface, moderate erosion and moderate stoniness; associated with:	Deep, well drained, coarse-loamy soils with loamy surface and moderate erosion.		
12	**Typic Hapludolls**	**Typic Udorthents**	**114.8**	**10.2**
	Deep, somewhat excessively drained, mesic, fine-loamy soils on moderately steep slopes with loamy surface and moderate erosion; associated with:	Medium deep, somewhat excessively drained, coarse-loamy soils with loamy surface and moderate erosion.		
13	**Typic Udorthents**		**1.8**	**0.2**
	Medium deep, somewhat excessively drained, fine-loamy soils on moderately steep slopes with loamy surface, moderate erosion and moderate stoniness; associated with:	Rock outcrops.		
14	**Dystric Eutrochrepts**	**Typic Eutrochrepts**	**3.6**	**0.3**
	Deep, well drained, thermic, fine-loamy, soils on moderately steep slopes with loamy surface, moderate	Medium deep, well drained, fine-loamy calcareous soils with loamy surface, moderate erosion and		

	erosion and slight stoniness; associated with	slight stoniness		
15	**Lithic Udorthents**		**0.7**	**0.1**
	Rock outcrops; associated with: Shallow, excessively drained, loamy soils on moderately steep slopes with loamy surface, moderate erosion and moderate stoniness.			
16	**Lithic Cryorthents**		**40.8**	**3.6**
	Dominantly rocky landscape; associated with: very shallow, excessively drained, fragmental soils on very steep slopes with loamy surface, very severe erosion and strong stoniness			
17	**Typic Udorthents**	**Typic Eutrochrepts**	**46.6**	**4.1**
	Medium deep, excessively drained, coarse- loamy soils on steep slopes with loamy surface, severe erosion and moderate stoniness; associated with:	Deep, well drained, fine-loamy, calcareous soils with loamy surface and moderate erosion		

2.3.6 Modeling

Soil loss has been calculated through RUSLE (Revised Universal Soil Loss Equation) model which is computed by the following equation:

Soil Loss (A) = R*K*LS*C*P

Wherein;

A = Soil loss (Tons/ha/year)

R is Rainfall & Runoff Erosivity Factor (MJ/ha/mm/year), which depends upon the annual average rainfall in mm.

K is Erodibility Factor (Tons/MJ/mm), which depends on the organic matter, texture permeability and profile structure of the soil. Also, it is a constant value for each soil type.

LS is Topographic Factor (dimensionless), which depends upon flow accumulation and slope steepness and length in the area.

C is Vegetation Cover and Crop Management Factor (dimensionless), which is the ratio of bare soil to vegetation and non- photosynthetic material

P is Support Practice Factor (dimensionless), which takes into account specific erosion control practices like contour bunding, bench terracing etc. This factor is taken as 1 for bare soil where no erosion control practice is taking place.

2.3.7 Output Presentation

A thematic map has been prepared using these calculated soil erosion values for delineating areas prone to soil erosion in the catchment area. The percentages of catchment area falling in different soil vulnerability classes are given in **Table 2.5** and shown in **Figure 2.7**.

Table 2.5 : Soil loss ranges for free draining catchment area of Ratle HE Project

S. No.	Soil loss range in tons/hectare/annum	Area (sq km)	Area (%)	Soil Erosion Intensity
1.	<1	354.80	31.59	Negligible
2.	1-5	205.61	18.31	Slight
3.	5-10	109.11	9.72	Very Low
4.	10-20	111.06	9.89	Low
5.	20-40	114.66	10.21	Moderate
6.	40-80	91.76	8.17	Severe
7.	>80	136.01	12.11	Very Severe
	Total	**1123.00**	**100.00**	

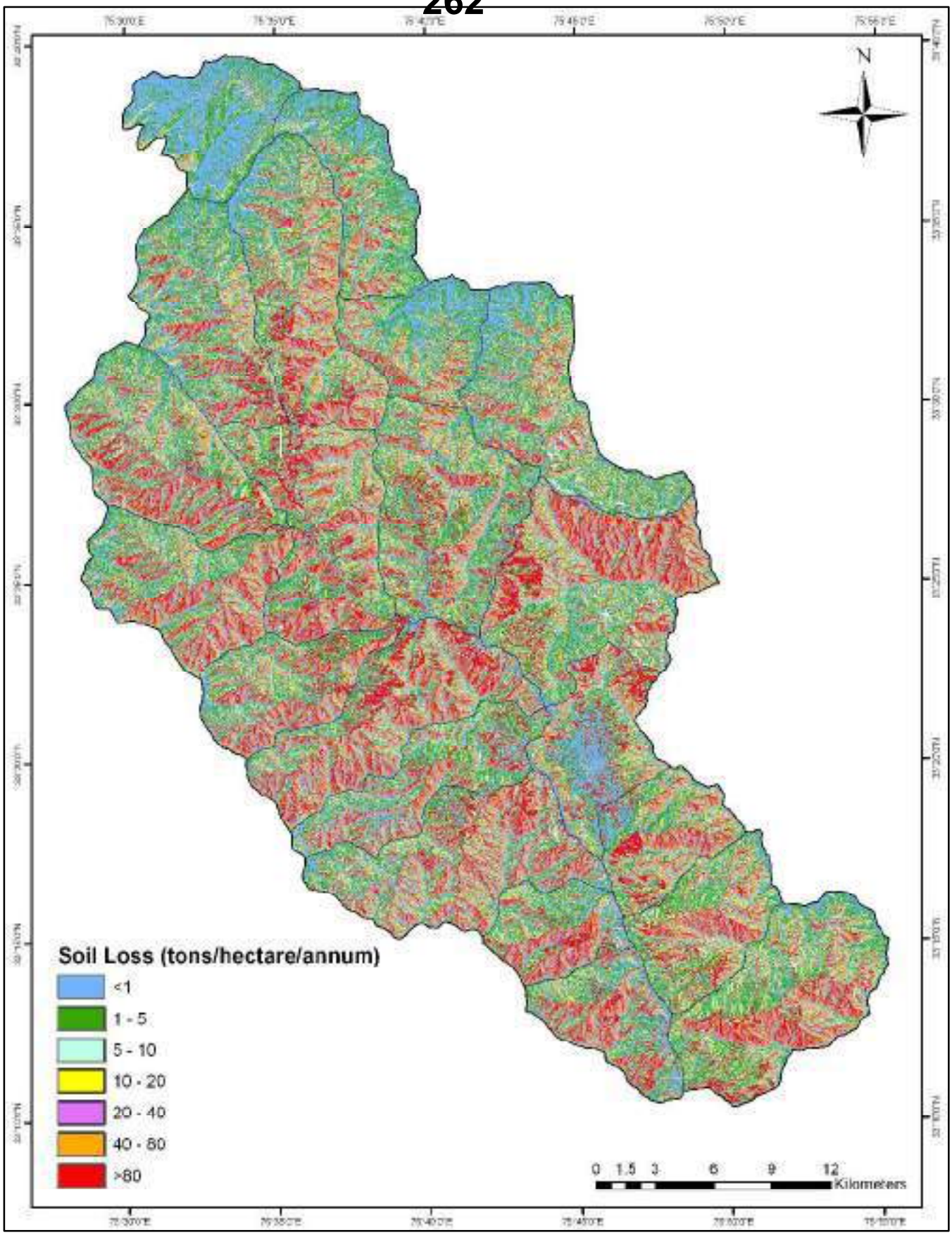


Figure 2.7 : Soil Erosion Intensity Map of Free Draining Catchment Area of Proposed Ratle HE Project

2.4 ESTIMATION OF SOIL LOSS USING SILT YIELD INDEX (SYI) METHOD

In `**Silt Yield Index' (SYI)**, method, the catchment is subdivided into various sub-watersheds and the erodibility is determined on relative basis. SYI provides comparative erodibility criteria of catchment (low, moderate, high, etc.). SYI method is widely used mainly because of the fact that it is easy to use and has lesser data requirement. Moreover, it can be applied to larger areas like sub-watersheds, etc.

The Silt Yield Index Model (SYI), considering sedimentation as product of erosivity, erodibility and arial extent was conceptualized in the Soil and Land Use Survey of India (SLUSI) as early as 1969 and has been in operational use since then to meet the requirements of prioritization of smaller hydrologic units within river valley project catchment areas.

2.4.1 Silt Yield Index

The Silt Yield Index (SYI) is defined as the Yield per unit area and SYI value for hydrologic unit is obtained by taking the weighted arithmetic mean over the entire area of the hydrologic unit by using suitable empirical equation.

2.4.1.1 Prioritization of Watersheds/Sub-watersheds

The prioritization of smaller hydrologic units within the vast catchments is based on the Silt Yield Indices (SYI) of the smaller units. The boundary values or range of SYI values for different priority categories are arrived at by studying the frequency distribution of SYI values and locating the suitable breaking points. The watersheds/ sub-watersheds are subsequently rated into various categories corresponding to their respective SYI values.

The application of SYI model for prioritization of sub-watersheds in the catchment areas involves the evaluation of:

a) Climatic factors comprising total precipitation, its frequency and intensity,

b) Geo-morphic factors comprising land forms, physiography, slope and drainage characteristics,

c) Surface cover factors governing the flow hydraulics and

d) Management factors.

The data on climatic factors can be obtained for different locations in the catchment area from the meteorological stations whereas the field investigations are required for estimating the other attributes.

The various steps involved in the application of model are:

- Preparation of a framework of sub-watersheds through systematic delineation

- Rapid reconnaissance surveys on 1:50,000 scale leading to the generation of a map indicating erosion-intensity mapping units.

- Assignment of weightage values to various mapping units based on relative silt-yield potential.

- Computing Silt Yield Index for individual watersheds/sub-watersheds.

- Grading of watersheds/sub-watersheds into very high, high, medium, low and very low priority categories.

The area of each of the mapping units is computed and silt yield indices of individual sub-watersheds are calculated using the following equations:

2.4.1.2 *Silt Yield Index*

To calculate silt yield index, the methodology developed by Soil & Land Use Survey (Department of Agriculture, Govt. of India) has been followed, where each erosion intensity unit is assigned a weightage value. When considered collectively, the weightage value represents approximately the relative comparative erosion intensity. A basic factor of K = 10 was used in determining the weightage values. The value of 10 indicates a static condition of equilibrium between erosion and deposition. Any addition to the factor K (10+X) is suggestive of erosion in ascending order whereas subtraction, i.e. (10-X) is indicative of deposition possibilities.

Delivery ratios were adjusted for each of the erosion intensity unit. The delivery ratio suggests the percentage of eroded material that finally finds entry into reservoir or river/ stream. Area of each composite unit in each sub-watershed was then estimated.

Silt yield index (SYI) was calculated using following empirical formula:

$$SYI = \frac{\sum (Ai * Wi) * Di * 100}{Aw} ; \quad \text{where } i = 1 \text{ to } n$$

where,

Ai = Area of i^{th} unit (EIMU)

Wi = Weightage value of i^{th} mapping unit

n = No. of mapping units

Aw = Total area of sub-watershed.

Di = Delivery ratio

Delivery ratios are assigned to all erosion intensity units depending upon their distance from the nearest stream. The criteria adopted for assigning the delivery ratio are as follows:

Nearest Stream	Delivery ratio
0 - 0.9 km	1.00
1.0 - 2.0 km	0.95
2.1 - 5.0 km	0.90
5.1 - 15.0 km	0.80
15.1 - 30.0 km	0.70

The SYI values for classification of various categories of erosion intensity rates are given in **Table 2.6.**

Table 2.6 : Criteria for erosion intensity rate

Priority categories	SYI Values
Very high	> 1300
High	1200-1299
Medium	1100-1199
Low	1000-1099
Very Low	<1000

The erosion category of various sub-watersheds in the catchment area as per the SYI index has been estimated **(Annexure I)**. The objective of the SYI method is to prioritize sub-watershed in a catchment area for treatment. The area under very high and high erosion categories is to be treated at the project proponent's cost. Hence, CAT plan shall be suggested for very high and high erosion categories, as a part of the EIA study, the expenses of which have to be borne by project proponents.

In the present report, CAT Plan as per the slope, land use pattern, soil characteristics has been suggested based on the prioritization of sub watersheds using SYI method (**Table 2.7**). The CAT plan has been suggested for sub watersheds with very high and high erosion categories as the cost for treatment for such watersheds is to be borne by the project proponents.

The objective of the SYI method is to prioritize sub-watershed in a catchment area for treatment. The area under very high and high priority categories accounts for about 22.56% of the total free draining catchment area. (**Table 2.7, Figure 2.8**). It is proposed that treatment measures shall be implemented over five years but major

activities shall be covered in initial three to four years so that to make it co-terminus with the construction of project. Phase wise treatment plan has been tabulated in **Table 2.12.**

Table 2.7 : Erosion Intensity Categorization as per SYI Classification

Sub watershed	Area in hectare	SYI	Priority Number
Very High Priority (>1300)			
Drubil	6548	1406	1
Paribagh	8251	1312	2
	14, 799 (13.18%)		
High Priority (1200-1299)			
Chhatra	6500	1244	3
Simbol	4027	1253	4
	10, 527 (9.38%)		
Medium Priority (1100-1199)			
Kurnag	2755	1194	5
Naidgam	5510	1194	6
Agral	4205	1183	7
Sarwal	7130	1175	8
Sat Kol	3637	1162	9
Macholi	3535	1154	10
Gahan	7019	1136	11
Keshwan	7095	1105	12
	40, 886 (36.42%)		
Low Priority (1000-1099)			
Bhandin	4399	1098	13
Singpor	6476	1075	14
	10, 875 (9.69%)		
Very Low Priority (<1000)			
Khawur	7044	924	15
Balur	6189	920	16
Dangar	5942	880	17
Pantsalmarg	4073	859	18
Shalamar	3467	848	19
Borpathar	4297	827	20
Kishtwar	4166	803	21
	35, 178 (31.33%)		

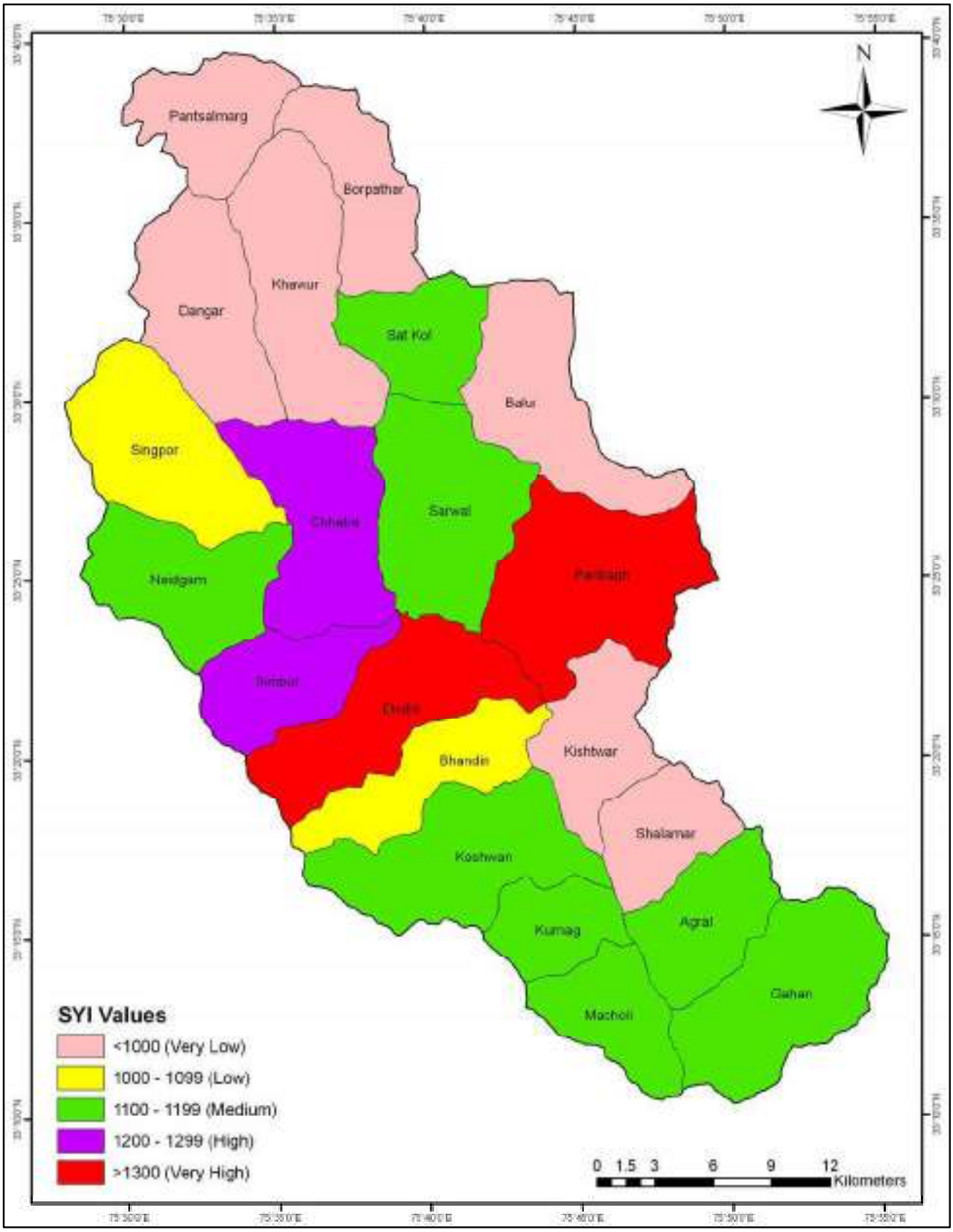


Figure 2.8 : Sub-Watershed Prioritization of the Free Draining Catchment Area of Proposed Ratle HE Project for Treatment

2.5 WATERSHED MANAGEMENT – AVAILABLE TECHNIQUES

Watershed management is the optimal use of soil and water resources within a given geographical area so as to enable sustainable production. It implies changes in land use, vegetative cover, and other structural and non-structural action that are taken in a watershed to achieve specific watershed management objectives. The overall objectives of watershed management programme are to:

- increase infiltration into soil;
- control excessive runoff;
- manage & utilize runoff for useful purpose.

Following Engineering and Biological measures shall be suggested for the catchment area treatment depending upon the requirement and suitability:

1. Engineering measures

- Step drain
- Angle iron barbed wire fencing
- Stone masonry
- Check dams

2. Biological measures

- Development of nurseries
- Plantation/afforestation
- Pasture development
- Social forestry

The basis of site selection for different biological and engineering treatment measures under CAT are given in **Table 2.8**.

Table 2.8 : Basis for selection of catchment area treatment measures

Treatment measure	*Basis for selection*
Social forestry, fuel wood and fodder grass development	Near settlements to control tree felling
Contour Bunding	Control of soil erosion from agricultural fields.
Pasture Development	Open canopy, barren land, degraded surface
Afforestation	Open canopy, degraded surface, high soil erosion, gentle to moderate slope
Barbed wire fencing	In the vicinity of afforestation work to protect it from

Treatment measure	*Basis for selection*
	grazing etc.
Step drain	To check soil erosion in small streams, steps with concrete base are prepared in sloppy area where silt erosion in the stream and bank erosion is high due to turbidity of current.
Nursery	Centrally located points for better supervision of proposed afforestation, minimize cost of transportation of seedling and ensure better survival.

2.6 SUBWATERSHED-WISE TREATMENT MEASURES

The treatment measures are to be taken up at Drubil, Paribagh, Chhatra and Simbol, as these watersheds come under very high and high priority. Within these watershed the area that is prone to Very Severe and Severe erosion are to be considered for treatment. Therefore, under the Catchment Area Treatment plan an area of 7013 hectare, which is 6.25% of the total free draining catchment, will be taken up for treatment. The sub-watershed wise area to be treated and treatment measures are given in **Table 2.9 & Table 2.10,** respectively**.**

Table 2.9: Sub-watershed wise area (hectare) considered for treatment

S.No.	Sub-catchment	Severe	Very Severe	Total
1.	Chhatra	663	1099	1762
2.	Drubil	742	1296	2038
3.	Paribagh	839	1425	2264
4.	Simbol	375	574	949
	Total	**2619**	**4394**	**7013**

Table 2.10: Sub-watershed – wise treatment measures to be adopted

Sub-watershed	Pasture Development	Enrichment Plantation	Contour Bunding	Afforestation	Stone & Masonry Check Dams
		(ha)			(No.)
Chhatra	146	62	332	1222	25
Drubil	135	36	440	1427	50
Paribagh	199	66	416	1583	45
Simbol	91	27	150	681	5
Total	**571**	**191**	**1338**	**4913**	**125**

Silt Observation points

Four silt observation locations for regular monitoring of silt load coming in tributaries have been suggested which should be established in consultation with state forest department. This would ensure monitoring efficacy of implementation various treatments measures suggested as in CAT plan. Monitoring would be undertaken for a period of 10 years after CAT plan has been fully implemented. Cost towards this should be kept in project estimates and could be taken as below:

Cost of one laboratory = ` 10.00 lakh

One hut at each site (@ ` 200,000/- lakh) = ` 8.00 lakh

Cost for hiring services of persons (@ two persons) (Average salary @ ` 15,000/- per person/month for 10 years) = ` 36 lakh

Consumables for the measurement ` 2.00 lakh per year for 10 years = 20.00 lakh

Total onetime cost = ` 74.00 lakh

2.7 COST ESTIMATE

The cost required for Catchment Area Treatment is ₹ **4681.57 lakh**. The details are given in **Tables 2.11**.

Table 2.11: Cost estimate for Catchment Area Treatment of Ratle H E Project

S. No.	Item	Rate (₹)	Unit	Target	
				Physical	Financial (₹ lakh)
	Biological Measures				
1.	Afforestation including maintenance	60,000	ha	4913	2947.80
2.	Enrichment Plantations	25,000	ha	191	47.75
3.	Pasture development	25,000	ha	571	142.75
4.	Nursery development	12,50,000	no.	3	37.50
5.	Maintenance of nursery for 4 years	2,50,000	no.	3	7.50
6.	Watch and ward for 5 years @ 20 persons	12,000	Man-month	1200	144.00

S. No.	Item	Rate (₹)	Unit	Target	
				Physical	Financial (₹ lakh)
	Engineering Measures				
7.	Contour Bunding	25,000	ha	1338	334.50
8.	Stone & Masonry Check Dams	60,000	no.	125	75.00
	Total*				**3736.80***
	Silt Observation Sites				**74.00**
	Total including Silt Observation sites				**3810.80**

**Year-wise phasing of this expenditure is given at Table 2.12*

Total cost for Biological, Engineering measures and Silt observation Sites = 3810.80 ₹ lakh

Micro-Planning Cost @ 5% = 190.54 ₹ lakh

Total ₹ 4001.34 lakh

Contingency Cost @ 5% = 200.07 ₹ lakh

Administrative expenditure @ 12% = 480.16 ₹ lakh

Total ₹ 4681.57 lakh

Total provision for the CAT PLAN = ₹ 4681.57 lakh

The year wise physical and financial targets are given in **Table-2.12** and **Figure 2.9.**

Table 2.12: Year-wise target (physical and financial) for Catchment Area Treatment Plan

Measures	Year I		Year II		Year III		Year IV		Year V		Total	
	Physical	Financial (₹ lakh)	Physical	Financial (₹ lakh)	Physical	Financial (₹ lakh)	Physical	Financial (₹ lakh)	Physical	Financial (₹ lakh)	Physical	Financial (₹ lakh)
Biological measures												
Afforestation (ha)	2243	1345.80	1747	1048.20	923	553.80	0	0	0	0	4913	2947.80
Enrichment Plantations (ha)	0	0.00	112	28.00	79	19.75	0	0	0	0	191	47.75
Pasture development (ha)	0	0.00	376	94.00	195	48.75	0	0	0	0	571	142.75
Nursery development (ha)	3	37.50	0	0	0	0	0	0	0	0	3	37.50
Maintenance of nursery	0	0.00	Lump sum	1.88	Lump sum	1.88	Lump sum	1.88	Lump sum	1.88	3	7.50
Watch and ward for 5 years @ 5 persons	240	28.80	240	28.80	240	28.80	240	28.80	240	28.80	1200	144.00
Engineering measures												
Contour Bunding (ha)	434	108.50	409	102.25	324	81.00	150	37.50	21	5.25	1338	334.50
Masonry Check Dams (no.)	50	30.00	25	15.00	20	12.00	15	9.00	15	9.00	125	75.00
TOTAL		**1550.60**		**1318.13**		**745.98**		**77.18**		**44.93**		**3736.80**

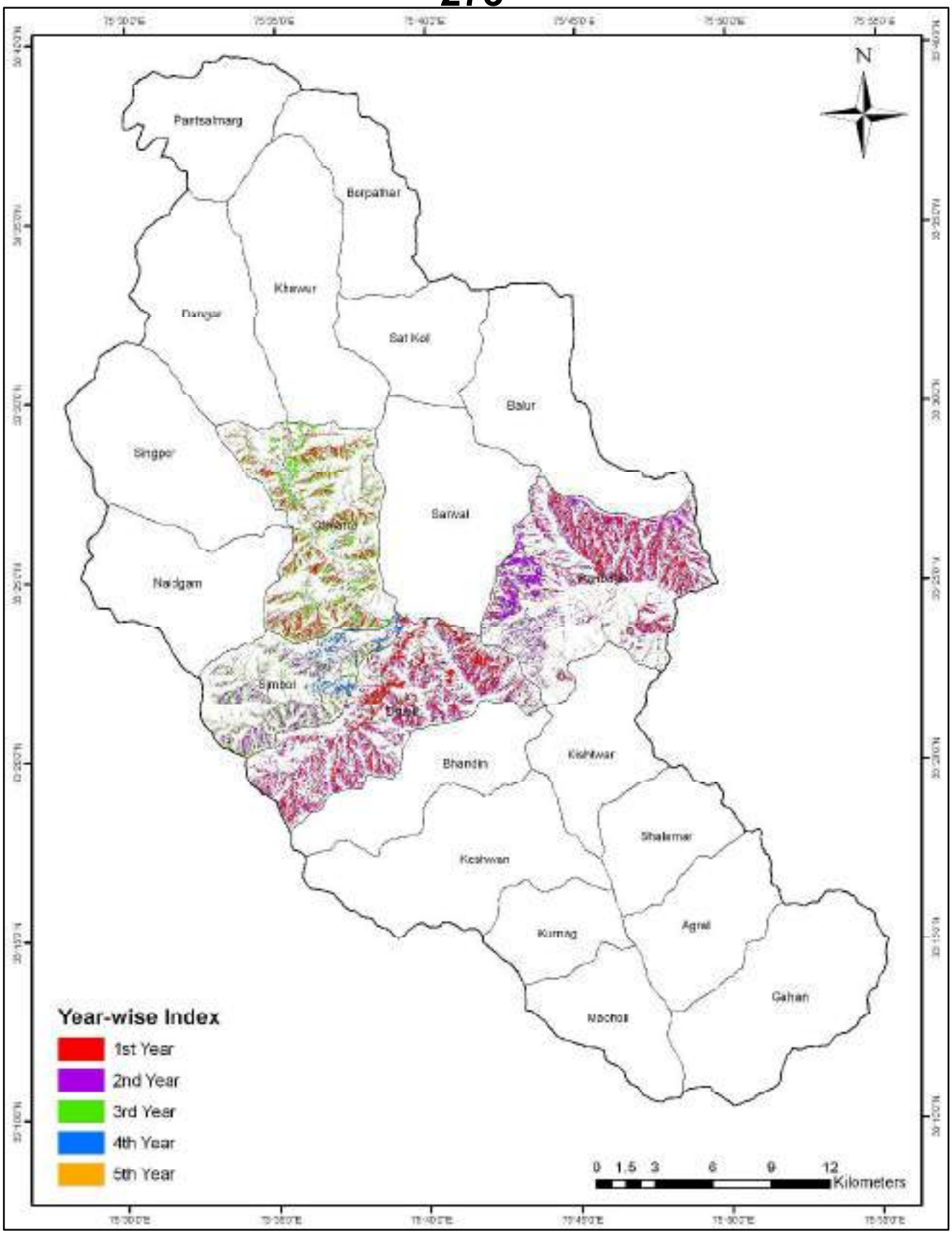


Figure 2.9: Area to be Treated along with the Year-wise Physical Targets for the Treatment Measures for the Free Draining Catchment Area of Proposed Ratle HE Project for Treatment

3 FISHERIES DEVELOPMENT PLAN

3.1 INTRODUCTION

Ratle HEP is a run-of-river scheme on River Chenab near Drabshalla village in Kishtwar District of J&K, wherein 133m high concrete gravity dam from deepest foundation level has been planned. The reservoir created by the dam will spread over an area of about 203 ha and extend for a length of about 13.35 km.

Though the economic value of existing fisheries is modest, there are concerns regarding the decrease in fish populations in this stretch of Chenab river. The development plan will have to take into account the impact of other operational hydropower projects on Chenab river and its fisheries which have already been affected by the presence of the other projects. For this inputs from the Department of Fisheries, Government of Jammu & Kashmir, have provided valuable information on Chenab fish and fisheries in general and on the experiences from artificial hatching and stocking of Mahseer in particular.

3.2 FISHERIES OF CHENAB RIVER

The main migratory fish species present in this reach of the river is the Mahseer. The Mahseer is a valuable food and game fish species and its numbers have been decreasing in the last few decades. The negative impacts of the Salal and Baglihar dam on the riverine fish populations have necessitated a focus on the integrated fishery development. In the preparation for the EMP, the different options for providing fish passage or stocking of the Ratle reservoir have therefore been assessed.

3.3 FISHERIES DEVELOPMENT ALTERNATIVES

Fish ladders (water channels constructed in steps with alternate rest chambers) have in several cases around the world been successful for fish species able to negotiate rapid flow of water. These entail high construction costs, but have little operational costs. The type of ladders that have been designed for mahseer and trout are virtually unheard of for dams of more than 30 m height, and the 133 m dam at Ratle makes this concept unrealistic, both practically and economically.

Regarding the feasibility for incorporating a fish lift in the dam structure there is very little international experience available regarding the feasibility and functioning of fish lifts as no successful schemes have been reported. In fish lifts the fish is trapped in a mechanical devise and "lifted" and released upstream the obstacle, which can enable the Mahseer pass even the Ratle dam. The construction cost and the operational costs are, however, high and there is no experience to indicate that this method will work in the

case of the Mahseer. The intake of the lift will have to be located just downstream the dam site. The design of the dam, biological uncertainty for its function in the case of the Mahseer, as well as the high costs (construction and operation cost all preclude the fish lift option.

It might be possible to capture fish in the river downstream of Ratle and mechanically transporting them up to be released in the Ratle reservoir. Such an operation is expensive and can only be justified if the released fish can reproduce efficiently in the tributaries in the reach between the planned Ratle dam and Baglihar reservoir. Further studies would be required to determine if fish transport would be of significant value, and if so how it can be designed to function on a sustainable basis.

A research programme for artificial breeding of Mahseer has been carried out at the Anji Fish Farm at Reasi in the vicinity of the Salal reservoir located further downstream of Baglihar dam. The stocking of Mahseer in the Salal reservoir has been successfully undertaken. It is envisaged that this action can help maintaining a local and partly self-sustained Mahseer population in the reach between the Ratle dam and Baglihar reservoir. A programme similar to the Salal breeding programme can also be implemented for the future Ratle reservoir also. This can be organised either as a joint breeding programme with Salal or by establishing a separate hatchery serving Ratle and Baglihar project areas. This approach could also be applied for Snow Trout also but the production potential of trout in the reservoirs and the tributaries reportedly has been good even without artificial stocking. Due to the height of the dam, it seems unrealistic to build functional fish ladders or fish lifts that can help the Mahseer to migrate past the Ratle dam. In addition, it is unlikely that fry and young fish that drift or actively migrate downstream will survive passing through the turbines or the overflow from the dam. The fish helped upstream will therefore not contribute to the population increase of Mahseer in the lower Chenab reaches. The biologically and economically best alternative to compensate for the obstructed migration possibilities of the Mahseer seems to be the option of artificial hatching and continuous restocking of the reservoir. It is therefore recommended to build a new hatchery in the Ratle Project area on the lines of Sala hatchery.

3.4 ARTIFICIAL BREEDING AND STOCKING

Construction of Hatchery

The positive experiences from the Anji hatchery at Salal can be used in the construction and operation of a hatchery serving for compensation of the negative impacts from Ratle HE project. The facility will require about 3-4 ha of land. It should have access to clean water and electricity, in addition to being suitably located in relation to transport and the Ratle and Baglihar reservoirs. The choice of site for a new hatchery would be made in consultation with Department of Fisheries.

The hatchery will consist of i) a house for egg and early fry, ii) water channels, iii) raising tanks, iv) laboratories and v) office buildings and staff housing. The premises are required to be equipped with vehicles for transport. Two boats with motors (one in each reservoir) are needed for fish releases, water sampling, fishing control, etc.

3.5 FISHERIES DEVELOPMENT

Fish Species

Establishment of a reservoir will provide an opportunity to increase or to establish new fisheries in the Chenab river. The stocking of the reservoir by fish from the planned hatchery might increase the potential for Mahseer fishing compared to the existing situation, and the conversion of the rapid river into a lake or slow flowing river reach will make fishing easier and more efficient. It is recommended to base the fish propagation in the reservoir on fish species indigenous to the Chenab river. Introduction of exotic species would not be done rather avoided.

Training and equipment

The new conditions give new fishing opportunities, which would require the use of new equipment and fishing methods. For proper execution of fisheries development plan the training of locals would be undertaken by Department of Fisheries with the help of project developer which would give guidance, plan the harvesting and provide adequate training for the fishermen already in operation in the Salal HE project area.

Monitoring and control

The staff from the Department of Fisheries, based at the hatchery, would be responsible for monitoring the development of the fish populations in the reservoir, monitoring of the general aquatic conditions and for setting quota or time limits for the fisheries in the reservoir and nalas. They should also be given control and policing authority to enforce the regulations established for the fisheries.

3.6 ENVIRONMENTAL FLOW

It is increasingly becoming a requirement for hydropower projects to supply an environmental flow or compensation flow, to support the water users, fish and the river ecosystem in reaches otherwise deprived of water. For the Ratle HE project the reach would be only 300 m from the dam site down to the tailrace discharge site as the powerhouse is located immediately downstream of the dam on the right bank of Chenab river. In addition as per requirement of MoEF, a provision of additional unit of 30MW has been made in the project which will be running 24x7 hours to maintain a minimum discharge of 33.43 cumec (27% of average lean season discharge) even during leanest months. In this case it no additional environmental flow release will be required. The dam already blocks the fish migration, and the additional fisheries value of the short reach is marginal.

3.7 COST OF THE FISHERIES DEVELOPMENT PLAN

The estimated cost for establishing of hatchery is given in **Table 3.1**. The specifications are based on the costing suggested by Department of Fisheries. The total cost of the project would be ₹ **488.50 lakh**.

3.8 IMPLEMENTATION PLAN

The first step in the implementation will be survey and investigations to make detailed assessment of aquatic microflora and fauna as well as fishes. The second step involves raising up of infrastructure followed by research activities regarding breeding potential of different fishes. In addition under extension programme unemployed youth in the area will be introduced to establish fish farming activities for income generation.

The Plan will be established over a period of about 5 years (**Table 3.2**). Sufficient land would be provided for the construction of hatcheries. The first phase shall be used for detailed planning and organisation and for land acquisition of land for the hatchery and the associated buildings and structures. The breeding and production fry will start after 3 or 4 years and the stocking of the reservoirs might commence on the 5th year. The fisheries development programme will start in parallel with the stocking of the reservoirs. After the completion of the construction and establishing phase the facility will be operating on a permanent basis.

The funds for implementation of the plan will be released periodically by the project authorities to the Fisheries Department. An Advisory Committee is proposed to be instituted which would monitor the implementation aspects, prioritize activities, etc. The committee would offer advice on development of marketing channels and training programmes, keeping in mind people's participation in fisheries development schemes. The committee would constitute the following members:

- Representative of State Fisheries Department
- Representative of Village Panchayat/s
- Manager (Environment), Ratle HE Project

Table 3.1: Cost of implementation of Fishery Development Plan

Sl. No.	Name of work	Amount (₹ lakh)
I.	**RAISING OF INFRASTRUCTURE**	
1	Development of land / approach road / fencing	30.00
2	Construction on of Mini-Hatchery House (Building, etc.)	35.00
3	Construction of Feed Mill (Building, etc.)	40.00
4	Construction of 4 pairs of American Type Raceway @ ` 7.0 lakh/raceway	28.00
5	Construction of 5 Nos of Schizothorax /Mahseer rearing ponds @ ` 5.50 lakh /pond.	27.50
6	Construction of 2 Nos of half dug /half raised carp rearing ponds @ ` 8.00 lakh/ pond	16.00
7	Construction of Feed store	7.00
8	Cost of feed mill-equipment	40.00
9	Augmentation of water supply / others	10.00
10	Installation of transformer / electrification / Misc	10.00
11	Cost of hatchery / farm equipments / others	20.00
12	Unforeseen cost	8.00
13	Work charged and contingencies	8.00
14	Landscaping / Misc	5.00
	TOTAL -I	**284.50**
II.	**DIRECTION & ADMINISTRATION**	
1	Salaries	35.00
2	Travel expenses / O.E / Contingencies	15.00
3	Project vehicle / others	12.00
	TOTAL -II	**62 .00**
III.	**SURVEY & INVESTIGATION**	
1	Survey with survey equipments	18.00
2	Hatchery equipment / farm equipment / other	17.00
3	Cost of feed / seed / brood stock for 5 years @ ` 5.0 lakh / year	25.00
	TOTAL -III	**60.00**
IV.	**RESEARCH**	
1	Cost of Laboratory equipments / chemicals /others	16.00
2	Cost of feed / seed / brood stock /	25.00
3	Stationary / O.E/ T.E	6.00
	TOTAL -IV	**47.00**
V.	**EXTENSION**	
1	Rehabilitation of fishermen of area	10.00
2	Training & education	10.00
3	Ponds in private sector / Others	15.00
	TOTAL -V	**35 .00**
GRAND TOTAL (I+II+III+IV+V)		**488.50**

Table 3.2: Monitoring Plan

Activity	Year of implementation				
	1	2	3	4	5
Detailed planning and land acquisition	—				
Construction works		—	—		
Breeding and fish production			—	—	—
Stocking reservoirs				—	—
Organisation of fishing activities					—

4 SOLID WASTE MANAGEMENT PLAN

4.1 INTRODUCTION

Solid Waste Management is one among the basic essential requirement for public health and aesthetic surroundings. Therefore, the removal of any scattered and littered waste is as important. This also brings to focus the necessity of synergy in the design, construction and maintenance of roads, surface (storm water) drains and storage, collection and transport of solid waste.

The construction of the proposed Ratle Hydroelectric Project will involve different categories of manpower like labour, technical, other officials and service providers. Most of these technical and non- technical workers will be temporary and will leave the region as soon as the construction phase of the project is over, which is estimated as 7 years. Some of the workers will be accompanied by their families. The total population of workers and their families has been estimated as 3000 during peak construction time. These people will be living in temporary and permanent colonie / settlements. The main sources of wastes in case of the proposed project can be divided into following categories:

- Municipal waste (includes commercial and residential wastes generated in either solid or semi-solid form excluding industrial hazardous wastes and bio-medical wastes)
- Construction and demolition debris (C&D waste)
- Bio-medical waste (waste generated by health-care and veterinary establishments)
- Hazardous waste (generated from construction machinery and equipment)
- e-Waste (computer parts, Printer cartilages, electronic parts, etc)

Solid waste generated from temporary and permanent colonies in construction as well as operation phase requires special management to dispose off as warranted under the Municipal Solid Wastes (Management and Handling) Rules 2000. For that an efficient waste management system will be required to put in place to keep the environment of the region clean and healthy.

These colonies and temporary settlements will also require adequate water supply for drinking and cleaning.

The project authorities will ensure sewage treatment from the colonies of labours and workers, water supply, cleaning of the colony area and solid waste disposal. Dwellings will be provided with septic tanks and soak pits along with water supply

for drinking and other daily needs for each and proper waste disposal by adopting various disposable methods.

4.2 INFLUX OF MIGRANT POPULATION

At the time of peak construction work in the project, maximum of 850 persons may be engaged, most of these will be from the local population. Around 200 nos. of the work force, which will include technical, non-technical and service class, will come from outside. In the first and seventh year 60% of the peak force will be required and in the second to sixth years 80% of the peak force will be required.

To calculate the human pressure during the peak construction of the project the following assumptions have been considered.

(i) family size is assumed as 5; and 80% of labours and technical staff are married
(ii) Out of total workforce, 80% will be such that both husband and wife will work
(iii) 50% of technical staff will come with their families and only husband will work
(iv) 2% of total migrating population are assumed as service providers, and
(v) 50% of service providers will have families.

Based on these assumptions the peak migrant population has been calculated as 3000 persons (**Table 4.1**). This population is expected to reside in the project area at any given time.

Table 4. 1: Calculation of Total Migrant Population (Peak time)

A.	**Migrant Population of Labourers**	
	Total labour force	**850**
	Married labourers (80% of 850)	680
	Single labourers (20% of 850)	170
	Husband and wife both working Labour (80% of 680)	544
	Number of families where both husband and wife work (544/2)	272
	Number of families where only husband work (20% of 680)	136
	Total number of labourers families (272 + 136)	408
	Total Migrant Population of Labourers (408 x 5 + 170)	**2210**
B.	**Migrant Population of Technical Staff**	
	Total technical staff	**200**
	Married technical staff	100
	Single technical staff	100
	Total migrant population of technical staff (100 x 5 + 100)	**600**
	Migrant Workforce (Labour plus Technical)	**2810**
C.	**Service Providers**	
	Total service providers (2% of total migrant workforce)	56
	Married service providers (56 % as assumed)	28
	Single service providers	28
	Total migrant population of service providers (28 x 5 + 28)	**168**
	Total Migrant Population	**2978 ≅ 3000**

In India average solid waste generated per capita per day is considered as 210 gms/ capita/day (Source: NEERI Strategy Paper on SWM in India, 1996). Therefore, for about 3000 persons an estimated amount of about 230 tons (0.210 kg x 3000 individuals x 365 days = 229950 kg) per annum of solid waste will be generated. This waste would not be allowed to be dumped near any surface water body or a stream.

4.3 MANAGEMENT OF SOLID WASTE

The project authority shall, within the territorial area of the project complex/ colony, be responsible for the implementation of the provision of Solid Wastes Management. Adequate facilities for collection, conveyance and disposal of solid waste will be developed. Any solid waste generated in the project complex/ project colony/ labour colony, shall be managed and handled appropriately. Various aspects of solid waste management include:

- Reuse/Recycling
- Storage/Segregation
- Collection and Transportation
- Disposal

A. Reuse/Recycling

Project proponent will explore opportunity to recycle the waste generated at the project site, in this context project will identify authorized vendors and send used batteries, used oil and used oil filters for recycling.

Bio-degradable waste will be disposed by composting and the manure generated will be provided to local community for cultivating vegetables and flowers.

B. Storage and Segregation

In the labour colony, provisions shall be made to separately store the degradable and non- degradable solid waste. Two different coloured bins will be supplied to each labour family, who will segregate the waste generated in their household. Green and Biodegradable waste is to be deposited in one container and non-biodegradable waste in another container. In case of canteens and community kitchens also, two different coloured dust bins will be used for separately storing the Biodegradable and non-biodegradable waste generated. A sustained awareness programme will be conducted to educate workers about the segregation of degradable and biodegradable wastes.

C. Collection and Transportation

The project authorities shall prohibit littering of solid wastes in the area under their control by resorting to following collection practices.

- Organizing house-to-house collection of solid waste on regular pre-informed timing by using tractor mounted trolley.
- Collected waste from residential areas shall be transferred to community bin by hand-driven containerized carts or other small vehicle
- Collection of wastes from office complexes and commercial areas
- Construction / demolition wastes or debris shall be separately collected and disposed off
- Wastes from vegetable and fruit shops and meat shops shall be separately collected

Solid waste collected shall be disposed off at a common storage point. Two trucks will be commissioned to collect the solid waste and dispose the same at sites designated for disposal of solid waste.

D. Disposal

The solid waste will be disposed off at the designated landfill sites. The landfill shall have impervious clay at the bottom most layers. The second layer shall be impervious liner (Geo membrane), third layer will be of sand, after that well compacted solid waste is to be put over the sand, then again a layer of clay, finally a layer of soil. Vegetation shall be grown on the topmost layers. It will give a good aesthetic view of landfill**.**

Degradable component

The bio degradable portion of the solid waste would be disposed of by composting. The degradable portion is expected to be about 40% i.e. about 250 Kg/day of degradable portion of solid waste will be generated. Composting process takes around 45 - 60 days to mature.

A pit of 2m x 1m x 1m deep (0.3m free board) size can take 0.7 m^3 (around 1000 Kg) of compostable waste. Therefore, 15 pits would be needed to store the biodegradable waste with 60 days retention time, however, a provision of 20 pits should be kept. The total area required would be almost two times the pit area as some area in between pits will be required for transportation and stacking of waste. Hence, total area required will be 80 m^2. The pits will be covered with GI sheets. Additional 60 m^2 would be kept for storage for compost plus screening and other activities.

The pits to be constructed will have around 25 cm of bottom lining consisting of about 5 cm thick stone grit over which 15 cm thick coarse sand followed by 15 cm thick earth lining will be done. There fuse along with animal dung will have to be laid in layers of 5 to 10 cm thickness. The pit will be then watered on alternate days.

There after waste is laid in 5 to 10 cm thick layers twice in a week till the whole pits filled up. Every week the waste will need to be turned up and water will have to be sprinkled every day to keep adequate moisture. The process will take around 45 to 60 days where after the composted waste from the pits taken out and after drying it is screened with screens having 2 mm dia holes. The screened compost would be filled in plastic bags and used as good manure especially for cultivation of vegetables and flowers.

Non-Degradable component

The non-degradable portion (about 139 tons /annum) such as plastic bottles, cans, etc. shall be segregated and disposed off at separate sites identified by the district administration. The details of land fill site are given as below:

Waste Generation:	139 tons per annum
Design Life:	7 years (construction phase)
Total Waste Generation in 7 Years:	973 tons
2 Pits of Size (LxWxD):	15m x 12m x 3m

A provision of additional 25% of the total area, for accommodating infrastructure facilities will be included while working out requirement of space. The liner system will comprise of the following layers below the waste:

- 0.30m thick drainage layer comprising of coarse sand or gravel
- 0.2m thick protective layer of sandy silt
- 1.50mm thick HDPE geo-membrane
- 1m thick clay layer/amended soil layer, comprising of local soil

F. Bio-medical Wastes

Biomedical waste is generated during the diagnosis, treatment or immunization of human beings. It may include waste like scrap, anatomical waste, culture media, discarded medicines, chemical waste, syringes, swabs, bandages, body fluids, human excreta, etc. This waste is highly infectious and can be serious threat to human health if not managed in a scientific and discriminate manner. In Ratle H.E. Project, source of biomedical waste will be first aid posts and other medical establishments in the area (CHC and PHC). As the quantity of biomedical waste generated is not expected to be very significant requiring separate incineration, it is proposed to have a tie up with district hospital in Kishtwar to treat/ dispose biomedical waste generated from project activities in their facility.

4.4 FINANCIAL REQUIREMENT

The total budget in order to manage the solid waste generated from this population, provisions for community toilets for labours and nearby villagers as well as septic tanks and soak pits, has been proposed to ₹ **170.00 lakh** (**Table 4.2**).

Table 4.2: Cost Estimate for Solid Waste Management Plan

S. No.	Item	Cost (₹ lakh)
1	Cost of land*	
2	Digging of pits, Reclamation and stabilization of landfill, composting sites, etc	50.00
3	Two covered trucks for conveyance of solid waste to landfill site @ ` 12 lakh per truck	24.00
4	Manpower cost for 8 persons @ ` 1.25 lakh per annum for 7 years	70.00
5	3 tractors with trolleys @ ` 4.00 lakh per tractor with trolley	12.00
6	Awareness programme/ Periodical Training	9.00
7	Tools & Implements	5.00
Total Cost (₹ lakh)		**170.00**

* Cost of land is taken in DPR

5 PUBLIC HEALTH DELIVERY SYSTEM

5.1 EXISTING MEDICAL FACILITIES

Medical services at secondary level play a vital and complimentary role to the tertiary and primary health care systems and together form a comprehensive district based health care system.

The district hospital serve as a referral centre for complicated cases, while the primary health centers and dispensaries provide health needs primarily to the inhabitants of rural areas. There is only one primary health sub-center at Darabshala and one primary health centre at Thatri village in the area. The district hospital and community health centre is located about 30 km from the dam site in Kishtwar. Most of the villages are not covered by the primary health facilities.

Objective of PHDS

- To improve efficiency in the allocation and use of health resources in the project area
- To improve the performance of the health care system in the project area through improvements in the quality, effectiveness and coverage of health services at the first referral level and selective coverage at the primary level, so as to improve the health status of the people, especially the local, by reducing mortality, morbidity and disability.

5.2 THREATS TO PUBLIC HEALTH

Project construction and operation will bring about several changes in the socio-economic environment of the area including increased threats to the health of the community. Possible threats to public health are briefly discussed below along with the management measures.

New Diseases due to Migratory Population

During the project construction period there will be further increase in the population of this region, particularly around the project area. The peak labour force during the construction period will be around 3000. These migrant workers and their family members may be the potential carriers of new diseases hitherto unknown/unreported from the project area. Diseases like AIDS, VDs, gastroenteritis, etc are some of the potential risks to human inhabitants of this area. The present available health services in the area would be insufficient to cater to such a vast influx of outside population in this area. Therefore, it would be obvious for the

project authorities and their contractors to have all the labourers including their family members registered, quarantined, and vaccinated against common diseases like malaria, TB, etc. The project authorities will hold screening camps for the labourers, where rapid blood tests will be conducted for diseases like AIDS, TB, etc and health card will be issued. Only after valid certification a labour or his family members will be registered with the contractor. The project authorities would ensure that the contractors follow this strict quarantine procedure and this clause would be included in the award of the contract/works. Adequate medical facilities will be provided by the project authorities for this purpose in addition to strengthening the existing medical facilities in the area.

5.3 MEDICAL FACILITIES

A population near about 3,000 is likely to congregate during the construction phase. It is recommended that the following medical facility should be provided by the developer to ensure safe and healthy operations during the entire construction phase. This also helps in minimizing dependence of labour population on the existing medical facility.

- One fully equipped ambulance needs to be procured to provide pre-hospital care to accident victims. The ambulance should always be stationed near major construction sites or the sites where risky operations are taking place such as blasting. Typically the ambulance should have equipments such as Fornoflex Chair/COT, Ventilator, Vacuum Splint Kit (Adult), Scoops Stretcher, Oxygen Cylinder with accessories, Resuscitation Bag (Adult), Suction Pump, Spine Board, siren/beacon, Emergency Light with public address system, Wireless equipments, additional battery, First Aid bag, BP instrument, stethoscope, etc and with trained manpower.
- Two first-aid posts need to be established at village Drabshalla - one near dam site and one near colony area - to take care of basic medical needs of the workers at major construction site.
- The first aid posts will have essential medicines including ORS packets, dressing materials, stretcher, wheel chair, etc. The first aid post can be housed in temporarily erected structure and should be managed by one Health Assistant and assisted by one dresser/first aid attendant. A visiting doctor can attend First Aid post regularly every day at a fixed time.
- As the existing medical facilities in the area are not adequate, budget provisions have been made for strengthening existing PHCs in the Thatri village.
- One Health Centre shall be opened in the Project Colony. The facilities thereof can be availed by local people.

5.4 HEALTH EXTENSION ACTIVITIES

The health extension activities will have to be carried out in the villages situated within the study area. It is important to inculcate hygienic sanitary habits especially with respect to water pollution by domestic wastes.

A medico needs to be engaged to make regular visits to these villages and organize health promotional activities with the active participation of the local village leaders, NGOs and available local health functionaries. The health functionaries would undertake the following tasks as a part of health promotional activities:

- Organize awareness programs and medical camps to make people aware about the common diseases in the region. This should include poster campaign, awareness camps, medical camps for health check-ups and vaccination/ treatment, etc.
- Special medical service in winter season for villages of the study area
- Collect water samples to ascertain the potability of water from different sources so as to monitor regular disinfection of drinking water sources.
- Maintain close surveillance on incidence of communicable diseases in villages.
- Maintain close liaison with the community leaders and health functionaries of different departments, so that they can be mobilized in case of an emergency.
- Close interaction to be maintained with health department functionaries of the state government.
- In case of verifiable health problem arising due to blasting activities of the project, necessary health care facilities shall be provided.

5.5 COST ESTIMATES

Budgetary estimates for public health delivery system have been worked out as ₹ **150.00 lakh**, as per the break up given at **Table 5.1**.

Table 5.1: Budgetary estimates for developing health care facilities

Sl. No.	Particulars	Amount (₹ lakh)
A.	Ambulance : 2 no. with all the basic Medicare facilities and small DG set, etc. to cater for villages in the project area	30
B.	Two first aid posts including sheds, furniture and basic equipment (dam and colony area)	15
C.	Budget for strengthening existing medical facilities	45
D.	Budget for Health Awareness/ Vaccination Camps	15
E.	Budget for combating communicable diseases	12
F.	Budget for combating vector borne diseases	12

G.	Maintenance of ambulance and recurring contingent expenditure @ ` 3 lakh/ year for 7 years	21
Total (₹ lakh)		**150**

6 ENERGY CONSERVATION MEASURES

6.1 INTRODUCTION

The proposed Ratle H.E. Project on Chenab River would require construction of various project components and infrastructural facilities like residential colonies for its staff, offices; contractor's and labour colonies in addition to various access roads and other structures.

During construction phase of the project, migration of labour, road development, etc. will be carried out. It is the general tendency that the migrant labourers will use forest wood for the fuel purpose, creating biotic pressure on the nearby forest.

To mitigate such impacts, feasible measures will be adopted to help minimize biotic pressure on forest.

6.2 ENERGY CONSERVATION MEASURES

In reviewed villages most of the families have LPG for cooking purpose; therefore there is not much pressure on the nearby forests for wood. It is estimated that migrant population during peak construction period will be around 3,000 persons in the project area. The existing facilities will become insufficient for supply of kitchen fuel for the migrant population during the construction of the project. They will require fuel for cooking and various other purposes and in the absence of adequate fuel availability they will resort to tree cutting for use of fuel wood. The project authorities would make adequate arrangements for supply of kitchen fuel. The details of the provision for kitchen fuel are provided in the following sections.

Provisions for Kitchen Fuel

In the villages of the project area the main source of energy is fuel wood and LPG. Tree species like *Dalbergia sissoo, Ficus palmate, Pinus roxburghii, Alnus nitida, Juglans regia, Olea cuspidate* and *Quercus baloot* are commonly preferred as fuel in the area.

The demand for kitchen fuel will increase due to the population coming from outside for the construction and other related work of the project. Project authority should provide kitchen fuel and make arrangement for community kitchen, canteen and efficient cooking facilities, as briefly discussed below.

1. Community kitchen: The project developer would make sufficient arrangement for the establishment of at least one community kitchen. This will be established

near the project labour colony. The kitchen should provide food to the labour. The facility should maintain proper hygiene while preparing and supplying food, with adequate arrangement for waste collection and disposal.

2. Kitchen fuel: During the construction period of the project, there would be around 3,000 people involved in the project work. Many families may prefer cooking on their own instead of using community kitchen. In the absence of fuel for cooking, they would resort to tree cutting and using wood as fuel. To avoid such a situation, the project authority should make LPG and/ or kerosene available to these migrant workers. The supply of LPG and kerosene can be ensured on regular basis. A local depot can be established through LPG/ kerosene suppliers for supply of the same.

3. Efficient cooking facilities: Project authority should also take measures for reducing the fuel consumption. The authority should provide pressure cookers and solar cookers to the families of migrant workers as well to local villagers. Accordingly, budget has been allocated for the supply of cookers. This facility will also increase the work efficiency of migrant workers and they will also get proper daily diet.

4. Space Heating: During the construction period of the project, there would be requirement of space heating (using LPG) for the persons involved in project work. The supply of LPG can be assured on regular basis. A local depot can be established through LPG/kerosene suppliers for the supply of the same.

6.3 COST ESTIMATES

A total grant of ₹ **30.00 lakh** has been assigned towards the provision of kitchen fuel, and other facilities including establishment of community kitchen or canteens for the migrant workers (**Table 6.1**).

Table 6.1 : Financial Provision for Energy Conservation Measures

Sl. No.	Particulars	Amount (₹ lakh)
1	LPG and Kerosene Depot Construction	6.00
2	For supply of Gas and Cylinders	13.00
3	For supply of Kerosene	3.00
4	Distribution of Pressure Cookers and Solar Cookers	2.00
5	Community Kitchen (1 Nos.)	3.00
6	Canteen (1 No.)	3.00
	Total (₹ lakh)	**30.00**

7 MUCK DISPOSAL PLAN

7.1 INTRODUCTION

Ratle HEP is a run-of-river scheme on River Chenab near Drabshala village in Kishtwar District of J&K, being developed by GVK Ratle Hydro Electric Project Pvt. Ltd. (GVKRHEPPL). The proposed layout of the project and design of civil engineering structures have been so carried out as to utilize the hydro power potential optimally.

Apart from the land for facilitating and construction of project components, land is also required for dumping of the muck which will be generated during construction of the project. A significant quantity of muck is expected to be generated as a result of excavation activities at Dam site, tunneling, underground Power House & other appurtenant works and other developmental activities etc. Muck generated from excavation of any project component needs to be disposed off in a planned manner so that it occupies least possible space and is disposed off an a environment friendly manner by creating terracing, planting trees etc. The dumping sites need to be rehabilitated in the environmentally sound and scientific manner. In the case of Ratle HEP it will be endeavored to use excavated muck in construction as much as possible and only remaining muck is to be disposed off in identified/approved dumping areas. The muck disposal sites will be rehabilitated as soon as these are full completely so as to minimize the impact on environment and visual aesthetics of the area.

7.2 MUCK GENERATION & ITS USE IN THE PROJECT

Total quantity of muck generated from surface as well as underground excavations is estimated as 24.4 lakh cum. The possibility of using excavated rock material for producing coarse and fine aggregates for use in civil works was examined. Six samples were collected from four drifts of dam site – 2 on right bank and 2 on left bank and tested. Based on test results, the excavated material was found suitable to use as coarse as well as fine aggregate in concrete. Further, suitability of rock material from the excavated muck of Pressure Shaft and Power House will continue to be tested on continuous basis during execution of the project and depending upon test results, its usage in production of aggregate and sand will be maximized Besides, concrete production, the muck would be utilized for coffer dams, upstream guide bunds and embankments at diversion site, roads (filling material), retaining walls, other protection works etc.

About 50% of the total muck generated 12.2 lac m^3 will be used for the construction/ protection works and the balance muck generated from all the components will be 12.2

lac m^3 and with 63% swelling factor, the total quantity of muck to be disposed off will be about 20 lac m^3.

The total muck generated and to be disposed off are given in **Table 7.1.**

Table 7.1: Muck to be generated from various project activities

S. No.	Item of Work	Excavation Quantity (Cum)	Qty. of muck to be utilized (50%) (Cum)	Qty. of muck unutilized (Cum) (Col.3-Col.4)	Total Qty. of Muck to be disposed assuming 63% swelling factor(Cum) (1.63x Col.5)
1	**2**	**3**	**4**	**5**	**6**
1	Concrete Dam and Plunge Pool	1130545	565273	565273	921394
2	River Diversion Works	344452	172226	172226	280728
3	Intake	89500	44750	44750	72943
4	Pressure Shaft and Adits	54590	27295	27295	44491
5	Power House and Transformer Cavern	268874	134437	134437	219132
6	D/S Surge Tank	124061	62031	62031	101110
7	TRT	205950	102975	102975	167849
8	P.H Access Tunnels & Adits	50869	25435	25435	41458
9	Pothead Yard	171000	85500	85500	139365
	Total	**24,39,841**	**12,19,921**	**12,19,921**	**19,88,471**

7.3 DUMPING SITES

For selection of probable dumping sites, several traverses of the entire project area and the near vicinity were taken. Area at higher elevation in the u/s side of the Dam (i.e. in the Reservoir area) was also investigated. The populated and vegetated areas were not considered suitable as the dump trucks would have required traversing through the populated areas. The available dumping sites were selected after detailed examination of environmental, economic and social aspects.

7.3.1 Alternatives Studied

The following alternate sites were investigated to examine the possibility of dumping of muck.

a) Alternate-1

A possible site approximately 4.0 km downstream of the proposed dam was examined (see Figure 7.1). Both the banks of river Chenab were inspected. The site is downstream of village Thathri.

Figure 7.1: A site on the left bank of river 4 km d/s of proposed dam site

Figure 7.2: Dumping site on the right bank of river 4 km d/s of proposed dam site

As can be seen in the photograph (Figure 7.1), the left bank has very steep slopes and thus will accommodate very less quantity of muck. The right bank has got many trees at

the lower level where as the higher level has steep slopes and has also got many trees (Figure 7.2). In addition, a road will be required to be constructed all along the right bank and this road will also require a bridge to cross over the river opposite village Thathri. There are also small streams and rivulets traversing the area. Further, on the right bank the muck will have to be transported through populated village of Thathri. The demerits of this Alternative-1 site are summarised below:

De-merits:

1. Steep slopes and therefore will accommodate less muck than the earlier recommended area.
2. Visibly more trees and plants compared to the earlier recommended area.
3. There are small streams and rivulets traversing through the area which is not recommended by MoEF
4. If the dumping site is selected on the right bank, a new road and a bridge would be required to be constructed. Besides, the dump trucks will be required to traverse through Thathri village.

b) Alternate-2

This site is approximately 10 km downstream of the proposed dam site on the right bank of river Chenab (Figures 7.3 & 7.4). As can be seen in the photo below, there is a RBM terrace at the lower level while the level above HFL has steep to moderate slopes. The area has moderate vegetation cover. The area is dissected by many streams and rivulets. Besides the bridge, the road which will be required to be constructed to utilise this site will traverse through populated areas. The area which can be utilised for dumping lies in the flood zone and therefore huge protection works shall be required.

Figure 7.3: Dumping Site on the right bank of river 10 km d/s of proposed dam site

Figure 7.4: Another view of dumping site on the right bank of river 10 km d/s of proposed dam site

The demerits of this Alternative site are summarized below:

De-merits:

i. Area available above HFL is more forested than the area recommended area earlier.
ii. Long road will be required to be constructed which might involve more forest land than the recommended land. In addition, a bridge will also be required.
iii. There are small streams and rivulets traversing through the area which is not recommended by MoEF
iv. The area is in the flood zone and therefore would require huge protection works.

c) Alternate-3

This site is approximately 15 km downstream of the proposed dam site (Figure 7.5).

Figure 7.5: Alternate dumping site-3 on the right bank of river 15 km d/s of proposed dam site

Figure 7.6: Alternate dumping site-3 view of the land at higher elevation

The area above HFL has moderate slopes. The area at higher elevation has villages, streams, rivulets and systematic plantation as can be seen in Figures 7.5 & 7.6. The road which will be required to be constructed to utilise this site will be passing through populated and forested areas.

De-merits:

i. The area has systematic plantation.

ii. Long road will be required to be constructed which might involve more forest land than that in the earlier recommended areas.

iii. There are small streams and rivulets traversing through the area which is not recommended by MoEF, Government of India.

iv. The area is populated.

Finally following three sites were identified for use as dumping sites **(See Figures 7.7 - 7.8)**.

Zone -I: on the right bank of river Chenab u/s of village Thathri and d/s of the proposed Dam in an approximate length of 1350 m.

Zone-II: on the left of river Chenab d/s of the proposed Dam and at a lower level then the existing NH-1B in a length of 1400 m.

Zone-III: on the right bank of Kuligad nalla above NH-1B in a length of 450 m.

The following points were considered and followed as guideline for finalization of the above 3 zones to be used as dumping sites:

i) The dumping sites were selected as close as possible to the project area to avoid long distance transport of muck.

ii) Standard distance between each dumping site and river bed is maintained as per MoEF guidelines.

iii) The sites were free from active landslides or creep and care were taken that the sites should not have a possibility of toe erosion and slope instability.

iv) The dumping sites are either at higher level than the flood level or are away from the river course so that the possibility of muck falling into the river is avoided.

v) There is no active channel or stream flowing through the dumping sites.

vi) The sites were far away from human settlement areas.

The muck is proposed to be disposed at designated sites, where a capacity of 23.8 lakh m^3 is available. Most of the excavated material is proposed to be dumped at three suitable locations identified specifically for this purpose. These proposed locations are spread over land area of 30.58 ha comprising forest land, state land as well as private land. The capacity of each muck dumping site is given in **Table 7.2.**

Table 7.2: Details of muck dumping sites

Description	Area (ha)	Capacity (Lakh cum)
Zone –I (Right Bank of river Chenab)	14.81	12.8
Zone –II (Left bank of river Chenab)	11.95	7.6
Zone –III (Right Bank of Kuligad Nala)	3,82	3.4
Total	**30.58**	**23.8**

The Designated Dumping areas were jointly inspected by the Forest officials, JKSPDC Officials and Project officials. The number of Trees, Poles and Saplings were enumerated in each dumping site (Zone-I)and are given in **Table 7.3**.

Table 7.3: Details of trees, poles & saplings in the dumping area

S. No.	Project Component	Number				
		Conifer trees	Broad Leaved trees	Broad Leaved poles	Broad Leaved Saplings	TOTAL
1	Dumping Site (Zone-1)	46	128	303	395	872

As is evident from the above, the total number of trees, poles and saplings in Zone-I is 872 out of which only174 numbers are trees while the rest of them are either poles or saplings.

Figure 7.7: Zone-I: Right bank of river Chenab

Figure 7.8: Zone-II: left bank of river Chenab

7.4 METHODOLOGY OF DUMPING REHABILTATION OF DUMPING SITES

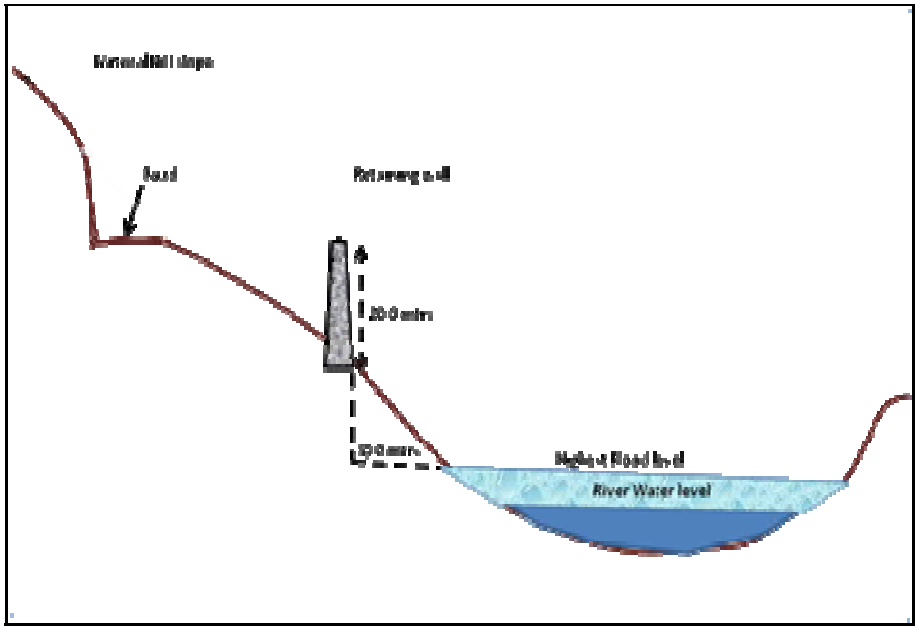
The generated muck will be carried in dumper trucks covered with heavy duly tarpaulin properly tied to the vehicle in tune with international practice. All precautionary measures will be followed during the dumping of muck. All dumpers will be well maintained to avoid any chances of loose soil being fallen during the transportation. All routes will be wetted prior to the movement of dump trucks. Dumping would be avoided during the high speed wind, so that suspended particulate matters (SPM) level could be maintained. Further, the dumping will be avoided during heavy traffic. After the dumping the surface of dumps will be wetted with the help of sprinklers and compacted.

The Rehabilitation plan of muck dumping sites includes engineering and biological measures. Most of the total unused excavated muck would be placed at an angle of repose to avoid any slippage of the muck at the proposed dumping sites. Besides, required quantity would be stacked along the roads, which would be utilised either in widening of the road or in newly constructed roads. In the former case slopes would be broken up by creating benches across the slope. This will be done to provide stability to the slopes and also to provide ample space for planting of trees which would further help in holding and consolidating the material stacked at different sites. As stated earlier, efforts will be made to disposed off the muck within short distances from sites of its generation.

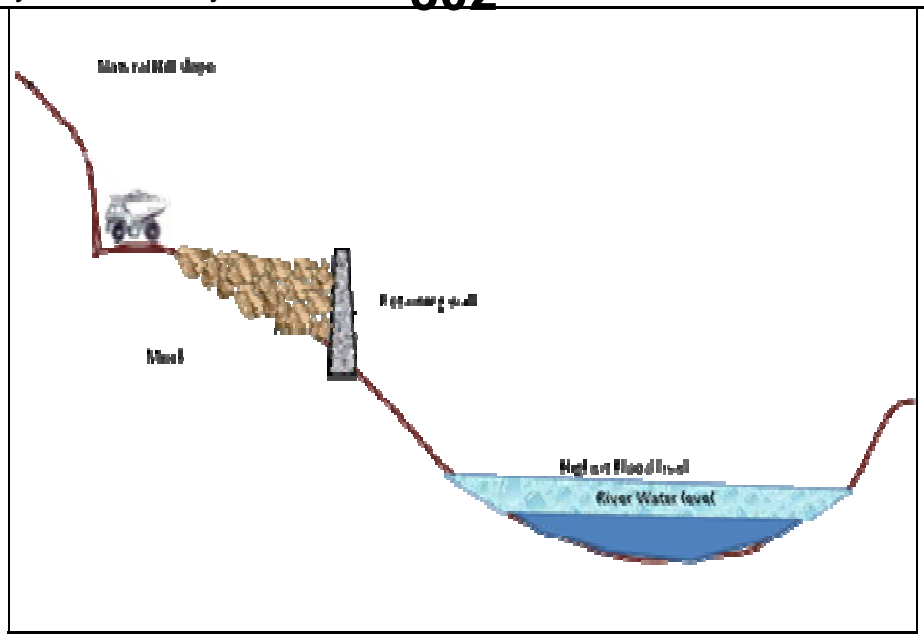
The capacity/volume of the muck dumping sites is more than the volume of the muck to be disposed. It may appear that the area requirement is in excess but the same is

required for temporary storage of usable muck, traffic movement of dumpers and lifters. The spoil from various construction sites would be disposed off at designated sites in a controlled and orderly manner. All measures would be adopted to ensure that the dumping of muck does not cause injury or inconvenience to the people or the property around the area. The general topography of the disposal area is mild sloped. The spillage of muck into the river at any site would be prevented by making concrete retaining walls to retain the muck pile. It shall be ensured that dumping is carried out at a minimum distance of 30 m away from the active river bank. The top surface would be leveled and graded after the capacity of any dumping site is exhausted. The top surface will be covered with soil and grass seeding will be ensured to promote vegetation cover (**See Figure 7.9**).

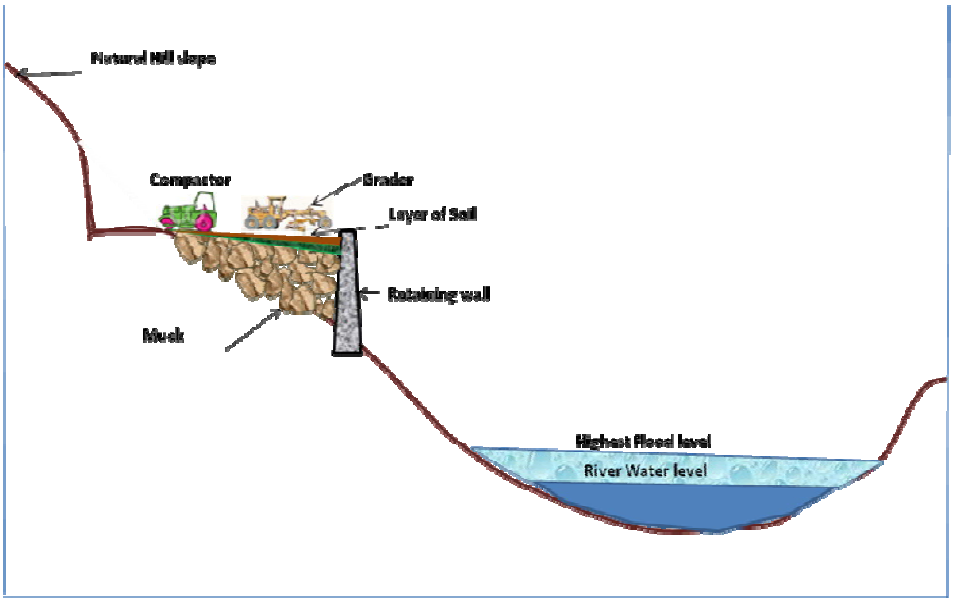
The following measures shall be adopted:



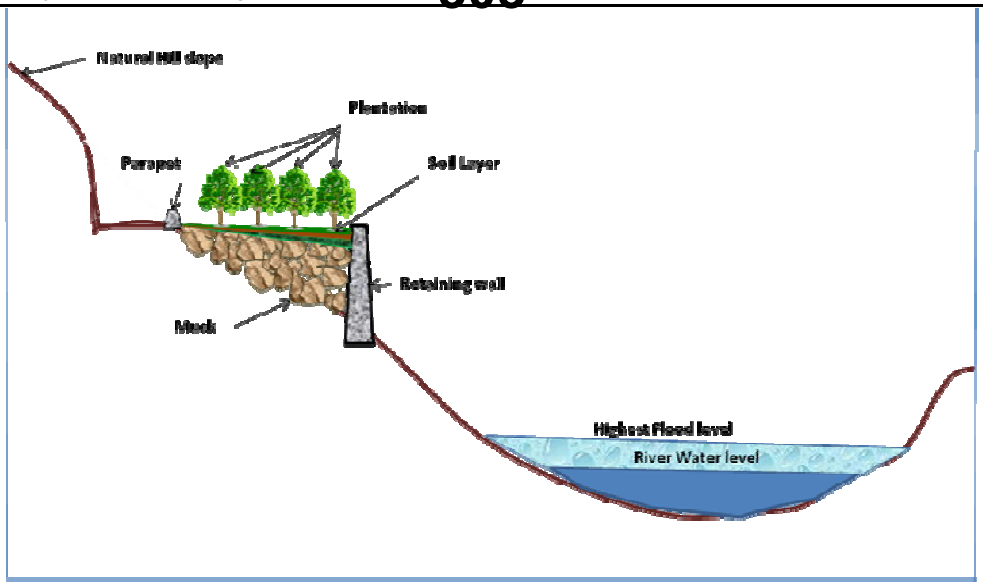
Stage-1: Construction of Retaining wall



Stage-2: Dumping of muck in layers



Stage-3: Layer of soil & Compaction



Stage-4: Plantation

Figure 7.9: Methodology of Dumping

A) ENGINEERING MEASURES

i) Retaining Walls

Total area for the dumping of muck is 30.58 ha which can accommodate about 23.8 lakh cum of muck whereas only 20 lakh cum muck is required to be disposed. The total length of retaining wall proposed to be constructed along the river would be about 3200 meter. The height of these retaining walls including MSE wall panels will be approximately 20m. The angle of repose would be 35^0 to 40^0. These retaining walls are proposed to be located at about 30.0m distance from the highest flood level. A typical sketch of the retaining wall is given in Figure 7.16. Total financial outlay for the retaining walls is ` 5725.00 lakhs, given in Table 7.4.

Table 7.4: Cost estimates for different measures at the dumping sites

S. No	Particular	Volume (cum)	Rate in ₹ per cum	Cost in Lakhs
1	Earth work excavation for foundation	6250	400.00	25.00
2	Cement concrete for retaining wall	6240	8000.00	500.00
3	MSE Wall Panel with Ribbed	18000	20000.00	3600.00

	Steel Strips			
4	Approach Road to Muck Dumping Site	4 km	400.00 Lakh /km	1600.00
	Total			**5725.00**

ii) Compaction

Compaction is an engineering measure, which would reduce bulk density of the muck thereby optimising the use of muck disposal area and would make it suitable for the plantation and other biological measures. Top surface would be levelled and graded to make the alternative use. The muck will be spread in layers of 500-700mm thick layers. Top surface would be levelled and graded to make the alternative use. On top a layer of soil would be spread to make the land suitable for plantation. The total cost for the process of compaction is ₹ **1000.00 lakhs**

iii) Fencing

Fencing is a bio-engineering measure. After rehabilitation of muck the dumping areas need protection for some time from disturbing by human and domestic animals. For this reason fencing over the muck deposits is required. Barbed wire strands with two diagonal strands, clamped to wooden/ concrete posts placed at 3 m distance are proposed around the dumping piles. Project authorities will establish temporary wind barriers around 3 sides of dumps in close of settlement area. Total budget for the fencing would be ₹**100.00 lakhs**.

B) BIOLOGICAL MEASURES

Top surfaces and slopes of all dumping areas would be left with a total area of about 20 ha. These areas will be treated for the purpose of plantation. Vegetation cover controls the hydrological and mechanical effects on soils and slopes. Therefore, biological measures to stabilize the loose slope are essential. In order to implement the biological measures in dumping areas the following activities would be taken into account. The biological measures include the following:

i) Soil treatment

Muck dumped at various sites is not considered to be nutrient rich as it is excavated from tunnels and other structures. In order to make it suitable for the plantation it will be provided bio treatment. The work plan will be formulated for re-vegetation of the dumping sites through Integrated Biotechnological Approach.

ii) Plantation

The selected species will be planted after their nurseries have been developed. The dumping areas are very small therefore; separate nursery would not be

required. The nurseries developed for the implementation of CAT plan can be used for the rehabilitation of dumping areas. Nearly 1-2 years old saplings would be used for the plantation. The plantation can be carried out in lines across the slopes. Grass and herb species would be used in the inter space of tree species. They will help in providing the continuous chain of support in retaining debris, reinforcing soil and increasing the infiltration capacity of the area.

After the process of compaction total area of about 20 ha will be available for the plantation. About 50,000 plant saplings will be planted at different dumping sites. Total budget for the biological measures would be ₹ **675.00 lakhs**. Detailed financial outlay for the biological measures is given in **Table 7.5**.

Table 7.5: Total financial outlay for the biological measures at dumping sites

S. No	Particulars	Quantity	Rate (in `)	Amount (in Lakhs)
1	Rolling of Muck	Lump sum		100.00
2	Pitting (size: 0.45 m x 0.45 m x 0.45 m)	50,000 pits	100.00/pit	50.00
3	Raising of plants (including nursery cost, manure, transport etc.)	50,000 plants	50.00/plant	25.00
4	Maintenance, watering, transport, etc	Lump sum		500.00
	Total			**675.00**

In Ratle HEP a very scientific approach and methodology was followed for identification of the dumping sites. All possible alternate sites were inspected and examined before rejecting or selecting any site. All the three finalised sites are:

i) With minimum possible forest cover: The area is mostly barren and rocky and covered with predominantly bushes. The total number of trees, poles and saplings is 872 out of which only 174 are trees while the rest all are poles and saplings.
ii) The populated /settlement areas are far away from the identified dump zones and therefore will be least impact on human life.
iii) Away from the river (30 m away from the HFL as per guidelines): The dumping sites are either at higher level than the flood level or are 30 m away from the river course to provide protection from high flood.
iv) The identified muck sites close to the project area to avoid hazards related to transport of muck to long distances.

v) With Retaining structures in the entire dumping area: Retaining wall have been suitably designed and proposed to be constructed all along the river bank which will prevent muck from falling into the river.

vi) With appropriate Restoration & Rehabilitation plan: all the three identified sites are proposed to be restored and re-habilitated in a very scientific manner and once completed will not only present an aesthetic view but will help the environment since the area which is rock and barren will be converted into forest cover because of the proposed plantation.

7.5 MONITORING & COMPLIANCES

i. Muck shall be dumped from bottom in layers of 500-700mm depending on size of boulders.

ii. Each layer shall be rolled compacted.

iii. A layer of soil shall be spread on top of it to make it suitable for plantation.

iv. Water testing facilities shall be set up for checking quality parameter of water.

v. Soil samples shall be regularly collected and tested for checking the level of contamination.

vi. Prescribed norms and approvals will be sought from PCB wherever necessary.

vii. All norms of Forest department, PCB and MoEF and their acts related to muck disposal shall be complied with.

viii. Design consultant shall be engaged for designing of retaining structures.

ix. Plantation shall be done on the reclaimed land and native variety of plants and trees shall be planted.

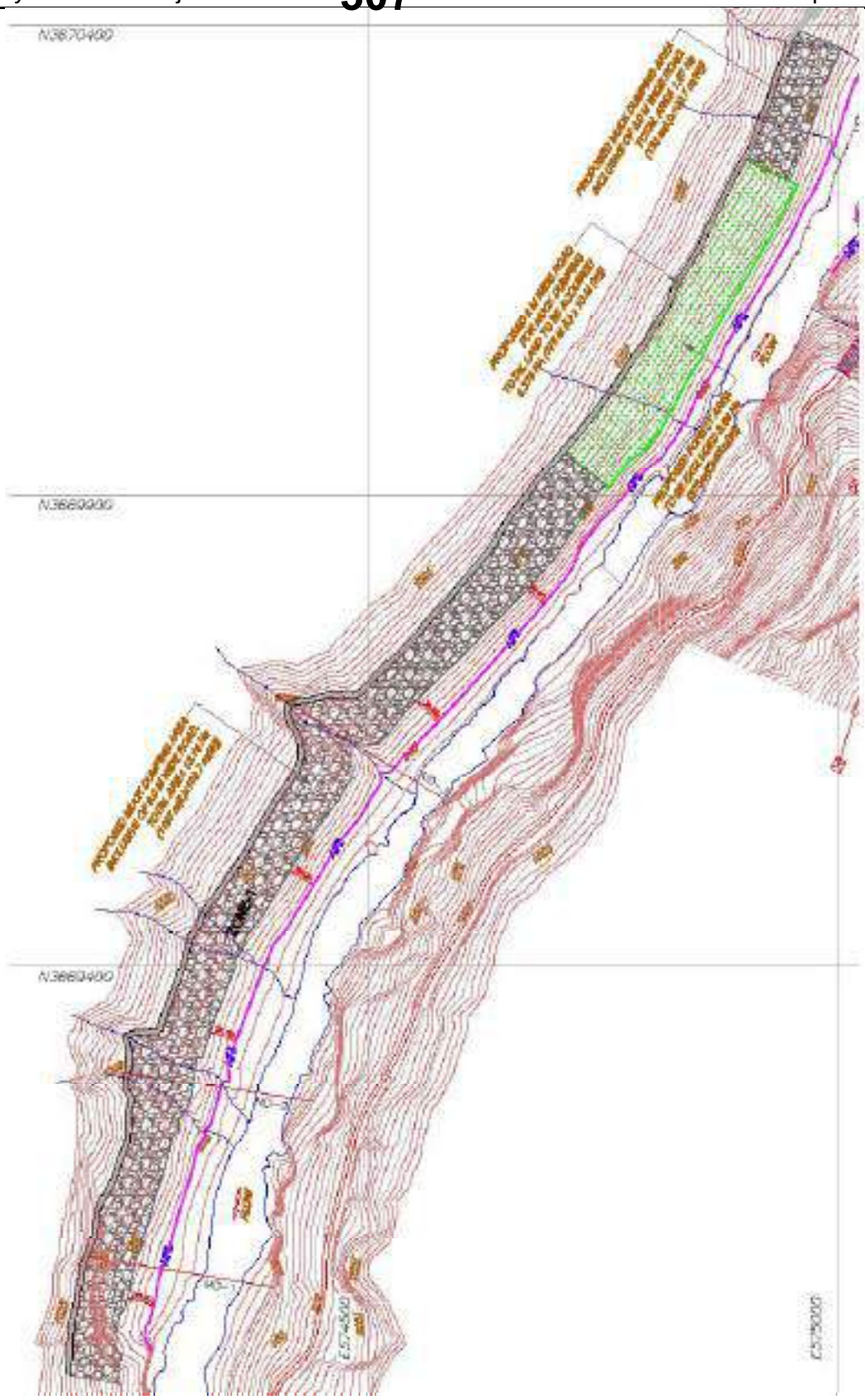


Figure 7.10: Muck Disposal Area (Zone– I) (Right Bank of River Chenab)

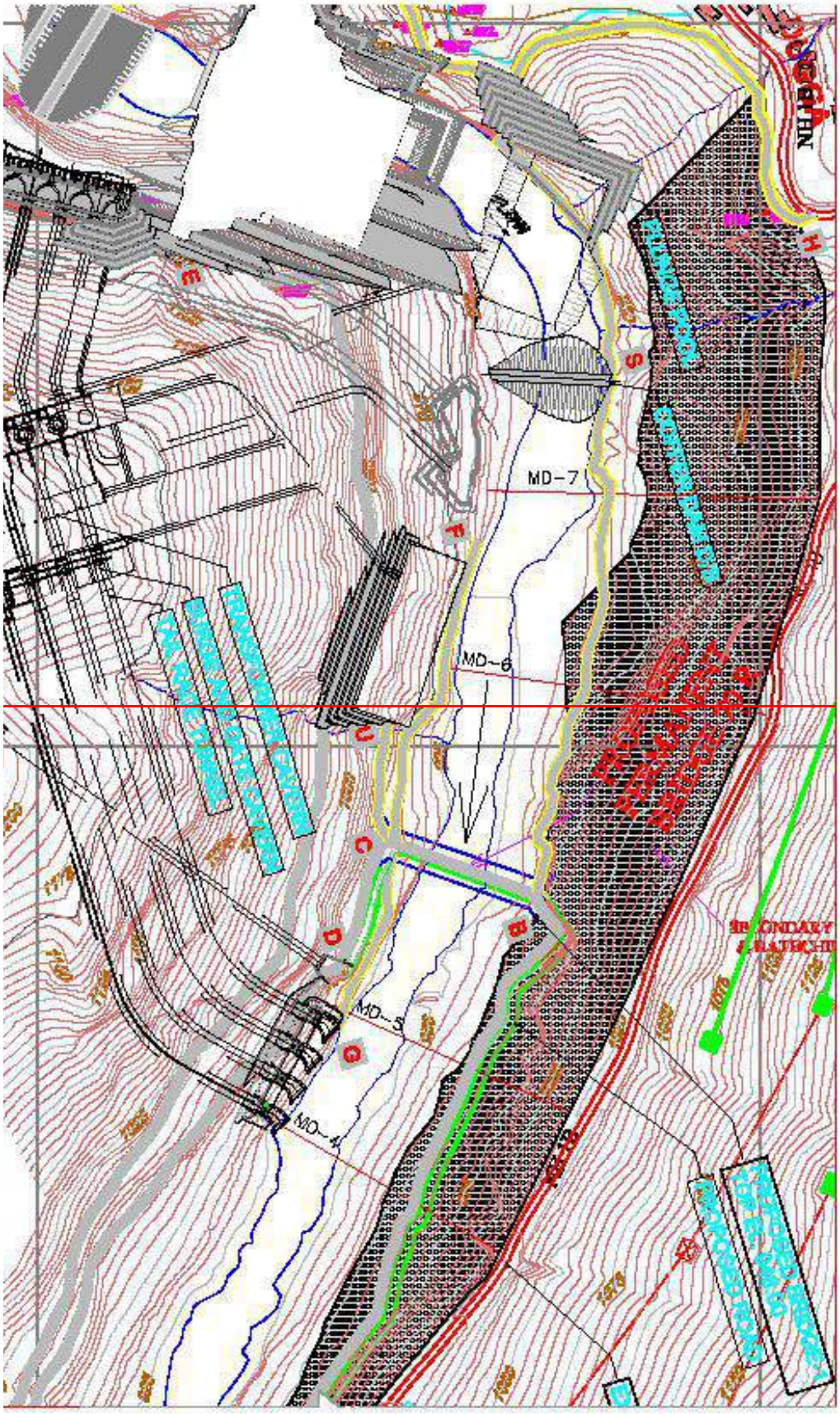


Figure 7.11: Muck Disposal Area (Zone– II) (Left Bank of River Chenab)

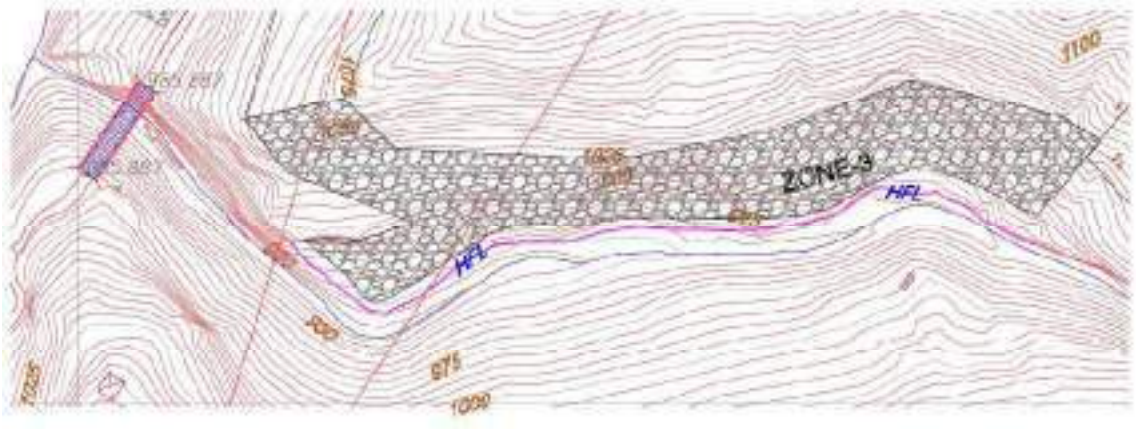


Figure 7.12: Muck Disposal Area (Right Bank of Kuligad Nalla)

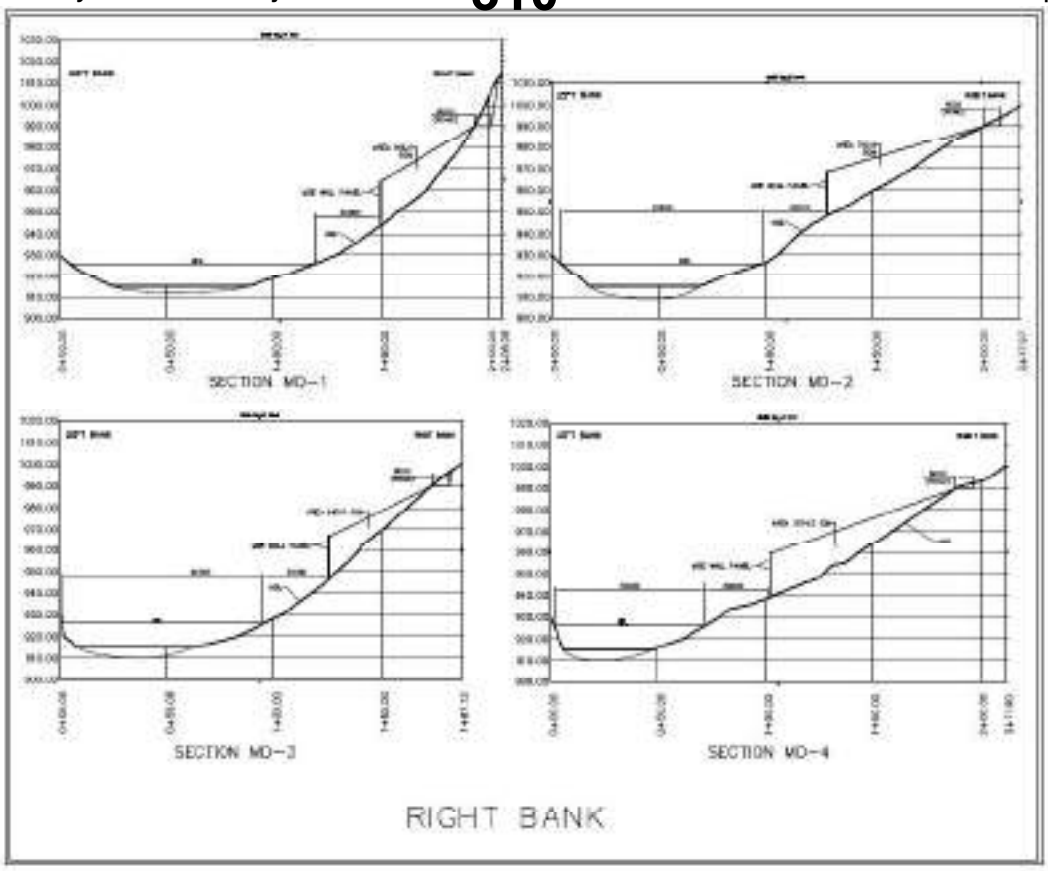


Figure 7.13: Cross Sections of Muck Disposal Area – Zone –I (Right Bank)

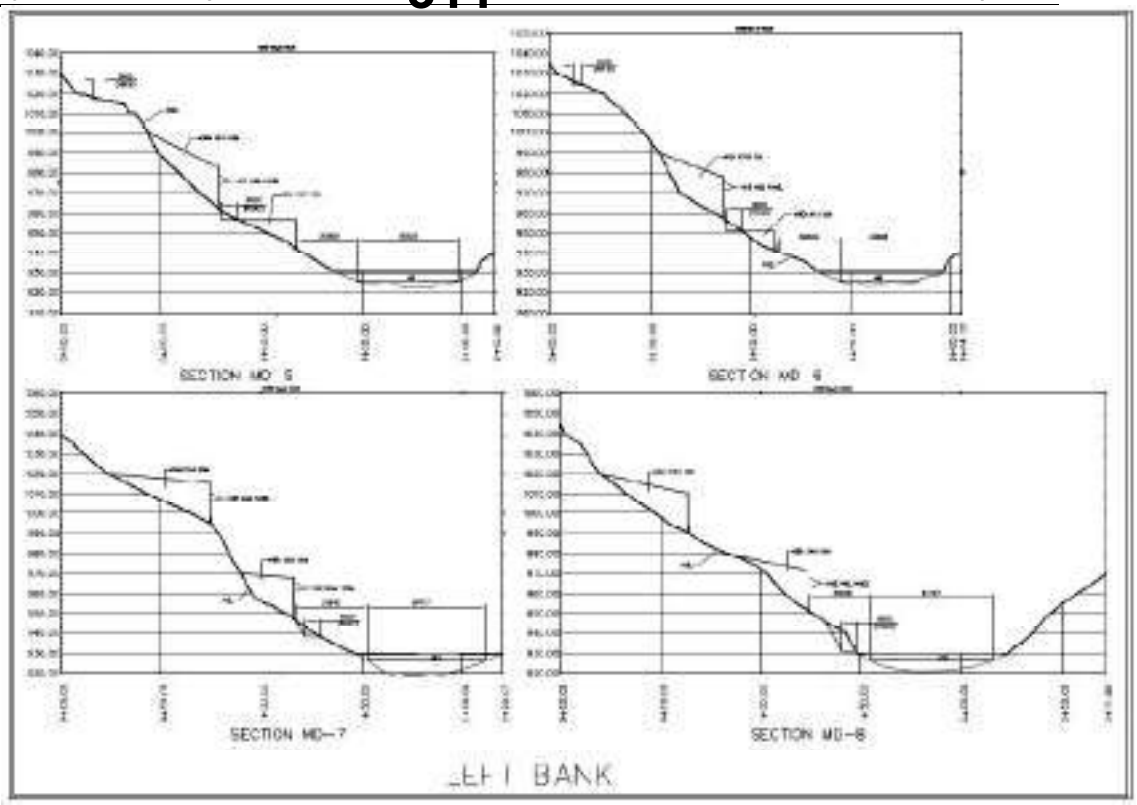


Figure 7.14: Cross Sections of Muck Disposal Area – Zone –II (Left Bank)

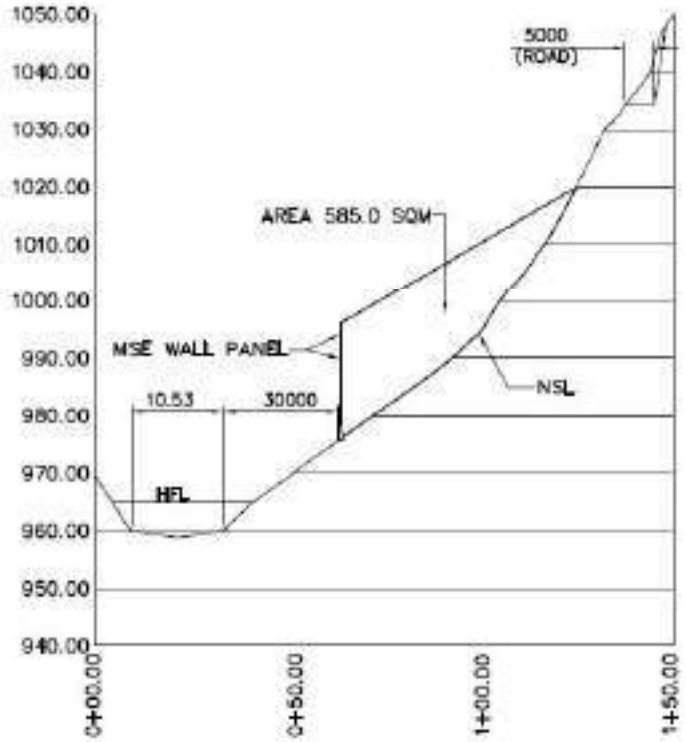


Figure 7.15: Cross Sections of Muck Disposal Area – Zone –III (Right Bank of Kuligad Nalla)

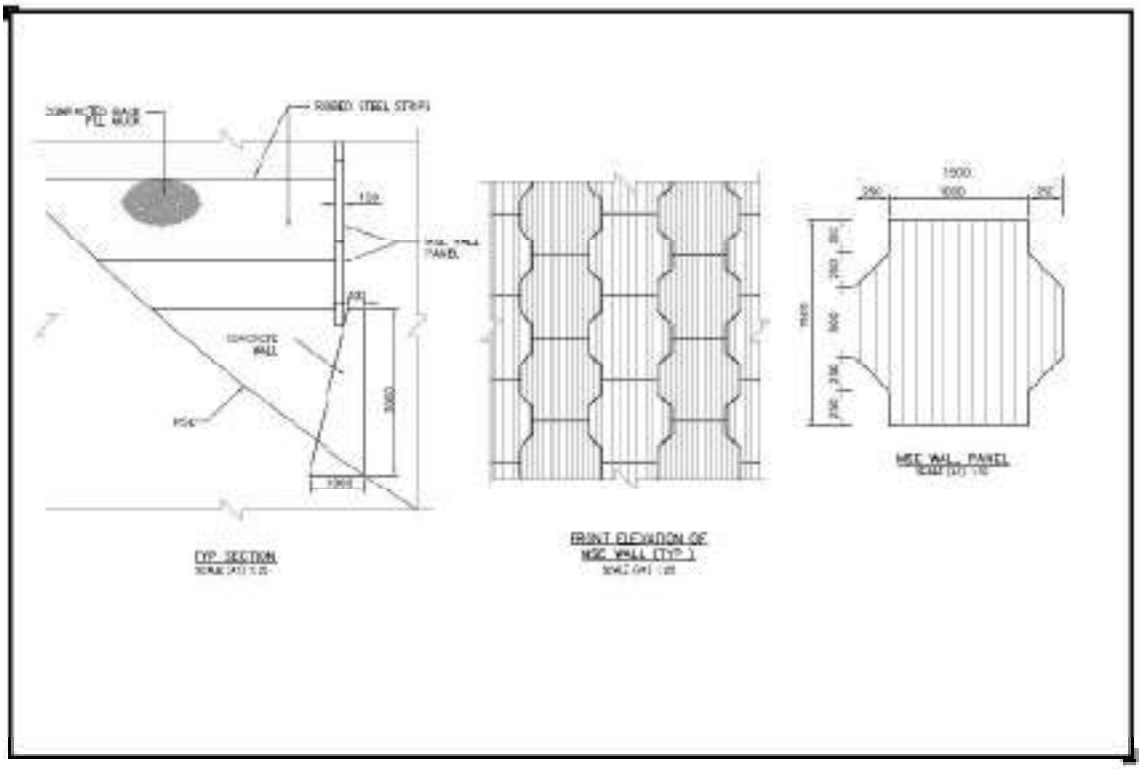


Figure 7.16: Typical Section of Retaining wall with MSE Wall Panel

7.6 FINANCIAL REQUIREMENT

The total estimated cost of the muck disposal & rejuvenation of muck disposal sites would be ` 7500.00 lakhs and is given in **Table 7.6**.

Table 7.6: Financial requirements for implementation of Muck Disposal Plan

S. No.	Item	Amount (₹ in lakh)
1.	Engineering Measures	5725.00
2.	Compaction	1000.00
3	Fencing	100.00
4	Biological Measures	675.00
	Total	**7500.00**

8 LANDSCAPING & RESTORATION PLAN

8.1 INTRODUCTION

The proposed Ratle H.E. Project on River Chenab would require construction of various project components and infrastructural facilities like residential colonies for its staff, offices; contractor's and labour colonies in addition to various access roads and other structures.

During construction phase of the project, number of temporary construction sites and working areas will come up. In addition to this mining for construction material will also be carried out. To restore these areas to its original landscape as much as possible and retain its aesthetic values following restoration measures have been suggested. In addition avenue plantations around the colonies and working sites will be carried out.

8.2 LANDSCAPING AND RESTORATION OF CONSTRUCTION AREAS

The proposed Ratle H. E. Project would involve construction of dam, intake, pressure shaft, Tail race tunnel (TRT), Power house, Adits, residential and staff colonies, roads, etc. These activities will result either in the modification or destruction of the existing landscape of the area. It is therefore imperative that after the project work and related activities are over restoration work should be carried out in these disturb areas to bring them back to their similar or near-similar pre-construction conditions and land use. Different project related activities will require acquisition of government as well as private land. The acquired land will also be used for dumping of muck and other garbage from the colony area. In addition to the habitat disturbance, project related activities will also result in the accumulation of large amounts of dumps at various construction sites, which needs to be either relocated or as an alternative can be utilized for landscaping. However, restoration success will largely depend on the topography of the area, the type of constructional activities and their detrimental effects on the terrain and the natural habitats.

There will be indirect disturbance to the area due to increase in human population and traffic movement. It will be essential for the project authority to restore the area back to its original state.

Disturbed Sites & their Restoration

Construction activities like roads, muck dumping sites, quarry sites, colonies, workshops, offices, etc. which will change the existing land use/ land cover in the region. After completion of the construction work, it is required to restore the disturbed area to its original condition. Various engineering and biological measures have been suggested for the restoration of Ratle H.E. Project affected areas. Proposed mitigation measures will also help to arrest soil erosion in the region. Restoration of quarry sites, roads and colony area is discussed and a detailed plan is given for the landscaping of the region.

i. **Proposed Access Roads and Infra-Structure:** Considering these broad aspects of existing access and infrastructure, the detailed planning for the approach roads, bridges, housing, offices, stores, construction plants and common facilities like canteen, etc. have been done (Table 8.1).

Table 8.1: Details of project roads planned to access various project components

S. No.	Description	Road length (km)
Direct Access Roads from NH-1B		
1	Road from NH 1B to left abutment of dam	0.465
2	Road from NH 1B to Bridge I	0.720
3	Road from NH 1B to Bridge II	1.465
Access Roads from Bridge-I		
4	Road from Bridge I to d/s coffer dam	0.380
5	Road from d/s coffer dam to river bed at dam location	0.200
6	Road from Bridge I to diversion tunnel outlets	0.230
7	Road from Bridge I to tailrace tunnel outlets	0.140
8	Road from Bridge I to Main Access Tunnel (MAT) to power house	0.100
9	Road from MAT to top of dam on right bank	1.430
10	Road from Bridge-I to Pothead Yard	0.075
11	Road to muck dumping sites	1.800
Access Roads from Bridge-II		
12	Road from Bridge II to u/s coffer dam	0.460
13	Road from Bridge II to tunnel intakes	1.020

14	Road from Bridge II –Tunnel Intake Road to diversion tunnel inlet portals	0.165
15	Road from Bridge II –Tunnel Intake Road to diversion tunnel gates operation platform	0.095
	Total road length	8.745

Table 8.2: Proposed Bridges in the Project Area

Description	Type	Deck Level (m a.s.l.)	Span (m), approx.
Bridge - 1	Permanent	948	110
Bridge - 2	Temporary	952	85

Other infrastructure include construction of colonies and camp sites, construction plants viz. crushing plant, batching and mixing plant and penstock fabrication yard.

II. Restoration and Landscaping of Construction sites:

Setting up of infrastructure for construction including colonies for labor will lead to clearing of vegetation and forests. Forest land at these sites will be cleared for the movement of heavy equipments required for different project related activities which would lead to the fragmentation and destruction of the habitats at these sites. Following measures will be applied for the rehabilitation and landscaping of the construction sites:

(i) Herbaceous plants and tree seedlings, grown in nurseries or in greenhouses, will be sown in alternating rows. The growth of trees, shrubs and herbaceous species will provide adequate erosion control, add vegetation variety for aesthetic values and provide the habitat for wildlife.

(ii) The choice of tree species for plantation will depend upon the topography of the area required to be regenerated after the constructional activities. In general, *Pinus roxburghii, Albizia stiplulata, A. lebbek, Robinia, pseudo-acacia, Bauhinia racemosa, Grewia elastica, Ficus palmata, Melia azedarach, Celtis australis, Dalbergia sissoo, Ailanthus excelsa* will be planted.

(iii) The plants which fix nitrogen like *Dalbergia sissoo, Albizia stiplulata* (leguminous) will help in increasing nitrogen levels of soil, sufficient to maintain growth of non-nitrogen fixing species. *Albizia stiplulata* will help in reclamation of derelict and infertile lands.

Following measures would be adopted for the rehabilitation and landscaping of colony areas and construction sites.

(i) Proper roads and lanes would be provided inside the colony area. The open area will be covered with vegetation. Ornamental plants and trees will be planted in rows along the roads and lanes.

(ii) Retaining walls will be built to avoid landslides and slips. Proper channels would be provided inside the colony to drain out the rain/ domestic water.

(iii) Parks and play grounds for children would be developed in colony area, near villages and in schools of project area.

(iv) After the project activity is over construction sites and other temporary settlements would be splattered with the top soil (separated out before construction). These leftover can support the growth of mosses and lichens which will act as ecological pioneers and would initiate the process of succession and colonization. This will provide necessary cushion and support for the growth of seeds of other plants to germinate.

8.3 LANDSCAPING & RESTORATION OF QUARRY SITES

The requirement of construction material for a 133 m high concrete dam, two nos. of diversion tunnels of dia. 11m, four nos. of Intake, four nos. Pressure shafts of dia. 6.6 m, underground Power house, Transformer hall & surge cavern, four nos. of tailrace tunnels and related other structures are estimated as 28 lakh m^3. Out of which coarse aggregate is 17 lakh m^3, fine aggregate is 8.5 lakh m^3, rock fill material is 2 lakh m^3 and impervious soil material is 0.5 lakh m^3.

For fine and coarse aggregate requirement of 25.5 lakh m^3, six rock quarries have been identified and explored as per details given in **Table 8.2**. All the rock quarries that are investigated for suitable construction material are located within 7.0 km from dam axis.

To meet the requirement of 0.5 lakh m^3 of impervious material, three borrow areas have been identified within 1 Km of the dam and for about 2.0 lakh cum of rockfill material required for the construction of cofferdams the excavated material from dam abutment excavation shall be sufficient.

Table 8.3: Details of the rock quarry sites proposed in the Ratle H.E. Project

	Location	Area (m^2)	Quantity (lakh m^3)
1	U/s of Dam site near Phagumorh	5365	0.50
2	Excavated material from dam & PH site	50000	5.00

3	U/s exposed rock material inside submergence area	3000	1.20
4	Rock quarry at L/S of Kalnai nala	30000	15.00
5	Rock quarry near crusher plant at R/S of Kalnai nala	136413	34.00
6	Rock quarry of Kulinad Nala	450000	20.00
	Total	674778	75.70

Opening of rock quarry will cause visual impact because of removal of a significant part of the hill face. Other impacts that are likely to be generated are: the noise generated during aggregate acquisition through explosive and crushing (which could affect wildlife in the area), dust produced during the crushing operation to get the aggregates to the appropriate size and transport of the aggregates, and transport of materials to the nearby rivers. The quarrying for rock material in the proposed project would lead to removal of vegetation cover, top soil and leave the area barren. After the completion of mining activity, these areas will be restored to their normal habitat conditions.

Standard mitigation measures against erosion and sedimentation, noise and air pollution will be taken, in particular for the use of explosive. At the end of the exploitation, quarries will be rehabilitated. This will include re-establishment of vegetation, restoration of natural watercourses, avoidance of flooding of the excavated areas, achievement of stable slopes, and avoidance of features, which would otherwise constitute a risk to health and safety or a source of environmental pollution.

The measures adopted for landscaping of the quarry site have been described below:

i) Measures to be adopted before quarrying

The top 6" - 12" of soil will be removed before starting the quarrying activity or any other surface disturbance. This top soil will be kept separate and stock piled so that it can be reused after quarrying is over for rehabilitation of sites.

ii) Measures to be adopted after quarrying

- **Diversion of run off**

  Effective drainage system will be provided to avoid the infiltration of run-off and surface waters into the ground of quarry sites.

- **Filling of depressions**

  Removal of rocks from quarry site for different construction works will result in the formation of depression and/or craters. These will be filled by the dumping materials consisting of boulders, rock, gravel and soil from nearby plant/working sites.

- **Construction of retaining walls**

Retaining walls will be constructed at the filled up depressions of quarry site to provide necessary support particularly where there are moderately steep slopes.

- **Rocks for landscaping**

  After the quarrying activity is over, the site will be splattered with the leftovers of rocks and boulders. These boulders and rocks can support the growth of mosses and lichens, which will act as ecological pioneers and initiate the process of succession and colonization. The boulders of moderate size will be used to line the boundary of a path.

- **Laying of the top soil**

  The depressions/craters filled up with rock aggregates will be covered with top soil. Fungal spores naturally present in top soil will aid plant growth and natural plant succession. The top soil will be further enriched by organic manure.

- **Re-vegetation**

  The work plan formulated for re-vegetation of the quarry site through 'Intensive Reclamation Programme' would be implemented by providing vegetation cover at the disturbed areas by planting shrubs and trees. Initial cover will be provided through shrubs and after 2-3 years of shrub growth trees also will planted.

  Shrub layer will comprise of the following:
  Justicia adhatoda, Buddleja asiatica, Desmodium elegans, Desmodium triflorum, Indigofera heterantha, Rosa macrophylla, Dodonaea viscose and *Daphne oleioides.*

  Trees layer will comprise of:
  Melia azedarach, Celtis australis, Dalbergia sissoo, Salix spp*., Cedrela toona, Morus alba,* etc.

8.4 BIOLOGICAL MEASURES

Green belt development will comprise plantations at various places alongside roads, around the periphery of reservoir rim, and at different project offices and colonies.

Roadside Plantation

In Ratle H. E. Project area construction of 8.75 km of new roads is proposed (see Table 8.1). It is proposed to carry out roadside plantation along these roads. The cost of the plantation has been calculated as per the existing labour charges, material cost (plants, FYM, tree guards, etc.) and the total area of plantation. The spacing for trees is proposed 3 m while 2 m for shrubs. The pit size has been recommended as 45 cm x 45

cm x 5 cm for trees and 30 cm x 30 cm x 30 cm for shrubs. Plantation along roads must take into account visibility aspects on curves so as to ensure safe driving.

Green Belt Development along the Reservoir Rim

As the slopes on both sides of proposed reservoir are very steep and covered with dense forests there is very little scope of developing a green belt around the reservoir rim. Only at places where it is required the slopes will be planted with suitable tree species. In such areas with moderately steep slopes indigenous, economically important, soil binding tree species will be planted, which are able to thrive well under high humidity and flood conditions.

i. Water loving species like *Syzygium cuminii, Salix tetrasperma, Robinia pseudo-acacia,* and *Ailanthus excelsa* will be planted in the vicinity of reservoir rim.

ii. It is also proposed to plant fruit bearing species and such species which are best studied for bird-nesting.

iii. At higher slopes away from the reservoir species like *Pinus roxburghii, Albizia stiplulata, A. lebbek, Robinia, pseudo-acacia, Bauhinia racemosa, Grewia elastica, Ficus palmata, Melia azedarach, Celtis australis, Dalbergia sissoo, Ailanthus excelsa* will be planted.

iv. The farthermost layer of the green belt will comprise of hardy tree species and shrubby mix to withstand any external influences/ pressures of grazing, browsing by cattle and sheep, etc. In this layer the species like *Celtis australis, Dalbergia sissoo, Salix* spp*., Cedrela toona* and *Morus alba* will be planted in the inner as well as outer rows.

Green belt at dam and Power house site

Plantation at the dam site and power house has been proposed for control of erosion/ siltation of the reservoir and aesthetic importance. The plants of recreational value, horticultural importance shall be planted within the complex. Developing a lawn and flower garden surrounded by this green belt may serve the purpose of beautification of the dam site area.

Green belt around crusher plants

For mitigating the impact of dust and noise, which will rise from the crusher plant, plantation must be done around the crusher plant area. Green belt comprising of fast growing species will created about 400 m distance surrounding the crusher working area has to be planted. The shrubs like *Carisa spinarum, Dodonaea viscosa, Woodfordia*

spp., *Flacourtia indica, Adhatoda vasica, Colebrookia oppositifolia, Zizyphus jojoba* will planted.

Green Belt around Colony area and Office Complex

Plantation around the project colony and office complexes is proposed to be done, so that, greenery is developed. Precaution should be exercised by not planting large size trees around buildings and other similar structures as during winter the sun rays are obstructed by them invariably and much wanted sunshine is impaired. Besides this, it is also proposed to develop green belt around the working areas for trapping the dust and noise. Plantation of avenue, ornamental and fruit trees are proposed in these areas along with the area around office complex. The ornamental, fruit plants will be procured from the horticulture department and local market while the avenue plants will be raised in the project nursery. For protection of trees from cattle iron tree guards shall be required.

8.5 PLAN IMPLEMENTATION

The landscaping and restoration plan will be implemented with help of landscaping experts and in consultation with Jammu & Kashmir state Horticulture Department as well as Kishtwar Forest Division and the coordination and funding will be provided by the project proponent.

8.6 COST ESTIMATES

The estimated cost for the restoration works and landscape designing would be ₹ **73.00 lakh** and details of the same are given in **Table 8.3**

Table 8.4: Cost estimates for landscaping and restoration works

Sl. No.	Item of Work	Unit	Quantity	Rate (₹)/unit	Amount (₹)
Engineering Measures					
A	**Pre-construction measures**				
	Removal of top soil including transportation and stock piling	ha	68	10000	680000.00
B	**Post-construction restoration measures**				
i	Diversion channels & Retaining walls	cum	120	8000	960000.00
ii	Filling of the crates with muck, stones, etc.	cum	100	2000	200000.00
iii	Preparation of mounds	cum	90	1000	90000.00
iv	Carpeting with geo-textiles like coir, jute and other fibers, etc.	Sq m	680000	60	4080000.00

Sl. No.	Item of Work	Unit	Quantity	Rate (₹)/unit	Amount (₹)
v	Seeding by grass	ha	68	1400	95200.00
Total A+B					
Biological Measures					
	Nursery development				300000.00
	Plantation and maintenance of successfully colonized seedlings	ha	15	55000	825000.00
Total (Engineering & Biological Measures)					7230200.00 **Say 73.00 lakhs**

9 AIR AND WATER ENVIRONMENT MANAGEMENT PLAN

9.1 IMPACTS ON PHYSICAL ENVIRONMENT

Hydroelectric projects are generally considered cleaner source of energy as the environmental impacts are considerably lower during the project operation phase. However, the construction phases of such project, in ecologically rich areas, pose serious threats to surrounding environment. Therefore, it is important to identify and quantify such impacts and formulate mitigation measures in order to have minimum damage to project surrounding areas during construction period.

During construction phase, the activities like site preparation, approach roads, excavation, drilling, blasting, foundation, tunneling, deployment of machinery, erection, transportation, dumping will be taken up. Tunneling and foundation works will involve land excavation, affecting environment by noise and dust pollution. Structural work, deployment of machinery, approach roads construction and erection work will also result in dust, noise pollution and vehicular traffic. Material handling and transportation would also lead to significant increase in air and noise pollution. Muck generation, its transportation and disposal may pollute surface water due to the generation of large quantities of suspended particulate matter. Wastewater from labor camps and colonies may also pollute water bodies in the area.

The likely impacts on the physical environment during the construction phase are listed. In addition, another important aspect to be taken care of during the construction phase of the project is that of "Safety". Deployment of large number of labour during the 7 years of construction period in difficult terrains, underground works, use of machinery and equipment, use of explosives for blasting, etc. may lead to serious accidents, if adequate safety measures are not adopted.

Table 9.1: Impacts during Construction Phase

Construction & Operational Phase	Activity	Potential Environmental Impact
a) Site work / other facilities.	i) Cleaning and grading	Dust emission
	ii) Temporary facilities, such as sheds, approach roads, sanitary facilities	Dust emission, water pollution and solid waste generation
	iii) Earth work comprising of excavation and trenches	Soil erosion, run off, increase in traffic, dust emission
	iv) Foundation work, piling and construction of check barrages	Dust, visual and noise pollution, wastewater generation
	v) Construction of permanent structures like roads, colony, etc.	Dust and noise pollution and wastewater generation
	vi) Mechanical erection and utility systems	Dust, noise and visual impact
b) Construction of approach roads tunneling works and foundations	i) Excavation	Dust, soil erosion, wastewater generation and noise
	ii) Drilling & Blasting	Dust, noise and health hazards
	iii) Dumping	Dust, noise and river pollution
	iv) Transportation	Dust, noise and visual
c) Accident	In all construction activities	Major or minor health impact

9.2 AIR ENVIRONMENT

As observed during various field visits, the air quality is quite pristine in the study area. In the absence of industries, the only source of air pollution in the area at present is vehicular traffic and few other anthropogenic activities like burning of fuel wood, garbage, etc. or occasional use of DG sets in the area. However, quantity of such emissions is relatively small and sources are scattered, therefore, ambient air quality is generally good for the entire area.

Construction and operation of the Ratle HEP will definitely impact the air quality of the area. The construction period will involve exploration activities, construction of DAM, other components and approach roads, operation of batch mixing plants, aggregate processing plants, crushers, dumpers, cranes and other construction equipments, operation of DG sets for construction power, quarrying operations, muck generation and disposal, repair and maintenance workshops, transportation of men and material, etc. All these activities will contribute to air pollution in the area. The nature and extent of impact on air environment will vary from time to time, location to location and through different stages of development of the project. As all these activities contribute to fugitive emissions in various forms, quantification of air pollution at this stage is not possible.

9.2.1 Impacts on Ambient Air Quality

Considerable amount of air pollution will take place during different stages of construction. Suspended Particulate Matter (**SPM**) is the main pollutant during construction phase, released in the form of fugitive dust from various operations and activities. Additionally, SO_2 and hydrocarbons will also be released as product of fuel burning during operation of equipments.

The pollutants released during the construction activities may cause immediate effect on the construction workers who are directly exposed to them. However, the pollutants are not expected to travel for long distance, as the project site is located in between hills. Disadvantage of such locations is that pollution generated in the valley do not get dispersed easily, hence even smaller quantities have serious impacts.

Pollution due to Fuel Combustion in Equipments

Major fuel consumption is diesel for DG sets which meet power requirement during construction phase. As this power requirement will be executed through a number of DG sets installed at different construction sites, colonies and workshops. Operation of DG sets and other construction equipments requires combustion of diesel. The major pollutant that gets emitted as a result of combustion of diesel is SO_2. The SPM emissions are generally not significant; however, amount depends upon quality of fuel used.

To reduce the impact of air emissions from DG sets, it is important to have adequate stack height of these DG sets to provide for plume dispersion and reduce the impact on receptors. Minimum stack height will be worked out based on capacity of DG sets as per the following formula:

$H = h+0.2\sqrt{KVA}$

Where,
H = Total height of stack in meter
h = Height of the building in meter where the generator set is installed
KVA = Total generator capacity of the set in KVA

These stacks form part of the DG assembly including the acoustic housing to control sound levels, hence their cost is not included in the EMP cost.

Emissions from Construction Equipment

As discussed above, various workshops/plants will be set up for construction and these will generate fugitive emissions comprising mainly of the suspended particulate matter during loading/unloading of material and repair and maintenance activities. Major impact will be on the immediate vicinity i.e. affecting the workers

involved in these operations. Provision of appropriate dust masks and other required Personal Protective Equipment at all the locations and enforcing their use by workers will help reduce emission's impact at workplace environment.

Depending on wind direction and other meteorological factor these emissions may also disperse in atmosphere and will affect the surrounding area. The impacts will remain limited to immediate surrounding and vary with wind direction. Best mitigation method is to keep the emissions under check so that they do not spread to outside the battery limits of these plants.

Fugitive Emissions from various sources

Construction activities such as tunneling, excavation, road cuttings, etc. are associated with large amount of dust generation. Additionally, quarrying operations, muck transport and dumping, transportation and storage of construction material like sand, fine aggregate, etc. generate large amount of dust. Continuous exposure to fugitive dust has serious health effects on workers and residents of nearby areas. Impacts are local and temporary, and their significance can be reduced by adopting various mitigation measures such as controlling emissions at source, water sprinkling and use of PPEs.

Emission due to Vehicular Traffic

The project construction will involve transportation of large quantities of construction material to the project site and all the transportation in the project area will be done by road. This would lead to substantial increase in heavy vehicular traffic in the area. Emissions from vehicular traffic, due to diesel burning, will lead to air pollution in the area. The impact cannot be eliminated, however, it can be reduced by enforcing on transporters that the vehicles used should have valid PUC certificate.

9.2.2 Mitigation Measures for Air Emissions

Following are the recommendations on mitigation measures for air pollution.

1. Use of DG sets to be kept at minimum and only for captive power generation, if possible.
2. Location of DG sets and other emission generating equipment should be decided keeping in view the predominant wind direction so that emissions do not effect nearby residential areas.
3. Stack height of DG sets to be kept in accordance with CPCB norms, which prescribes the minimum height of stack to be provided with each generator set to be calculated using the following formula:

H = h+0.2x √KVA

H = Total height of stack in meter

h = Height of the building in meters where the generator set is installed

KVA = Total generator capacity of the set in KVA

4. Proper maintenance for efficient functioning of DG sets and other construction equipment is essential to minimize exhaust
5. Construction equipment and vehicles will be turned off when not used for extended periods of time. Unnecessary idling of construction vehicles to be prohibited.
6. All the vehicles of contactor should have valid PUC certificate and same condition may be enforced on transporters bringing in material for construction.
7. Effective traffic management to be undertaken to avoid significant delays in and around the project area.
8. Road damage caused by sub-project activities will be promptly attended to with proper road repair and maintenance work.
9. Wherever practical, excavated spoils to be removed as the contractor proceeds along the length of the activity.
10. When necessary, stockpiling of excavated material will be covered or staged offsite location with muck being delivered as needed during the course of construction.
11. Excessive soil on paved areas will be sprayed (wet) and/or swept and unpaved areas will be sprayed and/or mulched. The use of petroleum products or similar products for such activities will be strictly prohibited.
12. Contractors will be required to cover stockpiled soils and trucks hauling soil, sand, and other loose materials (or require trucks to maintain at least two feet of freeboard).
13. Dust sweeping - The construction area and vicinity (access roads, and working areas) shall be swept with water sweepers on a daily basis or as necessary to ensure there is no visible dust.
14. All the construction workers and other staff, who get directly exposed to dust, should necessarily be provided with dust masks.

The project authorities will work closely with representatives from the community living in the vicinity of project area to identify areas of concern and to mitigate dust-related impacts effectively (e.g., through direct meetings, utilization of construction management and inspection program, and/or through the complaint response program).

9.2.3 Noise Levels

The sound will be generated during almost all the construction activities such as tunneling, blasting, movement of vehicles, operation of construction machines and equipments, repair and maintenance work, operation of DG sets, etc. Continuous exposure of workers to high sound levels may result in annoyance, fatigue, and may cause temporary shift of threshold limit of hearing and even permanent loss of hearing. As is evident from the baseline data, in the absence of vehicular traffic, sound levels in the area are generally low. There are no industries or any other source of noise in the area.

Construction phase will generate noise at various locations in the project area and is likely to affect residents and construction workers. The simultaneous operation of some equipment may increase the noise manifolds, however, resultant increase in noise levels will depend upon location of such equipment with respect to habitation, availability of the silencers/mufflers, condition of the equipment, losses during transmission, etc. Increase in vehicular traffic in the area will also contribute to high sound levels in the area. Construction activities such as tunneling, blasting, etc. also lead to high noise generation.

Sound attenuates with the distance and even if all the attenuation factors are removed, direct sound levels reduce by 6 dB(A) with every doubling of distance. Further, the sound level reduces substantially when the wave passes through a barrier. Therefore, if location of construction equipment is planned keeping in view the safe distance from habitation, impact can be greatly reduced on large section of population. Workers who are directly exposed need to use Personal Protective Equipments (PPEs) to reduce the impact.

9.2.4 Mitigation Measures for Noise Impact

Impacts due to high noise levels can be greatly reduced by adopting mitigation measures, as discussed below:

- Location of the construction equipment to be decided keeping in view the safe distance from habitation.
- Contractors will be required to maintain properly functioning equipment and comply with occupational safety and health standards.
- All the construction equipment will be required to use available noise suppression devices and properly maintained mufflers.
- Staging of construction equipment and unnecessary idling of equipment within noise sensitive areas to be avoided whenever possible.
- Minimize the use of noise producing equipment during night hours to avoid the disturbance to locals and wild animals of surrounding area.

- Use of temporary sound fences or barriers to be evaluated.
- Notification will be given to residents within 300 feet of major noise generating activities. The notification will describe the noise abatement measures that will be implemented.
- Monitoring of noise levels will be conducted during construction phase of the project. In case of exceeding of pre-determined acceptable noise levels by the machinery will require the contractor(s) to stop work and remedy the situation prior to continuing construction.
- Vehicles to be equipped with mufflers recommended by the vehicle manufacturer.

The following Noise Standards for DG sets (15-500 KVA) are recommended for the running of DG sets during the construction.

- The total sound power level, Lw, of a DG set should be less than, $94+10 \log_{10}$ (KVA), dB(A).
- Noise from the DG set should be controlled by providing an acoustic enclosure or by treating the enclosure acoustically.
- The Acoustic Enclosure should be made of CRCA sheets of appropriate thickness and structural/ sheet metal base. The walls of the enclosure should be insulated with fire retardant foam so as to comply with the 75 dB(A) at 1m sound levels specified by CPCB, Ministry of Environment & Forests.
- The acoustic enclosure/acoustic treatment of the room should be designed for minimum 25 dB(A) Insertion Loss or for meeting the ambient noise standards, whichever is on the higher side.
- The DG set should also be provided with proper exhaust muffler with insertion loss of minimum 25 dB(A).
- Proper efforts to be made to bring down the noise levels of DG sets within the ambient noise requirements, outside its premises, by maintaining proper control measures.
- A proper routine and preventive maintenance procedure for the DG set should be set and followed in consultation with the DG set manufacturer which would help prevent noise levels of the DG set from deteriorating with use.

9.3 WATER ENVIRONMENT

Construction work require large quantities of water to be used in various processing plants for material preparation; curing purposes, cooling water in equipments, domestic usages in colonies, etc. wastewater will be generated in various forms processing plants, workshops and residential areas. Additionally, during the construction work, muck transportation and transportation of materials; large quantities of suspended particulate matter will be generated to end up in the water

body. As the construction period is long such impacts can permanently deteriorate the water quality in the area, if adequate mitigation measures are not adopted.

The following mitigation measures are suggested to be followed during the construction of the project:

- Segregation of different types of wastes at source and avoid their mixing up in the main water body.
- Accumulation of oil wastes in depressions should be minimized in order to avoid possible contamination of the ground water system.
- Surface runoff from oil handling areas/devices (workshops and DG operation areas) should be treated for oil separation before discharge into the environment. If oil wastes are combined with sanitary sewage, oil separation will be necessary at the wastewater treatment facility.
- All effluents containing acid/alkali/organic/toxic wastes should be processed by treatment methods. The treatment methods may include biological or chemical processes.
- The impact due to suspended solids may be minimized by controlling discharge of wastes that contain suspended solids; this includes sanitary sewage and other wastes. Also, all activity that increases erosion or contributes nutrients to water (thus stimulating algal growth) should be minimized.
- For wastes containing high TDS treatment methods include removal of liquid and disposal of residue by controlled land filling to avoid any possible leaching of the fills. All surface runoffs around quarries and excavation areas should be properly channelized and taken care of.

9.4 ACCIDENTAL RISKS

In the hydro-electric projects, the environmental risk assessment is an important aspect. Larger environmental risks such as floods, landslides, etc. have been adequately covered along with their management plan at relevant sections of Environmental Management Plan. Some of the aspects posing accidental risk during construction phase, where work force and surrounding population may get affected, have been addressed below.

9.4.1 Safety in Explosive Handling

Explosives will be required to be stored at site during construction period. One no. 30MT explosive Magazine is proposed to be constructed upstream of Dam site, on right bank of river Chenab. Magazine structure means a building specially constructed in accordance with a design approved by the Chief Controller and intended for storage of more than 5 kg of explosives. Distances between two magazines or between a magazine and other buildings, road, railway, etc. is

governed by the Safety Distances given at Schedule VIII of the Explosives Rules, 1983 and are based on the category and quantity of explosive material stored. For magazine to store 30MT of explosive material, following safe distances are applicable:

Quantity in Kg	To and between magazine or magazine office etc.			To and between process bldgs		
	X	Y	ZZ	X	Y	ZZ
	M/UM	M/UM	M/UM	M/UM	M/UM	M/UM
30000	28	40	75	28	100	259

Quantity in Kg	To railway, Road, etc.			To Dwelling Houses, Offices, factories, etc.		
	X	Y	ZZ	X	Y	ZZ
	M/UM	M/UM	M/UM	M/UM	M/UM	M/UM
30000	29	98	345	60	199	690

NB: M denotes Mounded; UM denotes Unmounded; Distances are in m

Explosives are divided into four categories according to the risks which they present when initiated, namely –

Category X – explosives, which have fire or slight explosion risk or both, but the effect of which will be local.

Category Y –explosives, which have a mass fire risk or a moderate explosion risk, but not the risk of mass explosion.

Category Z –explosives, which have a mass explosion risk and major missile, effect.

Category ZZ – explosives, which have a mass explosion risk and minor missile effect.

Ratle HE Project falls under category X

If any question arises as to whether any explosive belongs to Category X, Category Y, Category Z or Category ZZ, the matter shall be referred to the Chief Controller whose decision shall be final.

In addition to taking license and maintaining safety distances as above, all the precaution required as the Explosive Rules need to be strictly adhered to during transportation, storage and handling of explosives.

9.4.2 Safety during Construction

With large scale increase in construction activity of river valley projects, the number of major accidents during construction stage has increased. Further, increased construction activity has also created construction related hazards for persons working on the projects. The degree of safety achieved in project constructions has a direct bearing on the amount of effort expanded to avoid accidents by those who control the conditions and practices on the project. In order to avoid accidents it

should be the overall responsibility of the project authorities to provide measures for the safety of all persons working on the projects.

The standards laid down for the safety aspects should be taken during construction work. Construction activities at the site of a hydro-electric project need to take care the safety aspect for all the activities in general and for following critical activities in particular:

- Storage, handling, transportation and operation of explosives required for blasting and tunneling activities
- Underground construction work including tunneling, excavation and other related activities
- Construction at heights
- Fire safety aspects
- Cross drainage construction work
- Storage, handling, detection and safety measures for gases, chemicals and flammable liquids
- Movement of vehicles on construction site

All persons should be made aware of the dangers and risks involved in these activities. They should be trained to take necessary precautions for their own safety as well as that of others workers. This should typically involve following the Safe Operating Procedure (SOP) wherever applicable, use of Personal Protective Equipment (PPE) such as helmets, gloves, gum boots, safety harness, etc., remain active and alert without any influence of alcohol or other intoxicating substances during work hours.

The safety requirement generally vary according to the type of structure, construction methodology, strata encountered, machinery and number of men deployed at site, therefore, it is important to develop site specific construction safety procedures. Such SOPs need to be incorporated in letter and spirit and all the staff involved need to be sensitized to the importance of safety and trained. A full time safety manager, will be appointed by the project developer with duties of monitoring and audit delegated to other staff members on safety aspects.

Apart from procuring the appropriate and adequate number of PPEs it is also important to maintain sufficient number of first aid boxes and some volunteers trained in giving first aid treatment. Further, the outsiders coming to site such as drivers, helpers, etc. should also be made aware of safety requirement of their activity. This can be achieved by putting posters carrying safety instructions and also, giving verbal instructions at the entry point.

Table 9.2 gives list of BIS Standards related to safety aspects during various stages of construction, installation, erection of different components and appurtenance of river valley projects, including inspection, observation and maintenance aspects from safety consideration.

Table 9.2: List of relevant BIS Standards

Sl. No.	IS No.	Title
1	IS 10386 (Part 1):1983	Safety code for construction, operation and maintenance of river valley projects: Part 1 General aspects
2	IS 10386 (Part 2):1982	Safety code for construction, operation and maintenance of river valley projects: Part 2 Amenities, protective clothing and equipment
3	IS 10386 (Part 3):1992	Safety code for construction, operation and maintenance of river valley projects Part 3 Plant & machinery
4	IS 10386 (Part 4):1992	Safety code for construction, operation and maintenance of river valley projects Part 4 Handling, transportation and storage of explosives
5	IS 10386 (Part 5):1992	Safety code for construction, operation and maintenance of river valley projects: Part 5 Electrical aspects
6	IS 10386 (Part 6):1983	Safety code for construction, operation and maintenance of river valley projects: Part 6 Construction
7	IS 10386 (Part 7):1993	Safety code for construction, operation and maintenance of river valley projects: Part 7 Fire safety aspects
8	IS 10386 (Part 8):1995	Safety code for construction, operation and maintenance of river valley projects Part 8 Excavation
9	IS 10386 (Part 9):1998	Safety code for construction, operation and maintenance of river valley projects Part 9 Canals and cross drainage works
10	IS 10386 (Part 10):1983	Safety code for construction, operation and maintenance of river valley projects: Part 10 Storage, handling, detection and safety measures for gases, chemicals and flammable liquids

9.5 COST ESTIMATES

Various mitigation and management measures have been discussed above to reduce the impacts of air, noise and water pollution and implement safety measures to ensure that impacts on these counts are reduced to minimum possible during the entire construction phase. To implement such measures, it is important to prepare a budget of such measures and include in the project cost so that lack of fund should not constrain their implementation.

Cost of equipment/treatment units for air and water pollution control or silencers/mufflers for noise pollution control is in built in the project cost for contractor's activities as such units will be set up by contractors and sub-contractors.

Developer needs to ensure that all the required measures are implemented and have to set up a team to monitor the implementation of mitigation measures.

Institutional arrangement is essential for ensuring the implementation of all the EMP components. Therefore, an in-house dedicated team needs to be set up and budgetary provisions needs to be kept for outsourcing services of expert organizations.

A budget of Rs 75.00 lakh is proposed for out sourcing services for expert organisation.

10 RESERVOIR RIM TREATMENT

10.1 INTRODUCTION

The Ratle hydroelectric project is to be situated on the Chenab River and total extent of the reservoir is about 14.00 km from dam axis. Project is bounded to the upstream by the Dulhasti HEP and the Full Reservoir Level (FRL) of Ratle HEP is governed by the tail water level of the upstream project which is Dul-Hasti HEP. The tail water level of Dul-Hasti HEP is 1031.50 m a.m.s.l. and the allotted FRL for Ratle HEP is 1029.00 m a.m.s.l. The total storage volume at FRL is 78.71 x 10^6 m^3. Accordingly the Minimum Draw-Down Level (MDDL) has been fixed at EL. 1018.86 m a.m.s.l.

The valley of the Chenab River is dominated by moderate to steep slopes, formed due to fluvial rejuvenation incising the valley base which is driven by rapid regional tectonic uplift. The Valley section of the reservoir runs with a relatively straight course of approximately NNW-SSE. The only significant sinuosity in the river course is seen near the Kandini village before the sharp 'Z'-form of the dam-site gorge itself. According to available satellite imagery the upper slopes of the eastern flanks are populated and agricultural terracing is apparent. No such agricultural land use is apparent on the western flank. The general form of the valley is of moderately steep upper slopes with over steepened mid and lower slopes incised by rejuvenating river erosion. At the valley toe local thick accumulations colluvium/talus form moderately steep slopes in places and in others very steep incised rock faces are formed [refer **Figure 10.1(in 4 parts)**.

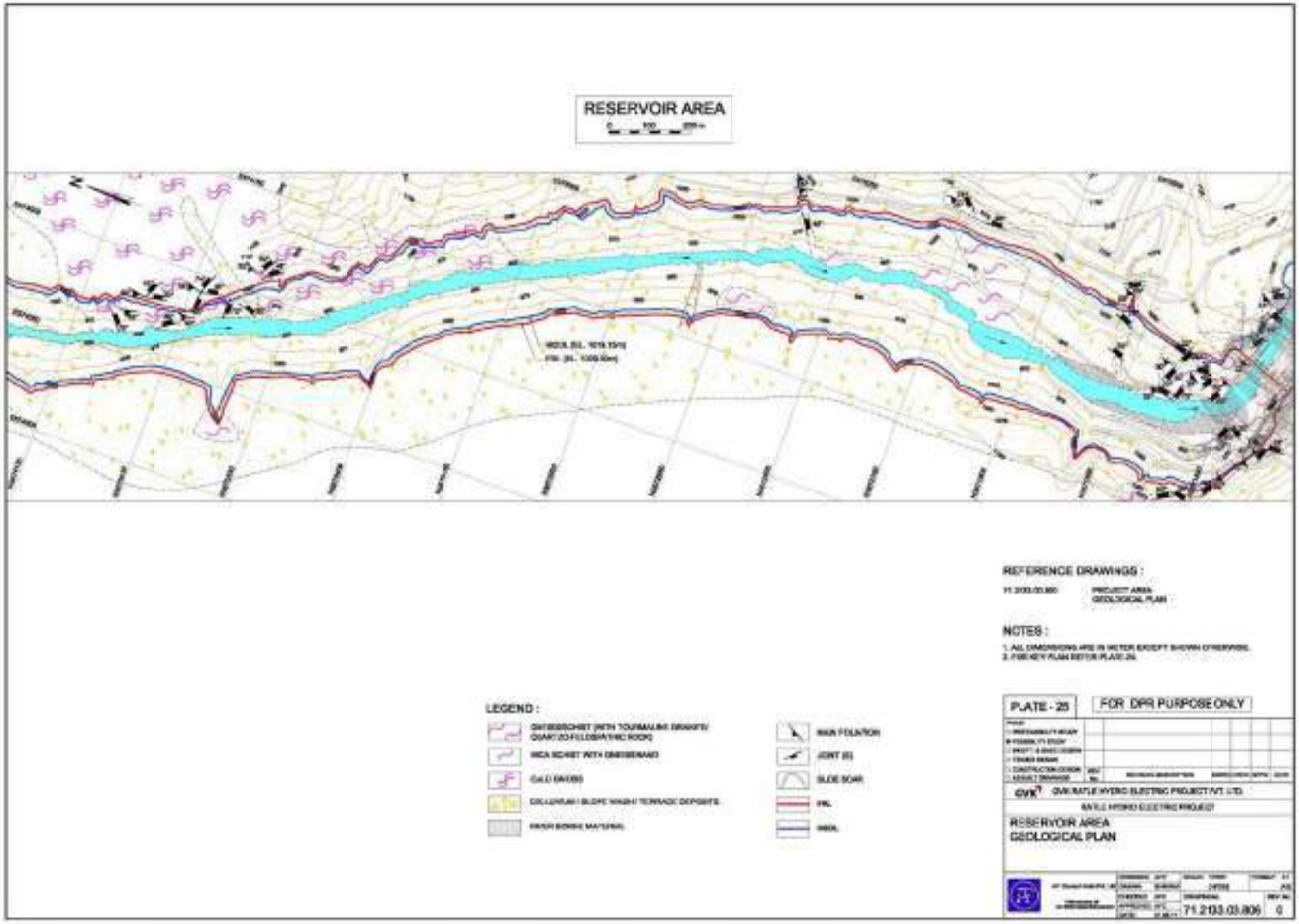


Figure 10.1(1 of 4): Geological map of reservoir area

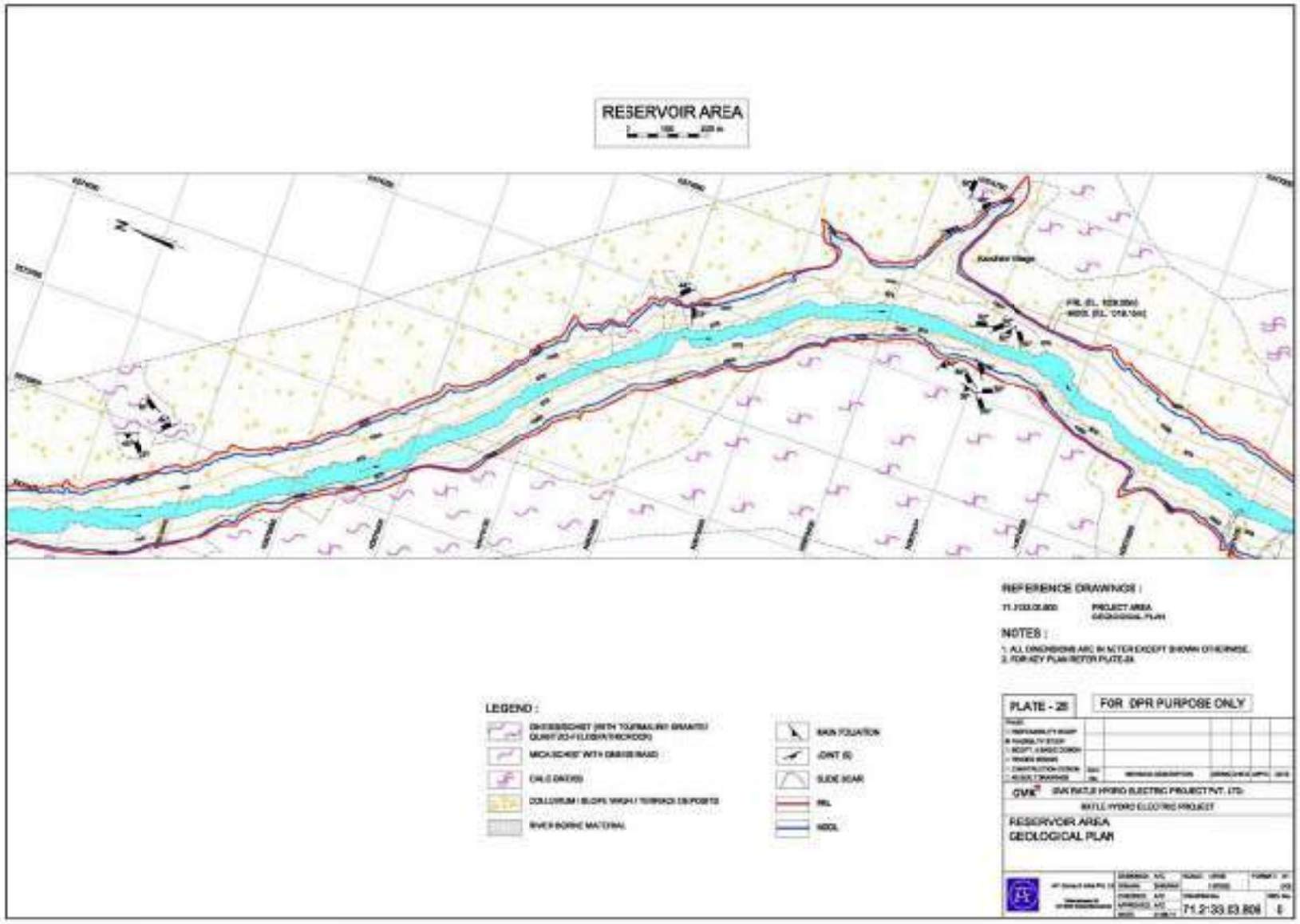


Figure 10.1(2 of 4): Geological map of reservoir area

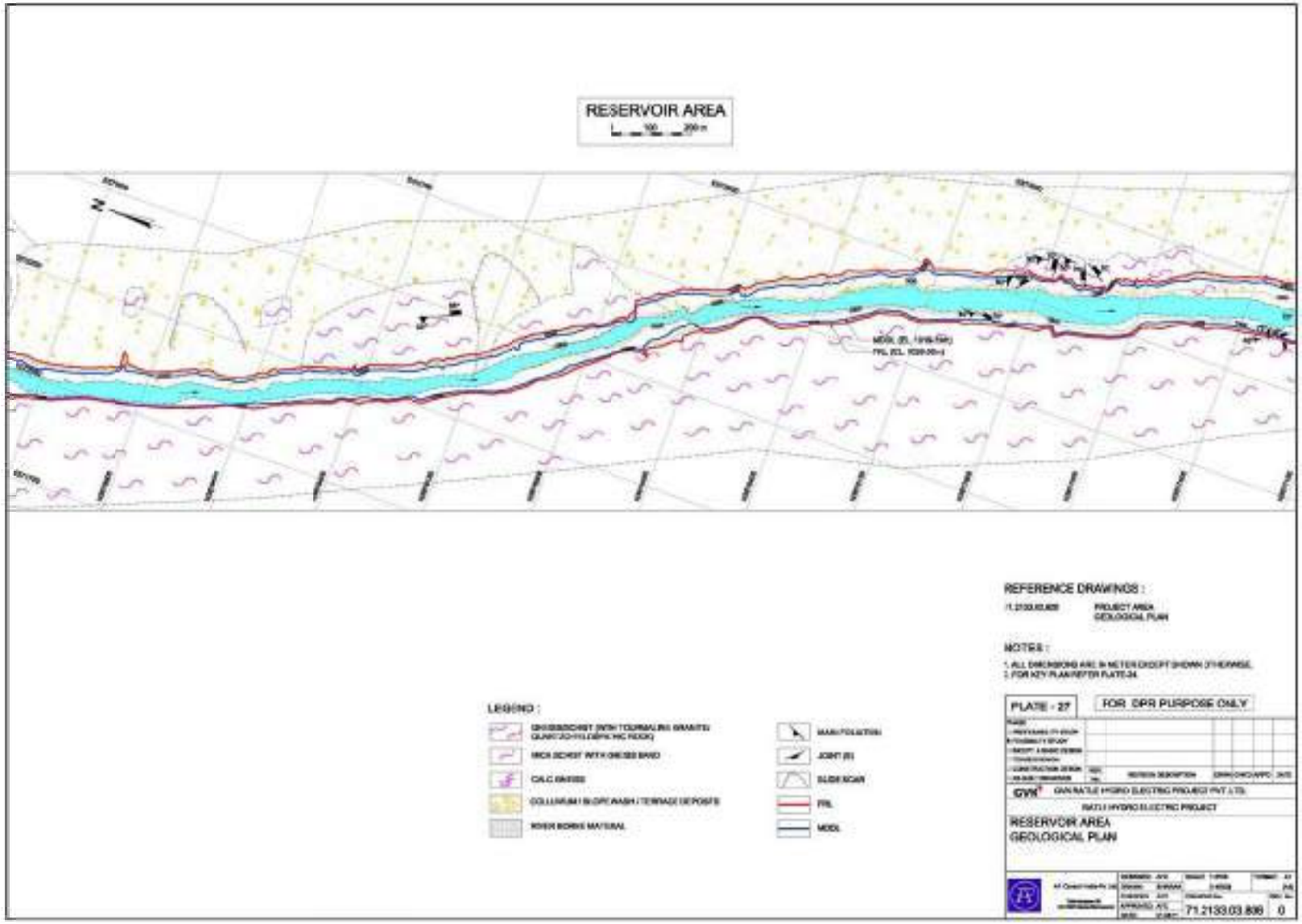


Figure 10.1(3 of 4): Geological map of reservoir area

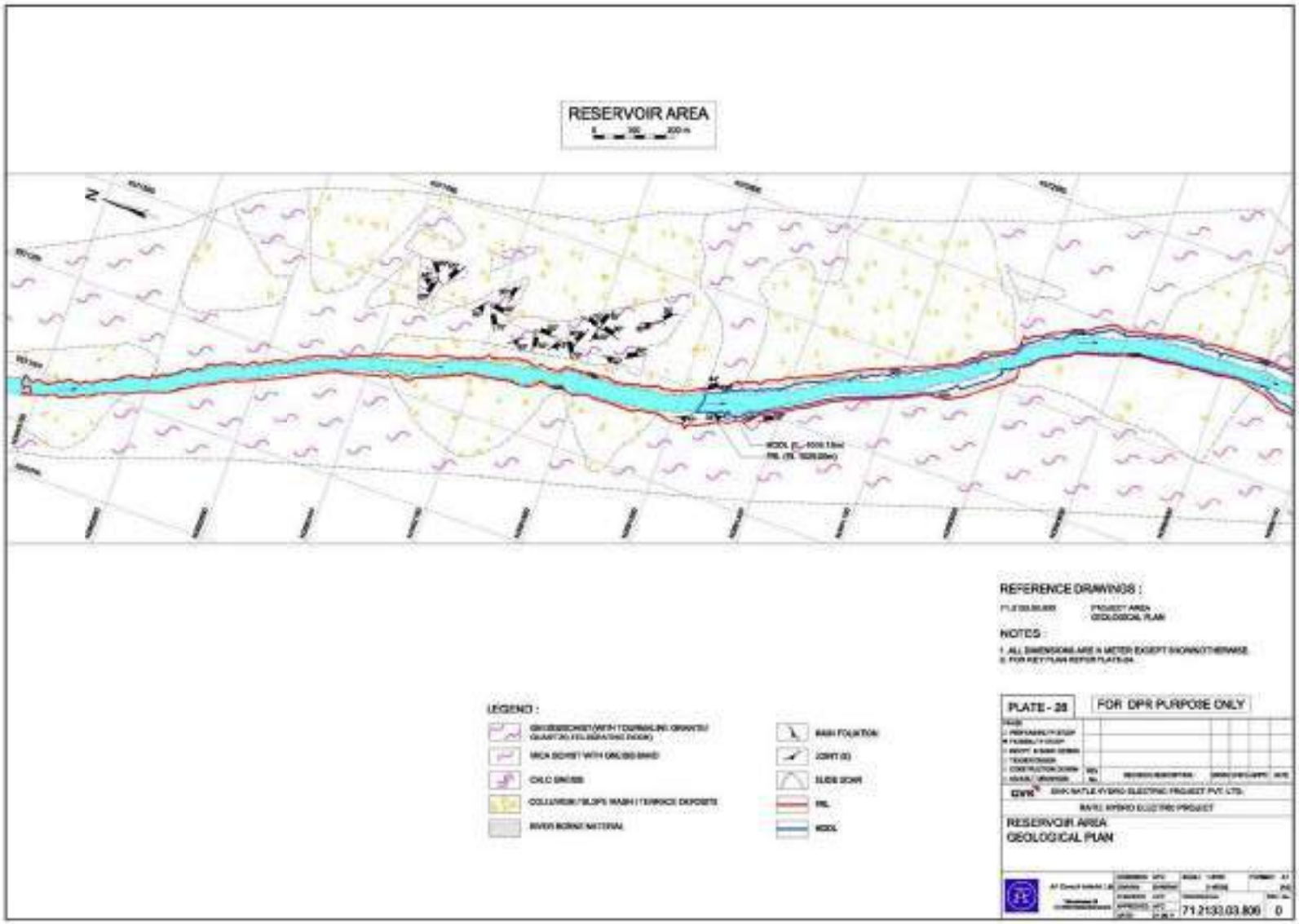


Figure 10.1(4 of 4): Geological map of reservoir area

The right bank is relatively unaffected by human activity (i.e. agricultural landuse). A few minor tracks and pathways are present and some housing is present at lower slopes, in reservoir area, particularly near Kandini village. No high level settlements were observed. The mid slopes of the right bank form generally a slope of between 40° and 50°. Along the lower stretches of the reservoir, the lower slopes are seen to reduce in gradient towards the river. This reduction in gradient is attributed to the accumulation of superficial colluvial deposits. Immediately above the river course this relatively shallow lower slope is sharply incised down to the river forming steeper slopes adjacent to the river. Above this break of slope ground vegetative cover is present and the oxidation state of the talus debris indicates stability. Below this break of slope the high ochre oxidation colours and the presence of only sporadic hardy trees indicates reduced slope stability. Sections of these steeper more instable slopes are seen along some sections to sit upon vertical rock faces. Along the higher stretches of right bank of the reservoir the colluviums and talus is much reduced to the extent of being, for considerations of stability, a rock-mass.

Along the left bank the mid to lower slopes exhibit generally a uniform slope directly down to the river. The upper slopes are less steep and are seen to be terraced and farmed. A higher density of settlement was noted. The left bank is controlled generally by the S1 tectonic foliation and colluvial and talus deposits sit upon this foliation in sheets. Where the maximum dip of the foliation is not coincident with the maximum slope of the valley flank thicker colluvial and talus deposits are seen to form and morphology similar to the right bank is developed. An important factor to the left bank is the presence of the highway which cuts often into the colluvium forming very steep engineered slopes, which will be partly submerged after impounding.

In the submergence and along the reservoir periphery some landslide scars can be seen especially on the right bank slopes a few km from the dam. On the left bank between 8 and 9 km 2-3 large slide scars are visible on the slopes which are of concern. These scars need to be kept under surveillance for any probable activity and any downward movement.

10.2 NEED FOR RESERVOIR RIM TREATMENT

The reservoir would lead to submergence of 203 ha of land at FRL. The construction of Ratle H.E. project would also lead to sudden change in the existing riverine lotic environment to lacustrine condition. The toe of steep hills towering over the river bed shall be subjected to raise water surface level due to the reservoir. The rock mass which

had not before experience the flow of river shall be subjected to hydraulic conditions apart from many other direct and indirect factors responsible for instability of land masses. Two types of factors e.g. internal factors and external factors are responsible for sliding in such water spread conditions.

The reduction in the shearing strength of the rocks, the water content of the rock masses, change in their mineralogical composition and meteorological character, structural features and the state of stress are some of the important internal factors. External factors include mainly vibrations either naturally by an earthquake or artificial due to heavy traffic and rock blasting. Besides these removals of support at the foot of the slope i.e. toe failure and toe cutting by high velocity of flow is another cause. Therefore, an assessment of geological conditions and geo-technical evaluation of the reservoir area gives adequate information of the behavior of reservoir.

10.3 AFFECT ON RESERVOIR SLOPES

The reservoir rim is expected to be fairly stable in the given geo-environment with both engineering and biological measures adopted for treating the minor slides. Also there is no possibility of water leakage into the adjacent valleys as the water divide is very high and extensive as compared to reservoir size and elevation.

10.4 TREATMENT MEASURES

10.4.1 Treatment Measures for Landslides/ Slips

The minor slides observed in the reservoir area and the places where mass movement has been noted can be treated by biological and engineering methods depending upon the cause of slide and its disposition with respect to the reservoir MWL and roads. These would be controlled by engineering means by constructing retaining walls, wire bolsters along with wire mesh treatment in the submergence zone in combination with biological measures such as planting of shrubs and spraying of seeds, brush layering in the non-submergence zone i.e. above the MWL. Various proposed measures both engineering and biological depending upon the slide characteristics have been described below:

a) Restoration of slopes

For restoration of slope gabion wall at two levels are proposed. Wire bolster, wire mesh and plantation of shrubs followed by spray of seeds are proposed in the non-

submergence zone. Above the submergence zone two tiers of retaining wall of 120 m length each have been proposed. For restoration of slope, gabion wall at different levels have been proposed and in the areas between gabion walls, plantation of shrubs will be undertaken. Below the submergence zone, retaining wall and gabion walls would be provided. Above submergence zone, gabion would be provided below and above the bridle path. Retaining walls of 35 m and 25 m length respectively would also be provided to modify the slope of slides just above the submergence zone. The depletion zone shall be treated with shrub and tree plantation. The rocky surface shall be reinforced with wire mesh. This treatment shall be clubbed with Green Belt development and part cost has already been included in the same.

10.4.2 Treatment at the Mouth of Streams joining Reservoir

The streams joining Chenab river along the banks have steep gradient and during rains these streams experience very high discharge and velocity. Wherever these streams meet the main river there is a large difference in their bed levels. Such streams are also potential carrier of highly sediment concentrated flows resulting from high velocities attained by them during flash floods. Loose deposits or fans are therefore often observed near the confluence point of such streams with the Chenab river. The mouth of these streams has a tendency of sliding and widening.

- These streams will be subjected to change in hydraulic conditions depending upon the fluctuation of water level of Chenab river during different periods of the year and abrupt water level changes brought about during monsoon. The changed gradient of ground water affects the pore water pressure of the soil mass of banks at the mouthing and reduces the shear strength of the rock-mass which disintegrates.
- The sediment load carried by the tributary streams gets deposited near the confluence and thus obstruct the high flow during monsoon thereby increasing the flow velocity near banks which cause toe-erosion.
- Due to the changes in flow conditions at the mouth of streams, from super critical to sub-critical the energy dissipation takes place and the bank material has to bear the onslaught.
- The FRL of the reservoir will fluctuate between El. 1029 m and 1015.86 m i.e. 13.14 m. Even though the variation is not very large, not very frequent and does not last over a considerable long period/duration, there are little chances of sudden draw down of water in the reservoir, yet due to presence of loose material at the mouths sliding cannot be ruled out.

- The mouth of the streams are generally comprised of riverine material usually shingle, pebbles, boulder and fine sediments like clay, silt and sand which have lower shear strength. Swelling caused due to hydration of clay might become the main cause of mass movement.
- Due to recharging of slopes some of the landslide scars visible above the level of reservoir might get activated and become prone to sliding.

Therefore, the mouth of these streams directly draining into reservoir require protection against toe-erosion at the level of FRL of reservoir by RCC retaining wall in the immediate length of either bank followed by gabion walls. The sediment load transported by the streams can be minimized by making check dams of sizes like 12 m x 1.5 m x 3.0 m, at least 10 each in each of the streams meeting the reservoir on both the flanks. In addition monitoring of old landslide scars would be periodically undertaken for any sliding activity in and around these areas.

The cost of various activities involved in reservoir rim treatment plan is ₹ **225.00 lakh**.

11 COMPENSATORY AFFORESTATION PLAN

11.1 INTRODUCTION

The Ratle H.E. Project is being constructed in the jurisdiction of two Forest Division viz. Kishtwar and Doda. The total land required for the construction of Ratle H.E. Project activities is approximately **567.21 ha** with **138.92 ha** of forestland, **373.29 ha** state land and **55.00 ha** private land (**Table 11.1**).

Table 11.1: Details of the Land to be acquired for Ratle H.E. Project

Sr. no.	Particulars	State Land	Private Land	Forest Land	Total Land
1	Land coming under submergence	96.92	18.44	44.79	160.15
2	Land for Reservoir rim Stability (1029 masl to 1040 masl)	17.98	4.01	12.52	34.51
3	Colony Area	81.39	23.54	-	104.93
4	Main project components & infrastructure work.	32.04	3.47	63.63	99.14
5	Quarry Area	34.30	1.73	-	36.03
6	Dumping Area	15.77	-	14.81	30.58
7	Re-alignment of NH-1B	2.69	3.81	3.17	9.67
8	River Bed Area.	92.20	-	-	92.20
	TOTAL	**373.29**	**55.00**	**138.92**	**567.21**

11.2 COMPENSATORY AFFORESTATION PROGRAMME

The objective of the compensatory afforestation programme will be to develop natural areas in which ecological functions could be maintained on sustainable basis. Therefore planting of economic important indigenous species would be undertaken. The compensatory afforestation is proposed to be done mainly in those forest blocks where degraded land and forest blanks are available for planting. The plantations in the above forests will be restricted to the areas which lie close to dam site and colony area of the project. Suitable sites, depressions and sites along streams will planted up with appropriate species.

The Forest (Conservation) Act, 1980 stipulates strict forest protection measures and procedures (Guide Line 1/08-1 (ii) for compensatory afforestation on acceptance of diversion of forestland for non-forestry purposes).

i. If non-forestland is not available, compensatory plantation is to be raised on degraded forest land to the extent of twice the affected or lost forest area, and
ii. If non forest land is available, the extent of compensatory plantation will be equivalent of the affected or lost forest area.

As per the guidelines of Forest Conservation Act, 1980 block plantation is to be taken up two times of the above ground component of forest land diversion **[138.92 ha x 2 = 277.84 ha]**. So that the compensatory afforestation to be taken up on **277.84 ha** on forestland in the denuded or degraded forest areas, it is also proposed to have avenue plantation along the proposed roads with iron guard fencing work around the new plantation with angle iron in the diverted land to maintain the ecological balance of the areas.

The compensatory afforestation is proposed to be undertaken on degraded forest land identified in consultation with the State Forest Department. The estimated cost of Compensatory Afforestation programme is ₹ **142.56 lakh**.

Table 11.2: Cost estimates of Compensatory Afforestation Plan

Particulars	Area (ha)	Rate ₹/ha	Amount (₹ lakh)
Total area for compensatory afforestation as per the notification	277.84	50,000.00	**138.92**

The species for plantation are selected after considering altitude, aspect, biotic pressure, soil depth, moisture etc., following species have been selected for plantation under the scheme:

Table 11.3: Tree Species Suggested for Compensatory Afforestation

Sl. No.	Family	Scientific Name
1	Betulaceae	*Alnus nitida*
2	Fabaceae	*Dalbergia sissoo*
3	Fabaceae	*Robinia pseudo-acacia*
4	Fagaceae	*Quercus baloot*
5	Juglandaceae	*Juglans regia*
6	Meliaceae	*Melia azedarach*
7	Moraceae	*Ficus palmata*
8	Oleaceae	*Fraxinus cornuta*
9	Oleaceae	*Olea cuspidata*
10	Pinaceae	*Pinus roxburghii*
11	Platanaceae	*Platanus orientalis*
12	Rosaceae	*Prunus cerasoides*
13	Salicaceae	*Populus ciliata*

11.3 NET PRESENT VALUE (NPV)

The Hon'ble Supreme Court of India has made it mandatory vide its order dated 28.03.2008 for the user agency to compensate for the diversion of forest land for non-forest use for developmental activities on the recommendations of Central Empowered Committee (CEC) to make payment of Net Present Value (NPV) of such diverted land so as to utilize this for getting back in the long run which are lost by such diversion (Refer Annexure II).

For this purpose CEC has classified the forest taking in view the ecological role and value of the forest and the purpose of the report, 16 major forest types have been further grouped into 6 ecological classes depending upon their ecological functions.

1	**Eco-Class I**	Consisting of Tropical Wet Evergreen Forests, Tropical Semi Evergreen Forests and Tropical Moist Deciduous Forests
2	**Eco-Class II**	Consisting of Littoral and Swamp Forests
3	**Eco-Class III**	Consisting of Tropical Dry Deciduous Forests
4	**Eco-Class IV**	Consisting of Sub-tropical Board Leaved Hill Forests, Sub-Tropical Pine Forests and Sub Tropical Dry Evergreen Forests
5	**Eco-Class V**	Consisting of Sub-tropical Board Leaved Hill Forests, Sub-Tropical Pine Forests and Sub Tropical Dry Evergreen Forests
6	**Eco-Class VI**	Consisting of Montane Wet Temperate Forests, **Himalayan Moist Temperate Forests, Himalayan Dry Temperate Forests, Sub Alpine Forest, Moist Alpine Scrub and Dry Alpine Scrub**

The net present value per hectare of forest has been fixed based on this data.

Based on this, the NPV was fixed and the following recommendations have been made:

For non-forestry use/diversion of forest land, the NPV may be directed to be deposited in the Compensatory Afforestation Fund as per the rates given below **(in ₹).**

Eco-Value class	Very Dense Forest	Dense Forest	Open Forest
Class I	10,43,000	9,39,000	7,30,000
Class II	10,43,000	9,39,000	7,30,000
Class III	8,87,000	8,03,000	6,26,000
Class IV	6,26,000	5,63,000	4,38,000
Class V	9,39,000	8,45,000	6,57,000
Class VI	9,91,000	8,97,000	6,99,000

Total forest land requirement for diversion for non-forest use i.e. for the construction of Ratle H.E. Project aboveground and underground activities is **138.92 ha** (**Refer Table 11.1**). As the forest in the project area fall in the **Eco Class VI** as being of type Himalayan Dry Temperate Forests, Sub Alpine Forest therefore NPV @

` 8.97 lakhs/ha would be required to be deposited in the Compensatory Afforestation Fund. The total cost of NPV has been computed as under.

Particulars	
Forest Land to be Diverted (ha)	**138.92**
Eco Class	**VI**
Forest Density	**Dense Forest**
NPV to be deposited ` 8.97 lakhs per ha	**₹ 1246.11 lakh**
Total NPV cost (lakhs)	**₹ 1246.11 lakh**

11.4 COMPENSATION OF TREES

The compensation of 8522 trees/poles/sapling at two times of the standard rate of 1992 is ₹ **73.94 lakh**. The details of the trees/poles/sapling in the forest area proposed for the acquisition is given in **Table 11.4**.

Table 11.4: Number of Trees/ Poles / Sapling

Species	Trees (30 - 40 cm & above)	Poles (20 - 30 cm & 10 - 20 cm)	Sapling (0 - 10 cm)	Total
Chir (*Pinus roxburghii*)	122	73	-	195
Broad-Leaved Shisham, Darenk, Champ, Robinia, Ailanthus, Harhi, Anardana, Willow, Poplar, Sainth, etc	966	2322	5039	8327
Total	**1088**	**2395**	**5039**	**8522**

11.5 ABSTRACT OF COST

The total cost of the compensatory afforestation plan, NPV, compensation of trees and cost of damage to fence and infrastructure is ₹ **1467.59 lakh**. The details are given in **Table 11.5.**

Table 11.5: Total Cost

Sl. No.	Particulars	Amount (₹ in lakh)
1	Compensatory Afforestation	**138.92**
2	Net Present Value (NPV)	**1246.11**
3	Compensation of Trees	**73.94**
4	Cost of damage to fence line & infrastructure	**8.62**
Total		**1467.59**

12 REHABILITATION & RESETTLEMENT PLAN

12.1 INTRODUCTION

The Ratle Hydro Electric Project is envisaged as a run-of-river scheme for utilizing the flows of Chenab River to harness the head created by constructing a dam near Drabshala village with FRL of EL 1029.00 m a.m.s.l. and the proposed underground power house located on the right bank of Chenab River just downstream of dam. The project comprises of a 133 m high concrete gravity dam (from deepest foundation level), 4 Nos. 6.6 m internal diameter circular steel lined pressure shafts with length varying from 211 m to 172 m, an underground power house followed by a tailrace surge chamber and 4 Nos. 8.7 m finished diameter tail race tunnels varying in length from 394 m to 330 m discharging back into Chenab River with normal tail water level at El. 924.23 m a.m.s.l.to generate 820 MW.

After detailed deliberations Environmental Appraisal Committee (EAC) of MoEF, directed to make a provision of 30 MW power station to ensure that adequate environmental flow is released at all the time. Accordingly, 30 MW additional unit is also considered to be installed at Ratle HEP. The total capacity of plant is 850 MW (820 MW+30 MW Additional unit). The design head of the scheme is 97.37 m and the nominal discharge including discharge for additional unit is 961.53m^3/s (928.1 + 33.43). The design energy works out to 3136.76 GWh (2887.1+249.66).

As is typical of any hydropower project, land would be required for construction of dam, powerhouse and other structures; submergence area, colony and construction camps, etc. Efforts have been made to avoid acquisition of private land with habitation, avoid large-scale displacement and acquire land commensurate with the purpose of the project. Therefore, land requirement has been planned in a manner that out of total land requirement of 567.21 ha for the project, only 55 ha is private land. This private land is mainly the land coming under submergence (18.44 ha under submergence is private land); land for colony area (23.54 ha), which is private land without any habitation or structures; land for the construction of main project components; realignment of NH-1B and some land for quarry area.

The Resettlement and Rehabilitation Plan has been prepared to comprehensively address the issues arising out of land acquisition and identification of Project Affected Families (PAFs), assessment of land/house/asset coming under acquisition, estimation

of extent of loss and compensation to be offered in line with the National Rehabilitation and Resettlement Policy (NRRP), 2007 and keeping in view the following objectives:

- To compensate families whose land or other assets are acquired for the project.
- To create better living conditions and to improve by and large the quality of life of people residing in the project area.
- To contribute to the overall development of the project affected areas.
- To create good rapport with the local people for long-term relationship and mutual benefits.

12.2 LAND REQUIREMENT

As discussed above, total land requirement for the project has been assessed as **567.21** ha land comprising of 373.29 ha of state land, 138.92 ha of forest land and 55.00 ha private land **(Table 12.1)**.

Table 12.1 :Land Requirement for RatleH.E. Project

	Particulars	State(A)	Private (B)	Forest (C)	Total(A+B+C)
1	Land coming under submergence	96.92	18.44	44.79	160.15
2	Land for Reservoir rim Stability (1029 masl to 1040 masl)	17.98	4.01	12.52	34.51
3	Colony Area	81.39	23.54	0.00	104.93
4	Main project components & infrastructure work	32.04	3.47	63.63	99.14
5	Quarry Area	34.30	1.73	0.00	36.03
6	Dumping Area	15.77	0.00	14.81	30.58
7	Re-alignment of NH-1B	2.69	3.81	3.17	9.67
8	River Bed Area	92.20	0.00	0.00	92.20
	TOTAL	**373.29**	**55.00**	**138.92**	**567.21**

12.3 IDENTIFICATION OF PROJECT AFFECTED VILLAGES AND FAMILIES

On finalization of the project layout, land required for the project was marked on the map of the area, which is prepared for the purpose of the project development by undertaking the topographical survey. This requirement is transferred on the revenue map (latha) of the area available with the local authorities (Patwari). Khasra numbers have been identified for the land required and ownership information was collated from the written revenue records. As the local records are all made in Urdu, they were translated in English and used for compiling the list of owners for the identified land for the Project. As can be seen from the land requirement Table above, 90% of the land

required for the project belongs to State Government and Forest Department and only remaining 10% has private owners.

The R & R package and the provisions under Local Area Development plan are proposed on the basis of socio-economic surveys conducted for the purpose. The family-wise door-to-door survey was conducted for all project affected families, identified based on the list provided by the project authorities. Survey was conducted with an objective to understand the profile of project affected villages and families, their social status, amenities available, etc. so that by way of resettlement and rehabilitation plan, impacts of land acquisition are mitigated to a large extent, if not eliminated altogether. Survey was based on the questionnaire drafted for the purpose (Refer Annexure III). Data was collected on various parameters of quality of life, income patterns, land holdings amount of land loss due to this project, etc. The required data was used to formulate the Rehabilitation and Resettlement Plan for the project affected families.

12.3.1 Profile of the Project Affected Villages

Demographic Profile

Population of 13 villages falling in the vicinity of the project area will be partly affected due to land acquisition for various project activities. Total population of these villages is 7240 belonging to 1163 households. The population belongs to Hindu, Muslim and Sikh communities.

Over a period of time, some families from 6 main villages at higher altitude have made their houses and shops along national highway and also along the bank of Chenab river. The main villages at higher altitude will not be submerged, however the lower settlements shall get submerged as their level is below the FRL (1029 m). These 6 villages are Agral, Salana (Kandani), Janwas, Bhandera and Sangna. Four villages viz. Khori, Lass, Dhar and Bhugrana, will beaffected by land acquisition for constructionof project components. Some families will be losing part of their land in these four villages, however, there will not be any displacement. Three villages viz. Bhadat, Joshana and Salanawill be affected due to land acquisition for colony area; again there will not be any displacement. The details are shown in Figure 12.1. This information is summarized below.Demographic Profile of Project Affected Villages is given at Table 12.3.

Table 12.2 : Project Affected Villages

Sl. No.	Village Name	Affect	Affected By
1	Agral	Part Habitation/Land coming under submergence	Submergence
2	Salana (Kandani)		
3	Janwas		
4	Bhandera		
5	Sangna		

6	Duga		
7	Khori	Only Land	Land for project component and land coming under submergence
8	Lass		
9	Dhar		
10	Bhugrana		
11	Badhat	Only Land	Colony Area
12	Joshana		
13	Salana		

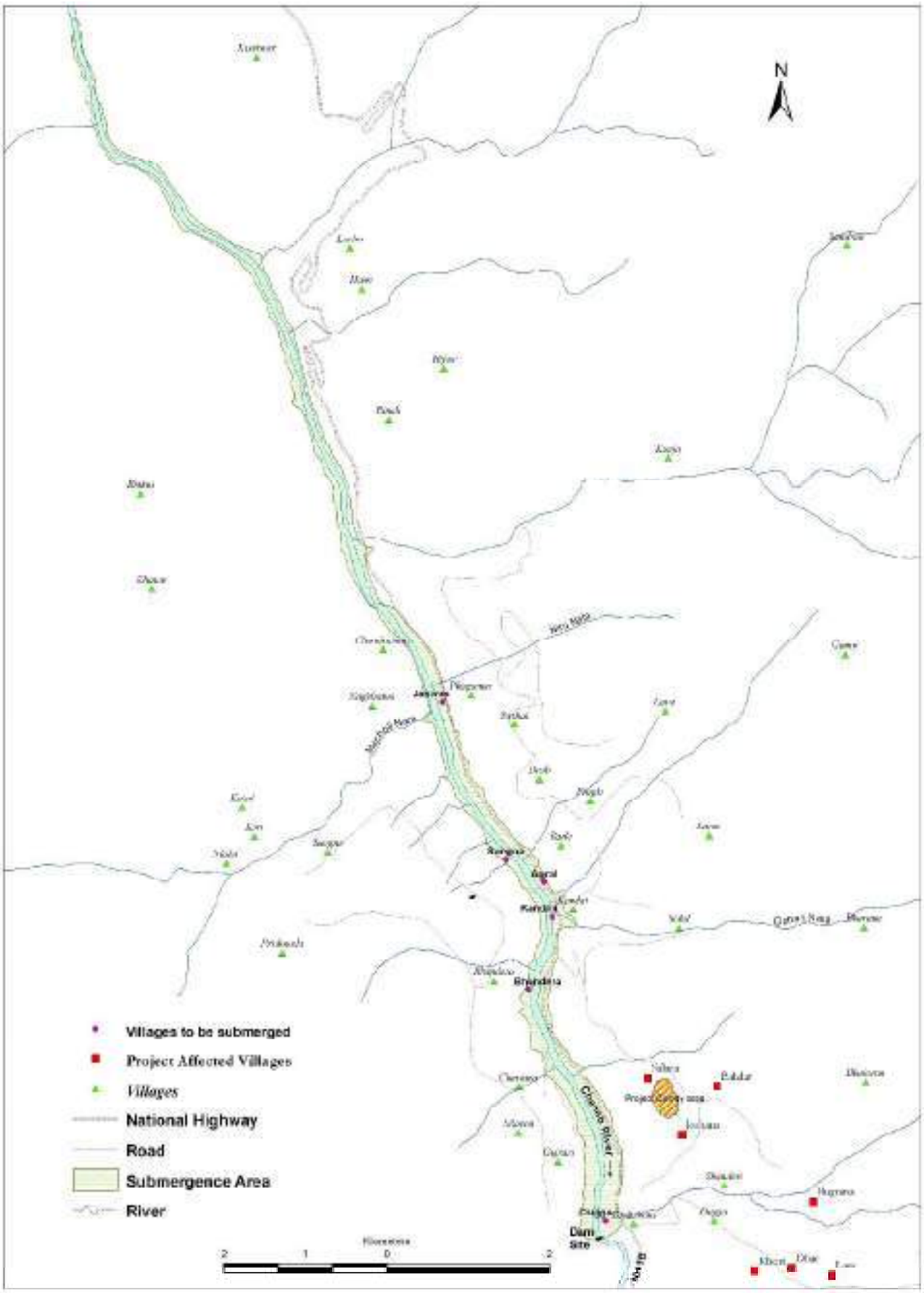


Figure 12.1 : Project Affected Villages

Table 12.3 : Demographic Data of Project affetced Villages

Sr. No.	Village Name	Households	Total Population	Males	Females
1	Agral	132	776	390	386
2	Badhat	112	664	331	333
3	Bhandera	94	620	316	304
4	Bhugrana	138	878	451	427
5	Dhar	55	358	187	171
6	Duga	143	870	428	442
7	Janwas	120	805	385	420
8	Jushana	38	247	127	120
9	Kohri	56	318	166	152
10	Lass	70	420	180	240
11	Salana	94	522	260	262
12	Salana (Kandani)	70	500	270	230
13	Sangna	41	262	139	123
Total		**1163**	**7240**	**3630**	**3610**

Educational Facility

Education facility is quite poor in the region. These villages have one AnganwadiCentre, 8 primary schools, three middle and higher secondary schools and only on collage in Kishtwar. Nearest middle and higher secondary school is located near Bhadat and Bhandera village.

Occupation Patterns

Agriculture and cattle rearing is the main occupation pattern in the affected villages. Maize, wheat, pulses and rice are the major crops and moong, rajmaha and peas are the common grown pulses. Saffron is cultivated in the Salana village. The horticulture is also practiced in the area; this includes apple, apricot, pomegranate, plum, etc. Apart from agriculture, people in project-affected villages are businessmen running shops and doing trading, there are government servants (in service and retired), artisans, teachers and factory workers as well.

Health Care Facility

Medical facility is also poor in the affected villages. There is only one primary health sub-center at Darabshala and one primary health centre at Thatrivillage in the area. The district hospital and community health centre is located about 30 km from the dam site in Kishtwar.

Transport Facility

The local transport on the left bank of the Chenab River is good and well connected by the NH 1B. The villages on the right bank do not have any road connectivity; the nearest road head for the right bank villages is Darabshala and Salana (Kandani). From Darabshala only Joshana village is well connected by road and for Bhadat and Salana there is no road connectivity.

Marketing Facility

Darabshala and Salana (Kandani) villages are the major marketing area in the affected villages. The right bank villages of Chenab River depend on these market areas for sale of agriculture produce and to buy vegetable, grocery, agricultural instrument and cloths.

The market area in Salana (Kandani)village will be submerged and alternate location needs to be identified in consultation with revenue department for establishment of market. Local traders, who have shops along the highway falling under Salana (Kandani)Village, have suggested during social survey that they can be resettled along the re-aligned portion of national highway (NH 1B) so that their business will not get affected.

Drinking Water Facility

The drinking water quality is good in the affected villages. Drinking water is sourced from hand pump, tap water and springs. Joshana, Salanaand Bhadat face water scarcity, due to lack of perennial springs on the hills. Salana (Kandani) and Darabshala are the two villages, which depend on the hand pump for the drinking water.

Other Amenities

- All the affected villages are electrified.
- The veterinary dispensary is located in Bhadat and also in Thatri village, which is downstream of dam site.
- The nearest bank is located in Darabshala village and another is in Kishtwar.
- Police station is in Shalimar and one post office is in Bhadat village.

12.3.2 Profile of the Project Affected Families

Demographic Profile

A total of 240 families have been identified as Project Affected Families (PAFs) – out of which 228 families have ownership of land/houses/shops and 12 families are identified as tenants. Total population of these 240 families is 1732 persons, out of which 9 are social cast, 19 schedule cast (SC) and 17 schedule tribe (ST). During the socio-economic survey 106 families have been identified as Below Poverty Line (BPL) families. Demographic Data of Project Affected Families is given at Table 12.4. The details of the projected affected families is given in Annexure III, IV and V.

Table 12.4 : Demographic Profile of Project Affect Families

Sr. No.	Village Name	PAFs	Total Population	Social Cast	SC	ST	BPL
1	Janwas	7	46			7	7
2	Salana (Kandani)	54	352	3			22
3	Agral	10	100				3
4	Dugga	31	285			10	20
5	Bhandera	6	44	6			3
6	Sangna	12	104				7
7	Bugrana	7	54		7		5
8	Khori	3	26		2		3
9	Dhar	1	10				1
10	Lass	3	14				1
11	Bhadat	21	171		10		14
12	Joshana	48	301				11
13	Salana	25	162				4
13	Tenant (Kandani)	12	63				5
Total		**240**	**1732**	**9**	**19**	**17**	**106**

Education

Most of the population in the affected families are literate i.e. they have the basic ability to read and write.

Occupation Pattern

Farming and animal rearing is the main occupation in the affected families, few people are in government and private jobs and some are involved in business. The annual income varies from Rs. 25000 to Rs 7 lakh. Average earning of large number of families is around Rs. 1.0 lakh per annum.

Livestock

The livestock rearing is the mainly practiced in the all affected villages. The livestock includes Buffalo, Cow, Ox, Goat, Sheep, Horse and Mule. The population of goat and sheep shares the major part in livestock.

12.3.3 Displaced Families

Out of 240 PAFs, 80 families are identified as displaced families due to loss of their houses or shops. The displaced families belong to Janwas, Salana (Kandani), Agral, Dugga, Bhandera and Sangna villages. Data on displaced PAFs is given at Table12.5 below. Out of 80 displaced families, 16 are losing both land and house. These are 10 families from Dugga Village (all are ST families) and 6 families from Bhandera Village (all are Social Caste).

Table 12.5 : Data of Displaced Families

	Village Name	Total Families	Total Population	No. of displaced families	No. of displaced families loosing houses & Land	No. of displaced families loosing houses	No. of displaced families loosing Cattle-sheds		No. of displaced families loosing Shops		No. of displaced families loosing Water-mills		No. of displaced families loosing Kothas	
							Families	Cattle-sheds	Families	Shops	Families	Water-mills	Families	Kothas
1	Janwas	120	805	6	_	6	5	5				1		
2	Salana (Kandani)	94	522	43	_	43	15	20	17	38[3]	1	1	2	2
3	Agral	132	776	9	_	9	8	8	7	7	4	3		
4	Dugga	143	870	10	10[1]	_	9	9			4	4		2
5	Bhandera	94	620	6	6[2]	_	6	6	5	5		1		
6	Sangna	41	262	6	_	6	1	1	1	1		1	5	5
	Total	624	3855	**80**	**16**	**64**	**44**	**49**	**30**	**51**	**9**	**11**	**7**	**9**

1 – All are Scheduled Tribe
2- All are Social Cast
3- 9 are tenants

12.3.4 Affected Government/Community Properties

In Salana (Kandani), Agral,Dugga and Bhandera villages there aregovernment properties, three temples, one grave yard and one samshanghatwhich will get affected as they are falling under submergence area. Details are given below.

Village	Property
Salana (Kandani)	R&B Hut
Salana (Kandani)	Forest Hut
Salana (Kandani)	Middle School Building
Salana (Kandani)	GREF (Beacon) Hut
Salana (Kandani)	Temple
Agral	2 Temples
Dugga/Salana/Agral	SamshanGhat (4 numbers)
Bhandera	Grave Yard

12.4 RESETTLEMENT & REHABILITATION PLAN

The process of R&R has two distinct components namely resettlement and rehabilitation. Resettlement primarily involves the physical relocation of the affected population (displaced) to a new residential site. Rehabilitation on the other hand means to assist the affected population so that every individual could regain and/or improve him/her life and socio-economic status. Imparting skills and/or vocations to the eligible persons from Project Affected Families is primarily undertaken as rehabilitation measure.

Resettlement and Rehabilitation involves the following interventions:

- Acquisition of land and homestead plots would have to be compensated in accordance with the Land Acquisition Act, 1894 and provisions laid in the NRRP-2007
- Resettlement involves provision of alternate housing site along with amenities and facilities. Also, assistance is given to the PAFs while shifting to these sites.

The main objectives of the Resettlement and Rehabilitation Plan are:

- To compensate the families affected adversely by land acquisition
- To improve the quality of life of the PAFs and the surrounding project affected area by developing infrastructure facilities
- To provide trainings and skill development activities for their better living
- To ensure that special care is taken for protecting the rights of the weaker sections

especially the Scheduled Tribes and also care is to be taken not to disturb much the cultural and ethnicity of the area.

- To provide adequate compensation to PAFs whose land is acquired
- To create good rapport with the local people for long-term relationship and mutual benefits.

Although the private land acquisition has been kept to minimum;240 families are getting affected, therefore theresettlement and rehabilitation plan for the project affected families of the proposed Ratle H.E.Project has been formulated as per the provisions of **NRRP– 2007.**

12.4.1 Definitions as per NRRP

The definitions of various institutional terms and categories used in this Chapter are as follows:

I. *"Administrator for Rehabilitation and Resettlement"* - means an officer not below the rank of District Collector in a State appointed for the purpose of rehabilitation and resettlement of affected persons;

II. *"Affected Family"* means

(a) A family whose primary place of residence or other property or source of livelihood is adversely affected by the acquisition of land for a project or involuntary displacement for any other reason; or

(b) Any tenure holder, tenant, lessee or owner of other property, who on account of acquisition of land (including plot in the abadi or other property) in the affected area or otherwise, has been involuntarily displaced from such land or other property; or

(c) Any agricultural or non-agricultural labourer, landless person (not having homestead land, agricultural land, or either homestead or agricultural land), rural artisan, small trader or self-employed person; who has been residing or engaged in any trade, business, occupation or vocation continuously for a period of not less than three years preceding the date of declaration of the affected area, and who has been deprived of earning his livelihood or alienated wholly or substantially from the main source of his trade, business, occupation or vocation because of the acquisition of land in the affected area or being involuntarily displaced for any other reason;

III. *"Affected Area" means area of village or locality notified by the appropriate Government;*

IV. *"Agricultural Labourer" means a person primarily resident in the affected area for a period of not less than three years immediately before the declaration of the affected area who does not hold any land in the affected area but who earns his livelihood principally by manual labour on agricultural land therein immediately before such declaration and who has been deprived of his livelihood;*

V. *"Agricultural Land" includes lands being used for the purpose of*

(a) agriculture or horticulture;

(b) dairy farming, poultry farming, pisciculture, breeding of livestock or nursery growing medicinal herbs;

(c) raising of crops, grass or garden produce; and

(d) land used by an agriculturist for the grazing of cattle, but does not include land used for cutting of wood only;

VI. *"Appropriate Government" means*

(a) In relation to the acquisition of land for the purposes of the Union, the Central Government;

(b) In relation to a project which is executed by the Central Government agency or undertaking or by any other agency on the orders or directions of the Central Government, the Central Government;

(c) In relation to the acquisition of land for purposes other than (a) and (b)above, the State Government; and

(d) In relation to the rehabilitation and resettlement of persons involuntarily displaced due to any other reason, the State Government;

VII. *"BPLfamily' The below poverty line (BPL)families shall be those as defined by the Planning Commission of India from time to time and included in a BPL list for the time being in force;*

VIII. *"Commissioner for Rehabilitation and Resettlement" means the Commissioner for Rehabilitation and Resettlement appointed by the State Government not below the rank of Commissioner' or of equivalent rank of that Government;*

IX. *"DDP block" means a block identified under the Desert 'Development Programme of the Government of India;*

X. *"Family" includes a person, his' or her spouse, minor sons, unmarried daughters, minor brothers, unmarried sisters, father, mother and other relatives residing with him or her and dependent on him or her for their livelihood; and includes "nuclear family" consisting of a person, his or her spouse and minor children;*

XI. *"Holding" means the total land held by a person as an occupant or tenant or as both;*

XII. *"Khatedar" means a person whose name is included in the revenue records of the parcel of land under reference;*

XIII. *'Land Acquisition" or "acquisition of land" means acquisition of land under the Land Acquisition Act, 1894 (1 of 1894), as amended from time to time, or any other law of the Union or a State for the time being in force;*

XIV. *"Marginal Farmer" means a cultivator with an un-irrigated land holding up to one hectare or irrigated land holding up to half hectare;*

XV. *"Non-agricultural labourer" means a person who is not an agricultural labourer but is primarily residing in the affected area for a period of not less than three years immediately before the declaration of the affected area and who does not hold any land under the affected area but who earns his livelihood principally by manual labour or as a rural artisan immediately before such declaration and who has been deprived of earning his livelihood principally by manual labour or as such artisan in the affected area;*

XVI. *"Project" means a project involving involuntary displacement of people, irrespective of the number of persons affected;*

XVII. *"Requiring body" means a company, a body corporate, an institution, or any other organization for whom land is to be acquired by the appropriate Government, and includes the appropriate Government if the acquisition of land is for such Government either for its own use or for subsequent transfer of such land in public interest to a company, a body corporate, an institution, or any other organization, as the case may be, under lease, license or through any other system of transfer of land;*

XVIII. *"Resettlement area" means any area so declared under paragraph 6.9 of NRRP, 2007 by the appropriate Government;*

12.4.2 R & R Benefits

The R&R package, discussed in the subsequent paragraphs, has been modeled on the basis of NRRP, 2007**.** Relevant applicable clauses have been discussed below.

1) Any affected family owning house and whose house has been acquired or lost, may be allotted free of cost house site to the extent of actual loss of area of the acquired house but not more than two hundred and fifty square meters of land in rural areas, or one hundred and fifty square meters of land in urban areas, as the case may be, for each nuclear family (Clause 7.2)

2) Provided that any such affected family which opts not to take the house offered, shall get a suitable one-time financial assistance for house construction, and the amount shall not be less than what is given under any programme of house construction by the Government of India.

3) Each affected family owning agricultural land in the affected area and whose entire land has been acquired or lost, may be allotted in the name of the khatedar(s) in the affected family, agricultural land or cultivable wasteland to the extent of actual land loss by the khatedar(s) in the affected family subject to a maximum of one hectare of irrigated land or two hectares of un-irrigated land or cultivable "wasteland, if Government land is available in the resettlement area (Clause 7.4.1).

4) In the case of irrigation or hydel projects, fishing rights in the reservoirs shall be given to the affected families, unless there are special reasons (Clause 7.5)

5) In case of a project involving land acquisition on behalf of a requiring body, the stamp duty and other fees payable for registration of the land or house allotted to the affected families shall be borne by the requiring body (Clause 7.6)

6) The land or house allotted to the affected families under this policy shall be free from all encumbrances (Clause 7.7)

7) The land or house allotted to the affected families under this policy may be in the joint names of wife and husband of the affected family (Clause 7.8)

8) In case of allotment of wasteland or degraded land in lieu of the acquired land, each khatedar in the affected family shall get a one-time "financial assistance of such amount as the appropriate Government may decide but not less than fifteen thousand rupees per hectare for land development (Clause 7.9.1)

9) In case of allotment of agricultural land in lieu of the acquired land, each khatedar in the affected family shall get a one-time financial assistance of such amount as the appropriate Government may decide but not less than ten thousand rupees, for agricultural production (Clause 7.9.2)

10) Each affected family that is displaced and has cattle, shall get financial assistance of such amount as the appropriate Government may decide but not less than fifteen thousand rupees, for construction of cattle shed (Clause 7.10)

11) Each affected family that is displaced shall get a one-time financial assistance of such amount as the appropriate Government may decide but not less than ten thousand rupees, for shifting of the family, building materials, belongings and cattle (Clause 7.11)

12) Each affected person who is a rural artisan, small trader or self-employed person and who has been displaced shall get a one-time financial assistance of such

amount as the appropriate Government may decide but not less than twenty-five thousand rupees, for construction of working shed or shop (Clause 7.12)

13) In case of a project involving land acquisition on behalf of a requiring body (Clause 7.13.1)

(a) The requiring body shall give preference to the affected families – at least one person per nuclear family - in providing employment in the project, subject to the availability of vacancies and suitability of the affected person for the employment;

(b) Wherever necessary, the requiring body shall arrange for training of the affected persons, so as to enable such persons to take on suitable jobs;

(c) The requiring body shall offer scholarships and other skill development opportunities to the eligible persons from the affected families as per the criteria as may be fixed by the appropriate Government; the requiring body shall give preference to the affected persons or their groups or cooperatives in the allotment of outsourced contracts, shops or other economic opportunities coming up in or around the project site; and the requiring body shall give preference to willing landless labourers and unemployed affected persons while engaging labour in the project during the construction phase.

(d) The requiring body shall give preference to the affected persons or their groups or cooperatives in the allotment of outsourced contracts, shops or other economic opportunities coming up in or around the project site; and

(e) The requiring body shall give preference to willing landless labourers and unemployed affected persons while engaging labour in the project during the construction phase.

14) The affected persons shall be offered the necessary training facilities for development of entrepreneurship, technical and professional skills for self employment (Clause 7.13.2)

15) In case of a project involving land acquisition on behalf of a requiring body, the affected families who have not been provided agricultural land or employment shall be entitled to. a rehabilitation grant equivalent to seven hundred fifty days minimum agricultural wages or such other higher amount as may be prescribed by the appropriate Government (Clause 7.14)

16) In case of a project involving land acquisition on behalf of a requiring body, each affected family which is involuntarily displaced shall get a monthly subsistence allowance equivalent to twenty-five days minimum agricultural wages per month for a period of one year from the date of displacement (Clause 7.16).

17) The project authorities shall, at their cost, arrange for annuity policies to pay a pension for life to the vulnerable affected persons as indicated at paragraph 6.4(v), of such amount as may be prescribed by the appropriate Government subject to a minimum of five hundred rupees per month (Clause 7.17)

18) If land is acquired in cases of urgency, such as under section 17 of the Land Acquisition Act, 1894 or similar provision of any other Act of the Union or a State for the time being in force, each affected family which is displaced shall be provided with transit and temporary accommodation, pending rehabilitation and resettlement scheme or plan, in addition to the monthly subsistence allowance and other rehabilitation and resettlement benefits due to them under this policy (Clause 7.18)

19) The affected families may be given the option to take a lump-sum amount in lieu of one or more of the benefits specified in above paragraphs, the amount being determined by the appropriate Government after consultation with the requiring body (Clause 7.20)

20) Each affected family of Scheduled Tribe followed by Scheduled Caste categories shall be given preference in allotment of land-for-land, if Government land is available in the resettlement area (Clause 7.21.3)

21) In case of a project involving land acquisition on behalf of a requiring body, each Scheduled Tribe affected family shall get an additional one-time financial assistance equivalent to five hundred days minimum agricultural wages for loss of customary rights or usages of forest produce (Clause 7.21.5)

22) In the case of irrigation or hydel projects, the affected Scheduled Tribes, 'other traditional forest dwellers and the Scheduled Castes families having fishing rights in a river or pond, or dam in the affected area shall be given fishing rights in the reservoir area of the irrigation or hydel projects (Clause 7.21.10)

12.4.3 Budget for R&R Benefits

Budget for R&R benefits has been prepared keeping in view the numbers of project affected families losing houses, land, shops, water mills, cattle sheds, etc. Categorization of Project Affected families, as prepared based on the information provided by the project developer through Revenue Department and also collected during socio-economic survey is given at Table 12.6 below.

Table 12.6 : Categorization of Project Affected Families (PAFs)

S. No.	PAFs Category	No. of PAFs
	Total no of Project Affected Families	
1	Total Number of Project Affected Families (PAFs)	240

	a) Losing house (16 are losing house and land)	80
	b) Losing land	148
	c) Tenant	12
	Sub total 1 (a+b+c)	**240**
2	Total Number of Cattle Sheds	55
3	Total Number of Kothas (Seasonal cattle shed in grasslands)	17
4	Rural artisans/small traders and self employed persons	62
5	Total Number of Shops	76
6	Total Number of Water Mills	17
7	PAF's Based on Cast	
	a) ST PAFs	17
	b) SC PAFs	19
	c) Social Cast PAFs	9
8	BPLPAFs	106

The budget for various R&R benefits with explanation is given in Table 12.7.

Table 12.7 : Budget for R&R Benefits

Clause No. ofNRRP-07	Provision Details	Affected PAFs	Unit Cost (Rs.)	Total Cost (Rs.)	Remarks
7.2/7.3/ 7.6	Each of the displaced PAFs would be provided free of cost a house and a plot for the house site to the extent of actual loss of area of the acquired house but not more than 250 sq m in rural area or one time financial assistance for house construction considered as Rs. 1.25 Lacs per house including cost of stamp duty and other fee payable for registration of the house	80	125000	**10000000**	Cost of land to be estimated separately. 80 PAFs are losing their houses and this compensation is for the construction of the new house and stamp duty to be paid thereof. If constructed houses will be provided, only the cost of stamp duty will be provided.
	Each PAF losing their shop (and water mill) shall be given a shop of equivalent size in the resettlement area or a one time financial assistance @ Rs. 50,000.00 per shop including cost of stamp duty and other fee payable for registration of the house	**93**	50000	**4650000**	Provisions are not specifically mentioned in the policy for the shops. If compensation is paid separately based on the size of the plot and structure, this cost will be eliminated from here.
7.4.1	Each Affected Family losing agriculture land; may be allotted in the name of the Khatedar(s) agriculture land or cultivable waste land to the extent of actual land loss by the Khatedar(s)	228		**0**	Cost of land to be estimated separately. 228 Khatedars have been recorded as owners of the total private land required for the project
7.10	Each displaced PAF having a cattle shed (and Kotha) shall get financial assistance of Rs. 15,000.00 for construction of cattle shed	72	15000	**1080000**	As per the present survey, 24 PAFs who are losing houses shall also loose Cattle Sheds
7.11	Each displaced PAF shall get financial assistance of Rs, 10,000 as transportation cost for shifting of building materials, belongings, cattle, etc. from the affected zone to the resettlement zone.	80	10000	**800000**	To be give to all the PAFs who are losing their houses
7.12	Each PAF comprising of rural artisans/small traders and self employed persons shall get one time financial assistance of Rs. 25,000 for construction of working shed/shop.	62	25000	**1550000**	50 shops are running, either by owner or by tenant

Clause No. ofNRRP-07	Provision Details	Affected PAFs	Unit Cost (Rs.)	Total Cost (Rs.)	Remarks
7.13.1	The requiring body shall offer scholarships and other skill development opportunities to the eligible persons from the affected families as per the criteria as may be fixed by the appropriate Government - It is proposed that a scholarship of Rs.500 per month for a period of 24 months would be extended to one child per PAF (Rs.500/month x PAFs for 24 months)	240	12000	**2880000**	Rate is not fixed in the policy and are proposed for the budgetary purposes. This is in addition to funds committed under local skill development
7.13.2	The affected persons shall be offered the necessary training facilities for development of entrepreneurship, technical and professional skills for self-employment - It is proposed that a grant of Rs.2000 for a period of 12 months would be extended to the PAFs for skill development	240	24000	**5760000**	Rate is not fixed in the policy and are proposed for the budgetary purposes. This is in addition to funds committed under local skill development
7.14	PAFs, who have not been provided agriculture land or employment shall be entitled to a rehabilitation grant equivalent to 750 days Minimum Agriculture Wages (MAW) @ Rs. 200 per day	240	150000	**36000000**	Rehabilitation grant to all the PAFs
7.16	Each displaced PAF will get Monthly Subsistence allowance @ Rs. 200 per day Equivalent to 25 days MAW's per month for a period of one year from the date of displacement.	80	60000	**4800000**	Only for displaced PAFs
7.21.5	Each scheduled tribe affected family shall get additional one-time financial assistance equivalent to 500 days of Minimum agricultural wages (Rs. 200 per day) for loss of customary rights and forest usage	17	100000	**1700000**	Only for ST PAFs
	Total cost (Rs.)			**69220000**	

12.4.4 Infrastructure Facility Proposed In Resettlement Area

As there are 80 displaced families requiring resettlement, apart from the rehabilitation benefits, as discussed above, it is important to budget for the infrastructure facilities to be provided in the resettlement area. NRRP, 2007 has given following directions for providing infrastructure facilities in the proposed resettlement area:

1) In cases of involuntary displacement of less than four hundred families en masse in plain areas, or less than two hundred families or more en masse in tribal or hilly areas, DDP blocks or areas mentioned in the Schedule V or Schedule VI to the Constitution, all affected families shall be provided basic infrastructural facilities and amenities at the resettlement site(s) as per the norms specified by the appropriate Government. It would be desirable that provision of drinking water, electricity, schools, dispensaries, and access to the resettlement sites, amongst others, be included in the resettlement plan approved by the appropriate Government (Clause 7.22.2)

2) If relocation takes place in an existing settlement area, the same infrastructure shall also be extended to the host community (Clause 7.22.3)

3) While shifting the population of the affected area to the resettlement area, the Administrator for Rehabilitation and Resettlement shall, as far as possible, ensure that (Clause 7.22.4):

    a) In case the entire population of the village or area to be shifted belongs to a particular community, such population or families may, as far as possible, be resettled en masse in a compact area, so that socio-cultural relations and social harmony amongst the shifted families are not disturbed.

    b) In the case of resettlement of the Scheduled Caste affected families, it may, as far as possible, be ensured that such families are resettled in the areas close to the villages.

Resettlement area, to relocate 80 identified displaced families, will be selected by the government or alternatively it may be decided to resettle them in the existing settlement area. In either of the case, it is important to budget for the infrastructure to be developed for resettlement. Exact plan for resettlement will be finalized, once a decision on resettlement is taken and budget will be updated accordingly.

As can be seen from Table 12.5 above, displaced families belong to 6 villages and no village is getting completely displaced. Main villages are at higher elevation and some of the families have established themselves in the lower area near national highway and riverbank; only these families are getting displaced from above 6 villages. Maximum displaced families are from Salana (Kandini) village, where 54 families will be displaced. Upper Kandini is above the Full Reservoir Level (FRL). Next is Dugga, where 31 families

will be displaced. Other 4 villages – Janwas, Agral, Bhandera and Sangna have 7, 10, 6 and 12 displaced families respectively. Keeping the above scenario in view, it would be possible to resettle these displaced families in the existing settlement area, preferably based on their cast and community. This would not put additional pressure on the displaced families by way of moving away from their community people and area where they are settled for a long time. Therefore, it is proposed to look into the option of resettling them in the same area and upgrade the infrastructure and amenities in those areas so that additional population pressure do not put strain on the existing infrastructure. Additionally, infrastructure improvement in existing settlement area will be beneficial for other families living in the area.

Following facilities needs to be created/ augmented in the villages where the displaced families will be resettled. Quantum will be decided once a final decision on the resettlement of displaced families will be taken. A budgetary provision is given so that the cost is built up in the overall cost of the project and shortage of funds should not delay in implementation of R&R measures.

- Approach roads and internal roads
- Sewage system for domestic wastewater and storm water
- Waste collection and disposal system
- Drinking water and electricity supply
- Education facilities
- Medical Facilities
- Parks and Playgrounds
- Cattle grazing ground
- Community Hall
- Panchayat Building
- Places of worship
- Market area
- Burial and cremation ground

The above list is not comprehensive and this will be updated based on the identified resettlement areas. A budgetary provision of **Rs. 12.00 crore** has been made for developing infrastructure facilities in the resettlement areas. A break up of the budgetary provision is given at **Table12.8** below.

Table 12.8 : Break up of Budgetary Provision

Infrastructure Facilities in Residential Area	Budgetary Estimate (Rs. In lakhs)
Approach roads and internal roads	250.00
Sewage system for domestic wastewater and storm water	125.00
Waste collection and disposal system	100.00
Drinking water and electricity supply	150.00
Education facilities	250.00
Medical Facilities	200.00
Parks and Playgrounds	5.00
Cattle grazing ground	5.00
Community Hall	25.00
Panchayat Building	15.00
Places of worship	25.00
Market area	40.00
Burial and cremation ground	10.00
Total	**1200.00**

12.4.5 Institutional Arrangement for Implementation

In order to ensure smooth and effective land acquisition, implementation of R&R measures, monitoring of R&R operations etc., the **NRRP – 2007** lays provision for appointment for commissioner R&R and Administrator R&R.

The State Government shall appoint an officer of the rank of Commissioner/ Secretary of that government for R&R in respect of such projects to which this policy (NRRP-2007) applies. The commissioner shall be responsible for supervising the formulation of R&R plans/schemes, proper implementation of such plans/schemes and redressal of grievances.

The State Government shall, by notification, appoint in respect of that project, an officer not below the rank of District Collector of the State Government to be Administrator for R&R. Subject to the superintendence, directions and control of the appropriate Government and Commissioner for R&R, the Administrator for R&R shall take all measures for the rehabilitation and resettlement of all PAFs in respect of that project. The overall control and superintendence of the formulation of R&R plan and execution of the same shall rest in the Administration for R&R. The officers and employees shall assist the administrator for R&R, the appropriate government may provide.

In view of the above, the following institutional arrangement for effective implementation & monitoring of R&R activities are suggested.

A) Supervisory Body

- Commissioner for R&R
- Project In Charge of Ratle Hydroelectric Power Company Ltd.

B) Implementation Body

- Administrator for R&R
- Representative ofRatle Hydroelectric Power Company Ltd.
- Representatives of village level Committees (VLC)
- Representatives of women of the affected villages
- Representatives of Nationalized Bank
- Representatives of Forest Department
- Representatives of Local NGOs
- MLA/MP of the Area
- Representative Scheduled Tribes residing in the affected area.
- Land Acquisition Officer of the project

Besides the foregoing organizational arrangement liaison should be established by the administrator for R&R with the other government departments, which will extend support in the implementation of land acquisition and rehabilitation plans. Specifically, government organizations like Department of Revenue, Rural Development, Agriculture, Forest, Horticulture; Rural Industries, etc. can be contacted for dovetailing their plans for the economic rehabilitation of PAFs. These organizations/departments shall not only extend their various development schemes for the economic welfare of the PAFs but would also provide technical guidance and training to PAFs in carrying out economic activities. However, the NRRP-2007 indicates R&R Committee at Project level, under the Chairmanship of Administrator for R&R.

C) Monitoring and Evaluation

Monitoring and Evaluation (M&E) must be simultaneous with the implementation of Rehabilitation Plan. It requires specialized skill for application of general project monitoring procedures to the process of land acquisition and rehabilitation. Conventional monitoring, normally carried out by the Government machinery, will continue. Additionally, an external M&E agency will also be engaged to help in proper monitoring of land acquisition and rehabilitation plans and post project monitoring.

It is suggested that the monitoring be conducted by an independent agency not connected with the project. Therefore, an independent consultant having experience in R&R studies in similar areas, and not connected with the project can be appointed for monitoring the project. The Consultant will review the rehabilitation and resettlement program during and after implementation and also review during 1st and 3rdyear from the completion of the project. A total provision of Rs. 1.50 crore have been kept in the project budget for this purpose.

Monitoring of the progress of R&R is important because of the sensitivity of these issues. The objective of monitoring is to assess the progress of resettlement activity, to identify difficulties, ascertain problem areas, and provide indication for the need of calling attention to some specific issues at an early stage. Following tasks have to be performed by the consultant at different stages of the project:

- Establish baseline information on individual PAFs and their pre-project standards of living, health conditions, nutritional patterns, etc. This should precede the implementation of R&R package in general after the completion of the project.
- The planning of the monitoring studies could cover disbursement of compensation and grants.
- After the completion of the project, a few sensitive indicators using 100% survey techniques should be undertaken mainly to understand how effective the R&R plan and project economic development package has been in reality.

12.4.6 Budget for R&R

The summary of the financial requirement for implementation of the Rehabilitation Plan is given in **Table12.9**.

Table 12.9 : Summary of Budgetary Estimates for R&R Implementation

Sl. No.	Component	Cost (₹ in lakh)
1	Rehabilitation Grant for Project Affected Families	692.20
2	Proposed Infrastructure Facilities	1200.00
3	Monitoring and Evaluation Set up	100.00
	Total (Rs. In lakh)	**1992.20**

12.5 LOCAL AREA DEVELOPMENT PLAN

In addition to the above mentionedprovisions for displaced families and other R & R benefits for the project affected families, project developer would aim at the improvement in the living standards of inhabitants in the project area not only by being a catalyst for development but also by developing infrastructure in the area. The infrastructure development will be in addition to the rightful compensation to the project affected families.

As large-scale investment is being made in the area by way of construction of hydropower project, benefits should reach to the local population so that there is remarkable improvement in their quality of life. Provisions will be made by the project proponent for the infrastructure development programme in the project area as per the needs of the local population.Thus the proposed Local Area Development strategy

should be formulated by keeping in view the existing facilitiesand giving due consideration to the views of the local people.

Additionally, as advised by MoEF while giving scoping clearance for the project, stress will be given to Local Skill Development so that they can be absorbed in the project and other allied activities during construction and operation phases of the project. This way project will bring long term benefits to the local population.

A fund under the name, LADF, will be created for development of infrastructure in the project area. The project authorities will contribute a total of 1% of the project cost towards this fund, with a view to keep 50% of this amount for local skill development activities.

Shelf of schemes and their execution & monitoring under Local Area Development Plan will be prepared. This shall be done by a specially constituted Local Area Development Committee (LADC) chaired by Deputy Commissioner and represented by Pradhans of concerned Panchayats, nominated project personnel and other concerned officers of various departments. Following guidelines will be followed to prepare the shelf of schemes:

(i) Facilities meant for panchayat only will be considered as panchayat level schemes like cement concrete internal paths, ropeways, street light, sanitation, rain water harvesting etc.
(ii) Facilities serving more than one Panchayat will be considered as Block Level e.g. school, cement concrete link road, health centre etc.
(iii) Facilities like Bus Stand, Hospital, College, Training Institute etc. will be covered under District level scheme.
(iv) Purchase of vehicles like fire tenders and ambulances.

Following activities are proposed under the local area development plan, however exact schemes will be formulated by LADC.

A. SKILL DEVELOPMENT:

a) Adaptation of ITI:

It is proposed to adopt ITIKishtwar and upgrade the facilities so that locals can be trained in various trades such as mechanic, electrician, draughtsman, surveyor, plumber, etc., Locals will be encouraged to get skill development training so that they can be absorbed in the project during construction and operation phase.

b) Training Courses through other Institutions:

In addition to adopting ITIKishtwar, the eligible youth from project affected families shall be imparted education and training through other well known institutes such as

diploma courses and other ITIs with a view to absorb them in the project construction and operation.

c) Tailoring, Knitting & Embroidery Training Centers:

To create job opportunities & generate income among the project affected and other local families; tailoring, knitting and embroidery centers shall be opened in consultation with the local panchayats. Necessary equipment along with raw material and instructors shall be made available. Arrangements shall be made through government agencies to sell the products to J&K Handloom Department and other private/ state agencies involved in the trade.

d) Computer Courses:

Computer training centers at appropriate places in consultation with local panchayats shall be opened to train eligible candidates both males and females to help them to avail job opportunities within and outside the project. Infrastructure and equipments for training courses along with instructor shall be provided.

e) Emergency Medical Response through Trauma Centers:

Eligible male and female candidates from project affected and other local families shall be imparted training in Hyderabad and their services shall be utilized in trauma centre to be established at project site.

f) Income Generating Activities/Projects

ITI training for eligible youths

Assistance for poultry farming

Priority to Local Community in Employment through various Job Contracts

Assistance for Fruit bearing tree plantations

Capacity building programmeswould be implemented for the development of skills.

g) Vocational Training

Creating institutions to impart vocational training for acquiring and upgrading technical skills with a view to enhance employability. Establishing partnerships with District Administration and various Non Governmental Organizations to assist gainful self-employment schemes for the unemployed youth in the area, such programs would include:

- Organization of training programs in Driving of 4 Wheelers, Welding and fabrication, TVs, Radio, other electronic appliances mechanism
- Training programs on tailoring, embroidery, bamboo crafting to women
- Donate sewing machines to woman

B. INFRASTRUCTURE DEVELOPMENT AND PUBLIC UTILITIES

a) Non- grid power to affected villages:

Free power in line with National policy shall be provided to the project affected/ disturbed families.

b) Drinking Water facility:

The Project affected villages are facing scarcity of drinking water, therefore, it is proposed to implement water supply scheme either from KuligadNallah or from KandaniNallah. Detailed survey shall be conducted for proper design and construction of water supply scheme.

c) Community Centers:

To facilitate project affected people to organize marriages/ other social functions community centers at places selected by the locals shall be constructed & provided with required furniture, tent house facilities and watchman.

d) 10 bedded Hospitals:

10 Bedded Hospital shall be constructed in the project area to provide free medical facilities to the project affected people. The Hospital shall be equipped with modern treatment facilities, doctors and paramedical staff. Ambulance and provision of life support system shall be made to meet emergencies. To provide better accommodation facilities residential quarters for doctors, paramedical staff and other staff shall be constructed.

e) Development of playgrounds:

In the project affected villages play ground shall be developed and all facilities for different games shall be provided to inculcate interest for sports amongst the youths.

f) Setting up of Recreation Facilities

There is a need to set up recreation facilities like development of gym, parks, etc. in the vicinity of the project area.

g) Model Schools:

Additional accommodation shall be provided to the Schools in the project affected villages and the Schools shall be provided with computers, furniture, library etc. to develop these Institutions as model Institutions.

h) Development of concrete paths from Village to Road heads & drainage system:

The affected villages shall be connected with the roads through concrete paths. Effective drainage system shall be developed in the villages.

i) Solar Street Lights:

Solar lights shall be provided in the project affected area as well as in the Thatri market.

j) Community Toilets:

Community toilets shall be constructed in the project affected villages in association with panchayats and proper maintenance shall be ensured.

k) Crematorium centers & graveyards:

The crematorium centers shall be relocated in consultation with the local panchayat at appropriate location. Similarly for graveyard, the alternative land shall be made available after consulting the affected habitations.

l) Upgrading of Unani & Ayurvedic Hospitals:

The Unani&Ayurvedic Hospital in the project affected area shall be upgraded in terms of better facilities and Medicare.

m) Face upliftment of parade ground Kishtwar:

The parade ground Kishtwarwhich is the only place at district Headquarter for general public use and entertainment shall be renovated in consultation with District Administration.

n) Enhancing Medicare in District Hospital Kishtwar:

The medicare system in District Hospital Kishtwar shall be improved by providing the latest equipments and developing modern clinical laboratories in consultation with district hospital authorities.

o) Financial assistance to Govt. aided Schools in Kishtwar:

The Govt. aided Schools vizBhartiVidyaMandir, IslamiaFaridiya Institute and AdarshBalniketan High School shall be provided with annual financial assistance for development of School infrastructure.

p) Development/ Construction of Temples/Mosques:

In the project affected villages the temples / mosques shall be developed or constructed where these structures do not exist.

C. SOCIAL SERVICES

a) Widow Grant:

One time grant of Rs. 10000.00 shall be given to the widows in the project affected villages. The one time grant shall be paid in presence of PanchayatSarpanches and Panches.

b) Assistance to Physically Handicapped:

One time financial assistance of Rs. 10000.00 in cash shall be provided to the physically handicapped in the project affected Villages in presence of PanchayatSarpanches and Panches.

c) Assistance for female marriages:

An amount of Rs. 10000.00 shall be provided to the project affected family for the marriage of female in the family.

d) Transportation facility for School Children's:

Busses shall be hired for School going Children's in the project affected and local villages.

e) Cattle Fodder:

After detailed Survey in respect of live stock in the project affected Villages, Cattle fodder shall be provided as per requirement with assistance of Panchayats.

f) Medical Camps:

Medical Camps shall be organized every three months in the project affected Villages and free medicines shall be provided to the patients.

g) Assistance to Critically ill:

One time good gesture assistance of Rs. 10,00.00 shall be made available to the critically ill persons in the project affected Villages.

h) Monitoring System for affect of Blasts:

Blast monitoring system shall be in place to see the pre & post blast affects on houses in near vicinity and remedies measures taken accordingly.

i) Weather Monitoring Station:

Weather monitoring station shall be installed and people apprised about weekly forecast of weather in the project affected area.

j) Photo Identity Cards:

Photo Identity Cards, free of cost, shall be issued to the project affected families.

k) Scholarships to Students:

Scholarships to the Students in the project affected Villages falling in the 1st to 10th rank in their respective classes shall be paid as per norms.

k) Artificial limbs to the Handicapped:

To the physically handicapped in the project affected Villages who need artificial limbs, free of cost services shall be provided. The limbs shall be provided and fitted through Man Singh Hospital.

I) Sponsoring Self-Help Groups

Sponsoring the SHGs would increase the quality of life of local people. Besides, the promotion of savings, this will also enhance the marketability of local products such as local handicrafts, fruits, minor forest produce, etc.

Special emphasis and attention would be given to women of the area to hone their skill and awareness would be raised regarding the gender sensitivity issues.

D. PROMOTIONAL PROGRAM

Literacy Promotion Programme

Under this programme assistance to the existing schools would be provided

Construction & repairs of Schools buildings located in the affected zone villages
Supply of Furniture, Lighting arrangements, etc.
Distribution of School Uniforms, Books, stationery, bags etc. to students
Arrangements of Sports meets and Sport Training Camps in school
Special efforts will be made for the Promotion of Girl Child education
Introduction of scholarships for girl students in the schools
Special Attention on education, training and rehabilitation of mentally & physically challenged children/persons will be given.

General Welfare Activities

Supply of Furniture, Lighting arrangements for Gram Panchayat building of project vicinity Villages
Construction of rain shelter and bus stand for Community
Supply and Erection of Solar Street Light System in project vicinity villages
Organize camps for importance of hygiene
Training programs for farmers for agriculture techniques
Donations/ funds to various non-governmental organizations for the implementation of welfare activities

Sports Promotion Schemes

Construction of Sport Complex with in acquired land. Encouraging sports talents by promoting and organizing various sports events. Monthly stipend must be given for training and dietary expenses along with necessary sporting equipment. Village level tournaments to be organized under various disciplines to encourage sports and to identify young talents.

E. PROJECT IMPLEMENTATION CENTRE (PICs)

PICs should be instituted for dissemination and grievance redressal. If someone has a complaint about how they or their property is being treated during project implementation, they can come to the nearest PIC and explain their complaint.

The staff of PIC will have continued ongoing consultations with the local communities and they give formal updates on the project every 6 months and publish a newsletter on the project.

13 DAM BREAK MODELING & DISASTER MANAGEMENT PLAN

13.1 DAM BREAK MODELING

The objective of dam break modeling or flood routing is to simulate the movement of a dam break flood wave along a valley or indeed any area downstream that would flood as a result of dam failure. The key information required at any point of interest within this flood zone is generally:

- Travel time of flood water
- Peak water level – extent of inundation
- Peak discharge
- Duration of flooding

The nature, accuracy and format of information produced from a dam break analysis will be influenced by the end application of the data.

The present study for the Ratle H.E. Project comprises of the following hydrodynamic simulations due to occurrence of:

- PMF with Dam break with initial reservoir level at top of the dam
- PMF without dam in place (virgin condition)

13.2 DAM BREAK MODELLING PROCESS

Generally, dam break modeling can be carried out by either i) scaled physical hydraulic models or ii) mathematical simulation using computer. A modern tool to deal with this problem is the mathematical model, which is most cost effective and approximately solves the governing flow equations of continuity and momentum by computer simulation. A flow chart for mathematical modeling is given at the end of this chapter.

Mathematical modeling of dam breach floods can be carried out by either one dimensional analysis or two dimensional analysis. In one dimensional analysis, the information about the magnitude of flood, i.e., discharge and water levels, variation of these with time and velocity of flow through breach can be had in the direction of flow. In the case of two dimensional analysis, the additional information about the inundated area, variation of surface elevation and velocities in two dimension can also be forecast.

One dimensional analysis is generally accepted when valley is long and narrow and the flood wave characteristics over a large distance from the dam are of main interest. On the other hand, when the valley widens considerably downstream of dam and large area is likely to be flooded, two dimensional analysis is necessary. The basic theory for dynamic routing in one dimensional analysis consists of two partial differential equations originally derived by Barre De Saint Venant in 1871. The equations are :

i. **Conservation of mass (continuity) equation**

$(\partial Q/\partial X) + \partial(A + A_0) / \partial t - q = 0$

ii. **Conservation of momentum equation**

$(\partial Q/\partial t) + \{ \partial(Q^2/A)/\partial X \} + g A ((\partial h/\partial X) + S_f + S_c) = 0$

where Q = discharge;

A = active flow area;

A_0 = inactive storage area;

h = water surface elevation;

q= lateral outflow;

x = distance along waterway;

t = time;

S_f = friction slope;

S_c = expansion contraction slope and

g = gravitational acceleration

13.3 DAM BREAK MODEL

The National Weather Service's DAMBRK model developed by D.L. Fread has been used in the present study. DAMBRK is used to develop the outflow hydrograph from a dam and hydraulically route the flood through the downstream valley. The governing equations are complete one dimensional Saint Venant equations of unsteady flow coupled with internal boundary equations, representing rapidly varied flow through structures (which may develop time dependent breach) and utilizes external boundary equations at the u/s and d/s ends of the routing reach. The system of equations is solved by a non-linear weighted 4-point implicit finite difference method. The flow may be sub-critical or super-critical or combination of these each varying in space and time from one to the other. Outflow hydrograph to be routed is developed by the model using specified breach parameters. High water profiles along the valley, Flood arrival times and hydrographs at user specified locations are standard output.

The model consists of two conceptual parts:

(1) Description of the dam failure mode i.e. temporal and geometrical description of breach.

(2) A hydraulic computation algorithm for determining the time history of the outflow through the breach as affected by the breach description, reservoir inflow, reservoir storage characteristics, spillway outflows and d/s tail water elevation for

routing of the outflow hydrograph through the d/s valley. The model also determines the resulting water surface elevations and flood wave travel times.

13.4 METHODOLOGY

DAMBRK model includes reservoir storage routing (level pool) to compute outflow hydrograph from reservoir with sub-critical dynamic routing of outflow hydrograph through entire length of d/s valley, tail water depth computed by Manning's equation applied to tail water section. In other words, this model simulates the failure of a dam, computes the resultant outflow hydrograph and also simulates movement of the dam break flood wave through the downstream river valley. The model is built around three major capabilities, which are reservoir routing, breach simulation and river routing. After computing the hydrograph of the reservoir outflow, the time of occurrence of flooding in the downstream valley is determined by routing the outflow hydrograph through the valley. The dynamic wave method based on the complete equations of unsteady flow is the appropriate technique to route the dam break flood hydrograph through the downstream valley.

13.5 EMERGENCY PLANNING

To reasonably prepare an emergency plan, it will be necessary for the Dam break analysis to provide:

- Inundation maps at a scale sufficient to determine the extent of flooding in relation to people at risk, properties and access routes
- Identification of structures (bridges etc.) likely to be destroyed
- Indication of main flow areas (damage potential of flow)
- Timing of the arrival and peak of the flood wave
- Identification of features likely to affect mobility / evacuation during and after the event including impact on infrastructure and the deposition and scour of debris and sediment.

The Dam failure study involves the following component steps:

- Development or identification of the inflow hydrograph to the reservoir at the time of failure.
- Routing this hydrograph through the reservoir,
- Calculating the outflow hydrograph from the failed structure, and
- Modeling the movement of the flood wave downstream to determine travel time, maximum water level reached, inundated areas etc.

13.6 STATEMENT OF THE PROBLEM

The computation of flood wave resulting from a dam breach basically involves solving following problems:

(1) The outflow hydrograph from the reservoir.
(2) The routing of the flood wave downstream from the breached dam along the river channel and the flow plain
(3) The flood hydrograph and water level at desired downstream location and its lag with respect to inflow/ breach hydrograph at dam site.

In this case, the computation of the flood characteristics is divided into two distinct phases: (a) the determination of outflow hydrograph (b) the routing of flood wave downstream from the dam breach.

In this study, the problem of simulating the failure of Ratle H.E. Project is considered, by computing the outflow hydrograph from the breached Dam structure and routing this hydrograph along the downstream channel using dynamic routing technique to obtain the maximum water level marks reached during the passage of flood wave. The information regarding inflow hydrograph into the reservoir due to the storm at the time of failure, the structural and the hydraulic characteristics details of the Dam, the channel cross sectional details, the maximum water level marks reached in the reservoir at the time of failure and those observed in the downstream reach of the Dam due to the passage of flood wave etc. are available for the study.

13.7 INPUT DATA AND MODEL SET-UP

13.7.1 Input Data Requirement

Dam break flood analysis requires a range of data to depict accurately to the extent possible the topography and hydraulic conditions of the river course and dam break phenomenon. The important data required are:

(i) Cross sections of the river from dam site and up to location downstream of the dam to which the study is required

(ii) Elevation-Volume relationship of the reservoir

(iii) Salient features of the all hydraulic structures at the dam site and also in the study reach of the river

(iv) Design flood hydrograph

(v) Stage-discharge relationship at the last river cross section of the study area

(vi) Manning's roughness coefficient for different reaches of the river under study

Elevation-Area-Volume table has been presented below as Table 13.1

Table 13.1: Elevation – Area – Capacity Values

Area Capacity Table at Ratle Dam Site		
Elevation (m)	**Area (sqkm)**	**Capacity (MCum)**
925	0.000	
930	0.023	0.038
935	0.049	0.214
940	0.106	0.593
945	0.163	1.260
950	0.215	2.202
955	0.275	3.424
960	0.345	4.971
965	0.418	6.875
970	0.498	9.162
975	0.598	11.899
980	0.702	15.145
985	0.801	18.900
990	0.912	23.179
995	1.002	27.963
1000	1.136	33.304
1005	1.285	39.353
1010	1.394	46.048
1015	1.576	53.469
1020	1.743	61.763
1025	1.898	70.863
1030	2.061	80.757
1035	2.232	91.487
1040	2.411	103.092

13.7.2 Design Flood Hydrograph

Probable Maximum Flood (PMF) hydrograph impinged in the model set up is given in Table 13.2. Manning's coefficient has been taken as 0.06. The study has been carried out till about 35 km downstream of the Dam. Cross sections considered have been appended in the model output.

Table 13.2: Probable maximum flood

Time (hr)	Design Flood Hydrograph
0	1801
3	1883
6	2279
9	3017
12	3841
15	4677
18	5460
21	6210

24	6959
27	7587
30	8218
33	8804
36	9451
39	10028
42	10865
45	11874
48	13059
51	**13815**
54	13491
57	11952
60	10170
63	8153
66	6714
69	5555
72	4742
75	4110
78	3611
81	3173
84	2808
87	2509
90	2281
93	2097
96	1958
99	1864
102	1819
105	1801

13.8 DAM BREAK SIMULATION

13.8.1 Selection of breach parameters for Dam Break study

For any dam break study it is extremely difficult to predict the chances of failure of a dam, as prediction of the dam breach parameters and timing of the breach are not within the capability of any of the commercially available mathematical models. However, assuming the dam fails, the important aspects to deal with are, time of failure, extent of overtopping before failure, size, shape and time of the breach formation. Estimation of the dam break flood will depend on these parameters.

The breach characteristics that are used as input to the existing dam break models are i) Final bottom width of the breach, ii) Final bottom elevation of the breach, iii) Left and right side slope of the breaching section iv) Full formation time of breach, and v) Reservoir level at time of start of breach. The of breach formation mechanism is, to a large extent, dependent on the type of dam and the cause due to which the dam failed.

A study of the different dam failures indicate that concrete arch and gravity dams breach by sudden collapse, overturning or sliding away of the structure due to inadequate design or excessive forces that may result from overtopping, earthquakes and deterioration of the abutment or foundation material.

As per the UK Dam Break Guidelines and U.S. Federal Energy Regulatory Commission (FERC) Guidelines, in the case of concrete gravity dams, the breach width should be taken between 0.2 to 0.5 times the crest length of the dam and full breach formation time should be taken instantaneous which may be practically taken as 0.2 to 0.25 hours. The full breach formation time for the for the dam break simulation of Ratle H.E. Project has been considered as 15 minutes. The final bottom elevation of the breach for sensitivity analysis has been taken corresponding to relatively weaker locations in the dam, such location of openings, galleries etc. Further, the final bottom elevation of the breach should be restricted to the reservoir bed level / natural ground level at the dam location due to nil reservoir storage below this level.

The manner in which the failure is to commence can be specified as one of the following:

- At a specified stage (water surface elevation) of the reservoir and duration
- At a specified time
- At a specified stage (water surface elevation) of the reservoir

Breach parameters selected for sensitivity analysis of dam break simulation

Considering the criteria for selection of breach parameters and critical condition for the dam break study, two different cases of breach parameters as given in (Table-13.3) have been identified for sensitivity analysis of dam break simulations. In all these two cases, the initial breach elevation has been taken corresponding to the top of dam (EL 1031 m). The final bottom elevation of the breach has been taken corresponding to average ground levels. The breach side slope has been taken as zero as applicable for concrete gravity dam. The time of failure has been taken as 15 minutes for the instantaneous failure of non- overflow blocks.

Table 13.3 : Breach parameters considered for sensitivity analysis

Case No.	Breach Elevation (m)		Breach Width (m)	Breach Development Time (Minutes)	Max. Discharge just d/s of dam (cumec)	Remarks
	Initial	Final				
1.	1031	1010	45	15	16500	3 non-overflow blocks considered to break up to the EL 1010 m.
2.	1031	975	30	15	29461	2 non-overflow blocks considered to break up to the elevation 975 m.

As case-2 generates the maximum discharge through the breach width of 30 m, the same has been finalized for detailed outputs of dam break simulation

13.9 CRITICAL CONDITION FOR DAM BREAK STUDY

The critical condition for a dam break study is when the reservoir is full and design flood hydrograph (PMF) is impinged. Accordingly, in the present study keeping the reservoir at full level of 1031 m, the PMF has been impinged keeping all the spillway gates fully open. The maximum water level reached in the reservoir is 1031 m, after the application of PMF. It is reasonable to assume that the Dam will breach when the water level in the reservoir is at this maximum level.

The following parameters have been considered for breach (refer Figure 13.1)

Breach parameters considered

Reservoir level at time when breach occurs 1031 m (top of Dam)

Time to failure – 0.25 hr as failure occurs instantaneously

Breach width – 30 m

Bottom of breach – 975 m

Slope of breach – vertical

Model reach –about 35 km from proposed Dam site

.

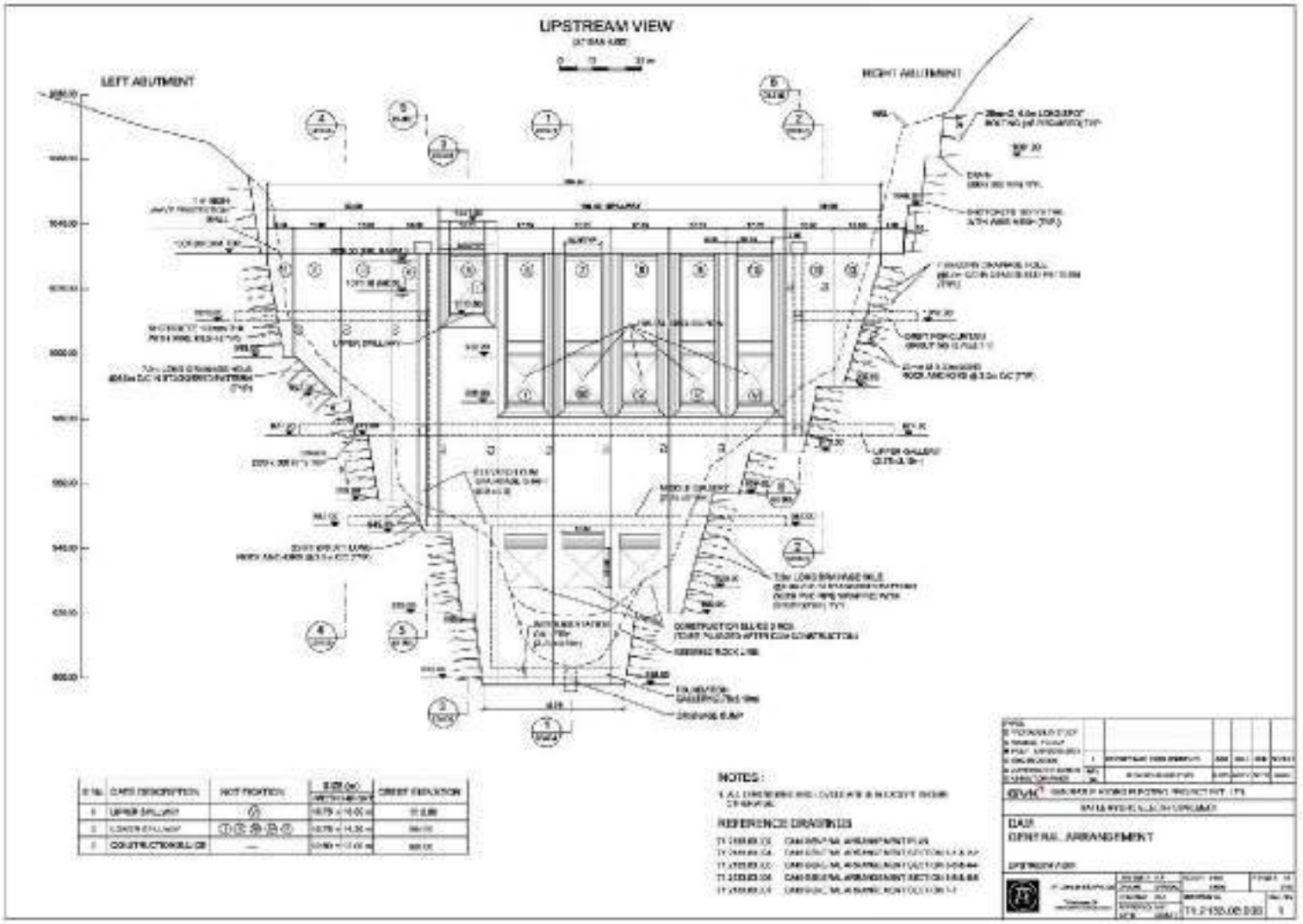


Figure 13.1: Upstream Elevation View of Dam

13.10 DISCUSSIONS ON RESULTS

The DAMBRK results consist of following important tables and profiles:

i. Reservoir depletion table

(It includes the outflow hydrograph at Dam site)

ii. Water surface and discharge profile from Dam site to desired location (up to approx 35 km in this case)

iii. Flood level at desired locations

iv. Time lag between time of maximum breach at Dam site and at desired locations.

13.10.1 Dam Break Study for Design Flood Hydrograph

In the model the Dam is made to breach at the time when inflow reaches PMF (13815 cumec). The study involves determination of the flood flow from the Dam due to its breach, and routing the same along the river channel on the downstream, to estimate the maximum flood levels at various locations on the downstream. These variations are shown in at Table 13.4.

The following table gives the maximum elevation, maximum flow, time to maximum elevation and maximum velocity at various distances downstream of the Dam up 35 km downstream of Dam.

Table 13.4: Profile of crests and times for river below Dam

DISTANCE FROM DAM (KM)	MAX ELEVATION (M)	MAX FLOW (CUMEC)	TIME TO MAX ELEVATION (HR)	MAX VELOCITY (M/SEC)
0.00	955.10	29461	0.250	15.16
0.25	951.66	29202	0.263	14.73
0.50	949.04	29021	0.287	13.88
0.75	946.65	28957	0.275	13.02
1.00	944.48	28839	0.350	12.58
1.25	942.39	28839	0.275	12.27
1.50	938.93	28740	0.387	13.40
1.75	938.68	28468	0.362	11.27
2.00	938.65	28175	0.350	9.38
2.25	937.29	27979	0.350	9.52
2.50	935.77	27855	0.362	9.71
2.75	934.01	27779	0.362	10.07
3.00	931.79	27706	0.400	10.78
3.25	930.91	27626	0.400	10.16
3.50	930.01	27531	0.412	9.66
3.75	929.09	27425	0.437	9.25

4.00	928.20	27319	0.475	8.90
4.25	927.39	27200	0.537	8.62
4.50	926.67	27064	0.600	8.39
4.75	926.04	26910	0.625	8.22
5.00	925.45	26707	0.650	8.10
5.25	924.92	26466	0.662	7.93
5.50	924.47	26200	0.675	7.66
5.75	924.09	25924	0.675	7.27
6.00	923.78	25651	0.687	6.79
6.25	923.30	25384	0.687	6.79
6.50	922.82	25120	0.700	6.80
6.75	922.33	24857	0.712	6.81
7.00	921.85	24603	0.712	6.83
7.25	921.39	24364	0.725	6.83
7.50	920.92	24157	0.725	6.82
7.75	920.44	23982	0.737	6.80
8.00	919.96	23833	0.737	6.76
8.25	919.55	23705	0.750	6.56
8.50	919.16	23592	0.750	6.32
8.75	918.78	23493	0.750	6.07
9.00	918.42	23407	0.750	5.82
9.25	917.68	23333	0.762	6.24
9.50	916.73	23272	0.762	6.87
9.75	915.39	23220	0.775	7.81
10.00	913.28	23169	0.812	9.53
10.25	912.80	23117	0.812	8.87
10.50	912.38	23067	0.812	8.21
10.75	912.01	23019	0.812	7.57
11.00	911.68	22975	0.812	6.96
11.25	910.89	22935	0.825	7.11
11.50	910.03	22901	0.825	7.30
11.75	909.07	22871	0.837	7.55
12.00	907.98	22844	0.837	7.86
12.25	907.00	22819	0.850	7.97
12.50	905.95	22795	0.850	8.11
12.75	904.81	22773	0.862	8.30
13.00	903.56	22749	0.875	8.55
13.25	902.46	22727	0.887	8.58
13.50	901.32	22702	0.900	8.65
13.75	900.13	22676	0.925	8.75
14.00	898.86	22647	0.937	8.92
14.25	898.07	22614	0.950	8.56
14.50	897.35	22579	0.962	8.20
14.75	896.70	22541	0.975	7.83
15.00	896.11	22502	0.975	7.46
15.25	895.19	22464	0.987	7.60

15.50	894.23	22425	1.012	7.77
15.75	893.20	22385	1.025	8.01
16.00	892.09	22342	1.050	8.33
16.25	891.59	22296	1.062	7.83
16.50	891.32	22249	1.075	7.07
16.75	891.28	22201	1.062	6.07
17.00	891.38	22153	1.062	4.96
17.25	890.82	22110	1.075	5.30
17.50	890.13	22073	1.087	5.75
17.75	889.28	22040	1.100	6.33
18.00	888.14	22010	1.125	7.11
18.25	887.30	21979	1.150	7.31
18.50	886.38	21946	1.175	7.57
18.75	885.36	21907	1.213	7.92
19.00	884.20	21862	1.263	8.45
19.25	883.75	21807	1.275	7.96
19.50	883.36	21744	1.288	7.50
19.75	883.02	21675	1.288	7.05
20.00	882.72	21600	1.300	6.62
20.25	882.46	21522	1.300	6.18
20.50	882.23	21442	1.300	5.77
20.75	882.03	21362	1.313	5.38
21.00	881.84	21285	1.313	5.02
21.25	881.40	21213	1.313	5.24
21.50	880.90	21151	1.325	5.51
21.75	880.32	21094	1.338	5.85
22.00	879.64	21044	1.350	6.28
22.25	879.46	20996	1.350	5.72
22.50	879.29	20948	1.363	5.23
22.75	879.14	20903	1.363	4.79
23.00	879.01	20860	1.363	4.40
23.25	878.60	20822	1.363	4.65
23.50	878.12	20790	1.375	4.97
23.75	877.52	20762	1.375	5.38
24.00	876.77	20739	1.388	5.92
24.25	875.92	20717	1.413	6.43
24.50	874.84	20696	1.425	7.09
24.75	873.35	20675	1.475	8.05
25.00	871.00	20648	1.575	9.80
25.25	870.32	20612	1.600	9.39
25.49	869.70	20567	1.625	9.08
25.74	869.13	20511	1.638	8.88
25.99	868.62	20447	1.650	8.84
26.24	869.60	20372	1.613	5.43
26.49	869.86	20285	1.613	3.94
26.74	869.96	20190	1.600	3.05

26.99	870.00	20097	1.600	2.45
27.24	869.80	20024	1.600	2.82
27.49	869.48	19976	1.613	3.41
27.74	868.85	19945	1.613	4.48
27.99	867.06	19925	1.625	6.99
28.24	866.60	19909	1.638	6.70
28.49	866.18	19894	1.638	6.42
28.74	865.80	19880	1.638	6.14
28.99	865.46	19867	1.638	5.88
29.24	864.83	19856	1.638	6.09
29.49	864.13	19847	1.638	6.33
29.74	863.34	19840	1.650	6.62
29.99	862.44	19834	1.650	6.97
30.24	861.39	19828	1.650	7.39
30.49	860.11	19825	1.650	7.94
30.74	858.43	19821	1.663	8.70
30.99	855.87	19818	1.663	9.96
31.24	854.47	19815	1.675	9.83
31.49	853.07	19813	1.675	9.71
31.74	851.69	19809	1.688	9.59
31.99	850.30	19806	1.688	9.48
32.24	848.93	19803	1.700	9.36
32.49	847.56	19800	1.700	9.25
32.74	846.19	19796	1.713	9.15
32.99	844.83	19793	1.713	9.05
33.24	843.48	19790	1.725	8.94
33.49	842.13	19786	1.725	8.85
33.74	840.78	19783	1.738	8.75
33.99	839.43	19779	1.738	8.66
34.24	838.09	19776	1.738	8.57
34.49	836.74	19772	1.750	8.49
34.74	835.39	19769	1.763	8.41
34.99	834.03	19765	1.763	8.33

13.10.2 Routing of Design Flood Hydrograph (no dam scenario)

Profile of crests and times for river below dam location have been arrived at after routing of PMF only (no dam scenario). The study involves determination of the flood flow below dam location, and routing the same along the river channel on the downstream, to estimate the maximum flood levels at various locations on the downstream. These variations are shown below:

Table 13.5: Profile of crests and times for river below Dam location (only PMF; no dam scenario)

DISTANCE FROM DAM (KM)	MAX ELEVATION (M)	MAX FLOW (CUMEC)	TIME TO MAX ELEVATION (HR)	MAX VELOCITY (M/SEC)
0.00	947.42	13814	51.00	11.38
0.25	944.97	13814	51.00	10.61
0.50	942.55	13813	51.00	10.03
0.75	940.37	13812	51.00	9.43
1.00	937.52	13812	51.00	9.45
1.25	934.41	13811	51.00	9.58
1.50	931.52	13810	51.00	9.51
1.75	930.60	13809	51.00	8.12
2.00	930.37	13808	51.00	6.78
2.25	929.28	13806	51.00	6.90
2.50	928.14	13805	51.00	7.03
2.75	926.94	13804	51.00	7.17
3.00	925.63	13803	51.00	7.36
3.25	924.76	13802	51.00	6.99
3.50	923.89	13801	51.00	6.68
3.75	923.02	13800	51.00	6.43
4.00	922.14	13798	51.00	6.23
4.25	921.26	13797	51.00	6.07
4.50	920.35	13795	51.00	5.95
4.75	919.42	13793	51.00	5.86
5.00	918.50	13791	51.00	5.79
5.25	917.71	13789	51.00	5.59
5.50	917.05	13786	51.00	5.35
5.75	916.52	13784	51.00	5.08
6.00	916.09	13781	51.00	4.80
6.25	915.55	13778	51.00	4.82
6.50	915.03	13776	51.00	4.85
6.75	914.52	13773	51.00	4.87
7.00	914.02	13771	51.00	4.90
7.25	913.53	13769	51.00	4.93
7.50	913.04	13766	51.00	4.95
7.75	912.55	13764	51.00	4.98
8.00	912.06	13762	51.00	5.01
8.25	911.63	13759	51.00	4.94
8.50	911.22	13757	51.00	4.86
8.75	910.83	13755	51.00	4.78
9.00	910.47	13752	51.00	4.70
9.25	909.82	13750	51.00	5.11
9.50	908.98	13748	51.00	5.65
9.75	907.85	13746	51.00	6.39

10.00	906.11	13744	51.00	7.53
10.25	905.50	13743	51.00	7.03
10.50	904.97	13741	51.00	6.57
10.75	904.51	13739	51.00	6.14
11.00	904.11	13738	51.00	5.75
11.25	903.38	13736	51.00	5.92
11.50	902.59	13734	51.00	6.11
11.75	901.73	13732	51.00	6.34
12.00	900.76	13730	51.00	6.62
12.25	899.86	13729	51.00	6.72
12.50	898.91	13727	51.00	6.85
12.75	897.89	13725	51.00	7.00
13.00	896.78	13724	51.00	7.19
13.25	895.77	13722	51.00	7.20
13.50	894.73	13721	51.00	7.23
13.75	893.65	13719	51.00	7.28
14.00	892.51	13718	51.00	7.36
14.25	891.70	13716	51.00	7.06
14.50	890.96	13714	51.00	6.76
14.75	890.29	13712	51.00	6.47
15.00	889.68	13711	51.00	6.17
15.25	888.85	13709	51.00	6.26
15.50	887.97	13707	51.00	6.37
15.75	887.05	13705	51.00	6.49
16.00	886.07	13703	53.55	6.64
16.25	885.50	13701	53.55	6.24
16.50	885.13	13699	53.55	5.68
16.75	884.97	13697	53.55	4.97
17.00	884.99	13694	53.55	4.12
17.25	884.51	13691	53.55	4.41
17.50	883.94	13688	53.55	4.77
17.75	883.23	13686	53.55	5.22
18.00	882.32	13684	53.55	5.81
18.25	881.56	13682	53.55	5.97
18.50	880.72	13680	53.55	6.16
18.75	879.77	13678	53.55	6.41
19.00	878.66	13676	53.55	6.73
19.25	878.09	13674	53.55	6.30
19.50	877.58	13675	53.55	5.91
19.75	877.15	13677	53.55	5.54
20.00	876.77	13678	53.55	5.20
20.25	876.44	13679	53.55	4.88
20.50	876.15	13680	53.55	4.59
20.75	875.89	13682	53.55	4.32
21.00	875.66	13683	53.55	4.07
21.25	875.24	13685	53.55	4.27

21.50	874.76	13686	53.55	4.51
21.75	874.22	13688	53.55	4.79
22.00	873.59	13689	53.55	5.13
22.25	873.35	13690	53.55	4.73
22.50	873.14	13691	53.55	4.38
22.75	872.96	13693	53.55	4.06
23.00	872.80	13694	53.55	3.79
23.25	872.43	13696	53.55	4.03
23.50	871.99	13697	53.55	4.32
23.75	871.46	13698	53.55	4.68
24.00	870.81	13699	53.55	5.14
24.25	870.07	13700	53.55	5.57
24.50	869.12	13701	53.55	6.12
24.75	867.84	13702	53.55	6.88
25.00	865.85	13702	53.55	8.08
25.25	865.03	13703	53.55	7.65
25.49	864.27	13703	53.55	7.27
25.74	863.55	13704	53.55	6.92
25.99	862.88	13704	53.55	6.61
26.24	863.64	13705	53.55	4.31
26.49	863.82	13706	53.55	3.21
26.74	863.88	13708	53.55	2.54
26.99	863.89	13709	53.55	2.10
27.24	863.71	13711	53.55	2.46
27.49	863.42	13713	53.55	3.03
27.74	862.85	13714	53.55	4.00
27.99	861.29	13714	53.55	6.20
28.24	860.79	13715	53.55	5.97
28.49	860.34	13716	53.55	5.75
28.74	859.93	13716	53.55	5.53
28.99	859.56	13717	53.55	5.31
29.24	858.95	13717	53.55	5.51
29.49	858.29	13718	53.55	5.73
29.74	857.55	13719	53.55	5.99
29.99	856.72	13719	53.55	6.30
30.24	855.75	13719	53.55	6.67
30.49	854.58	13720	53.55	7.15
30.74	853.09	13720	53.55	7.81
30.99	850.90	13721	53.55	8.87
31.24	849.56	13721	53.55	8.76
31.49	848.22	13721	53.55	8.65
31.74	846.89	13722	53.55	8.55
31.99	845.57	13722	53.55	8.45
32.24	844.25	13722	53.55	8.35
32.49	842.94	13723	53.55	8.25
32.74	841.64	13723	53.55	8.16

32.99	840.34	13723	53.55	8.07
33.24	839.05	13723	53.55	7.98
33.49	837.76	13724	53.55	7.89
33.74	836.48	13724	53.55	7.80
33.99	835.21	13724	53.55	7.71
34.24	833.95	13725	53.55	7.62
34.49	832.70	13725	53.55	7.52
34.74	831.46	13725	53.55	7.42
34.99	830.25	13726	53.55	7.32

Difference between maximum water level elevations in case of impingement of PMF with dam break and without dam break scenarios have been worked out and are shown below (Table 13.5):

Table 13.6: Difference of crests for river below Dam location in both cases (PMF plus dam break and no dam break scenarios

DISTANCE FROM DAM (KM)	MAX ELEVATION (PMF WITH DAM BREAK CONDITION) (M)	MAX ELEVATION (ONLY PMF; NO DAM BREAK) (M)	DIFFERENCE BETWEEN MAX WATER ELEVATION IN BOTH SIMULATED CONDITIONS
0.000	955.10	947.42	7.68
0.250	951.66	944.97	6.69
0.500	949.04	942.55	6.49
0.750	946.65	940.37	6.28
1.000	944.48	937.52	6.96
1.250	942.39	934.41	7.98
1.500	938.93	931.52	7.41
1.750	938.68	930.60	8.08
2.000	938.65	930.37	8.28
2.250	937.29	929.28	8.01
2.499	935.77	928.14	7.63
2.749	934.01	926.94	7.07
2.999	931.79	925.63	6.16
3.249	930.91	924.76	6.15
3.499	930.01	923.89	6.12
3.749	929.09	923.02	6.07
3.999	928.20	922.14	6.06
4.249	927.39	921.26	6.13
4.499	926.67	920.35	6.32
4.749	926.04	919.42	6.62
4.999	925.45	918.50	6.95
5.249	924.92	917.71	7.21
5.499	924.47	917.05	7.42
5.749	924.09	916.52	7.57
5.999	923.78	916.09	7.69

6.249	923.30	915.55	7.75
6.499	922.82	915.03	7.79
6.749	922.33	914.52	7.81
6.998	921.85	914.02	7.83
7.248	921.39	913.53	7.86
7.498	920.92	913.04	7.88
7.748	920.44	912.55	7.89
7.998	919.96	912.06	7.90
8.248	919.55	911.63	7.92
8.498	919.16	911.22	7.94
8.748	918.78	910.83	7.95
8.998	918.42	910.47	7.95
9.248	917.68	909.82	7.86
9.498	916.73	908.98	7.75
9.748	915.39	907.85	7.54
9.998	913.28	906.11	7.17
10.248	912.80	905.50	7.30
10.498	912.38	904.97	7.41
10.748	912.01	904.51	7.50
10.998	911.68	904.11	7.57
11.248	910.89	903.38	7.51
11.498	910.03	902.59	7.44
11.747	909.07	901.73	7.34
11.997	907.98	900.76	7.22
12.247	907.00	899.86	7.14
12.497	905.95	898.91	7.04
12.747	904.81	897.89	6.92
12.997	903.56	896.78	6.78
13.247	902.46	895.77	6.69
13.497	901.32	894.73	6.59
13.747	900.13	893.65	6.48
13.997	898.86	892.51	6.35
14.247	898.07	891.70	6.37
14.497	897.35	890.96	6.39
14.747	896.70	890.29	6.41
14.997	896.11	889.68	6.43
15.247	895.19	888.85	6.34
15.497	894.23	887.97	6.26
15.747	893.20	887.05	6.15
15.997	892.09	886.07	6.02
16.246	891.59	885.50	6.09
16.496	891.32	885.13	6.19
16.746	891.28	884.97	6.31
16.996	891.38	884.99	6.39
17.246	890.82	884.51	6.31
17.496	890.13	883.94	6.19

17.746	889.28	883.23	6.05
17.996	888.14	882.32	5.82
18.246	887.30	881.56	5.74
18.496	886.38	880.72	5.66
18.746	885.36	879.77	5.59
18.996	884.20	878.66	5.54
19.246	883.75	878.09	5.66
19.496	883.36	877.58	5.78
19.746	883.02	877.15	5.87
19.996	882.72	876.77	5.95
20.246	882.46	876.44	6.02
20.496	882.23	876.15	6.08
20.746	882.03	875.89	6.14
20.995	881.84	875.66	6.18
21.245	881.40	875.24	6.16
21.495	880.90	874.76	6.14
21.745	880.32	874.22	6.10
21.995	879.64	873.59	6.05
22.245	879.46	873.35	6.11
22.495	879.29	873.14	6.15
22.745	879.14	872.96	6.18
22.995	879.01	872.80	6.21
23.245	878.60	872.43	6.17
23.495	878.12	871.99	6.13
23.745	877.52	871.46	6.06
23.995	876.77	870.81	5.96
24.245	875.92	870.07	5.85
24.495	874.84	869.12	5.72
24.745	873.35	867.84	5.51
24.995	871.00	865.85	5.15
25.245	870.32	865.03	5.29
25.494	869.70	864.27	5.43
25.744	869.13	863.55	5.58
25.994	868.62	862.88	5.74
26.244	869.60	863.64	5.96
26.494	869.86	863.82	6.04
26.744	869.96	863.88	6.08
26.994	870.00	863.89	6.11
27.244	869.80	863.71	6.09
27.494	869.48	863.42	6.06
27.744	868.85	862.85	6.00
27.994	867.06	861.29	5.77
28.244	866.60	860.79	5.81
28.494	866.18	860.34	5.84
28.744	865.80	859.93	5.87
28.994	865.46	859.56	5.90

29.244	864.83	858.95	5.88
29.494	864.13	858.29	5.84
29.744	863.34	857.55	5.79
29.993	862.44	856.72	5.72
30.243	861.39	855.75	5.64
30.493	860.11	854.58	5.53
30.743	858.43	853.09	5.34
30.993	855.87	850.90	4.97
31.243	854.47	849.56	4.91
31.493	853.07	848.22	4.85
31.743	851.69	846.89	4.80
31.993	850.30	845.57	4.73
32.243	848.93	844.25	4.68
32.493	847.56	842.94	4.62
32.743	846.19	841.64	4.55
32.993	844.83	840.34	4.49
33.243	843.48	839.05	4.43
33.493	842.13	837.76	4.37
33.743	840.78	836.48	4.30
33.993	839.43	835.21	4.22
34.243	838.09	833.95	4.14
34.493	836.74	832.70	4.04
34.742	835.39	831.46	3.93
34.992	834.03	830.25	3.78

It can be seen from above table that at 35 km downstream of Ratle dam location, difference in maximum water levels between two scenarios (PMF only and PMF with Dam break) is about 3.78 m.

The particulars of the data used are given in **Annexure – I (model outputs)**

13.11 PREPARATION OF INUNDATION MAP

An inundation map is a map depicting the d/s areas vulnerable to inundation by the Dam break flood. The DAMBRK model computes maximum flood elevation at each original or interpolated cross-section. In present case, the cross-sections are available up to 35 km d/s of Dam. The profile of water levels below the Dam at all cross-sections (original and interpolated) is given as Table 13.2. From this profile, at locations below the Dam & their subsequent markings on the topographic maps, it can be seen which areas are likely to be submerged in case of Dam break.

It is clear from the inundation map that in case of Dam break, the flood will be confined within the gorge only and though there would be inundation of few lower areas adjacent to the river however no settlement or area will be affected.

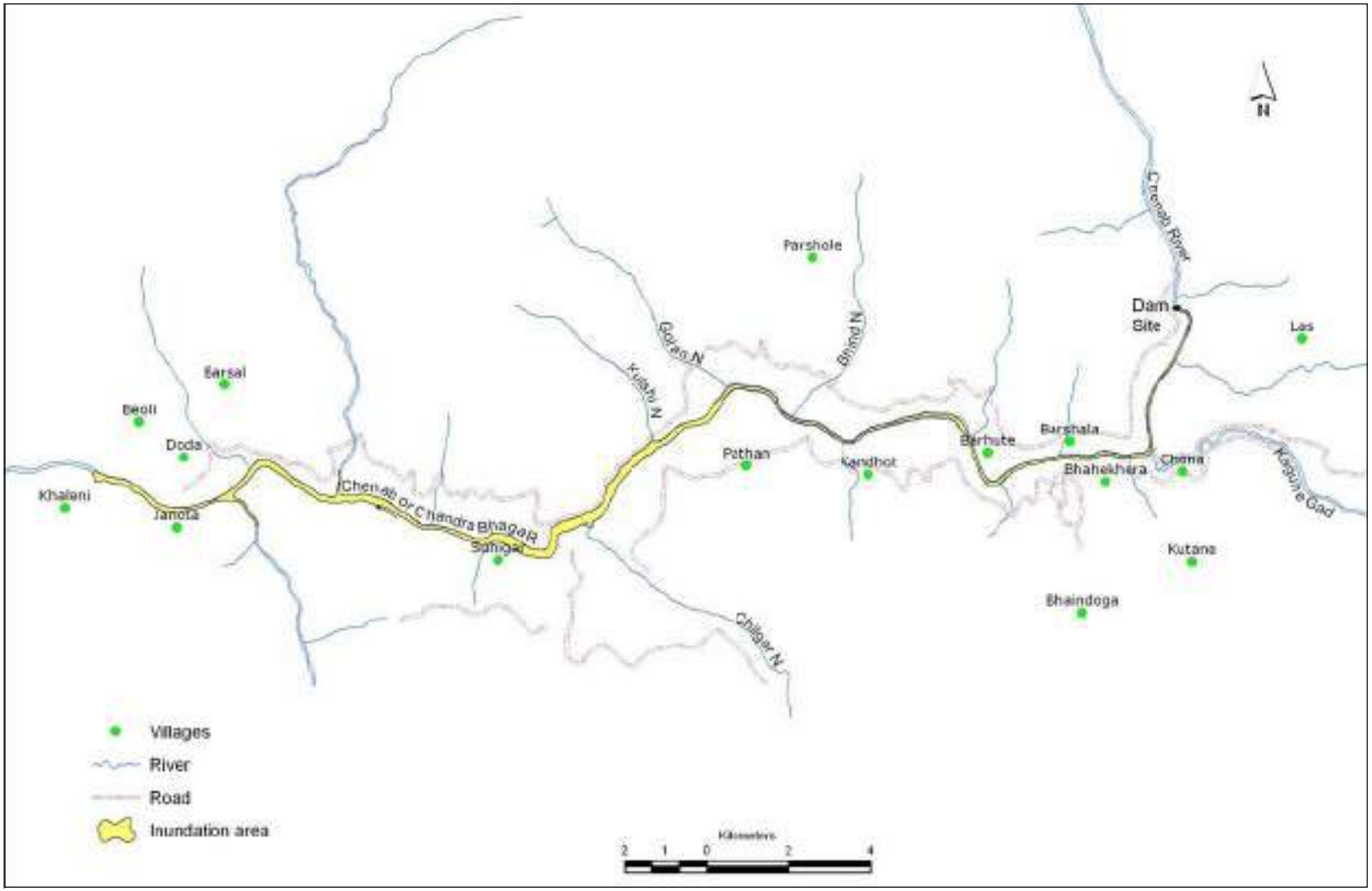


Figure 13.2: Inundation Map

13.12 DISASTER MANAGEMENT PLAN

From the result it is evident that up to about 35 km d/s of the Dam, time required in reaching the flood wave elevation to the maximum is of the order of less than couple of hour. It hardly leaves any possibility of any rescue or evacuation. Since the time available is very short, the Disaster Management Plan should concentrate on preventive actions. Also as evident from the inundation map, a flood wave remains confined to the narrow gorge only and doesn't affect adjacent areas to the river course; Disaster Management Plan is more of a precautionary measure.

Surveillance and monitoring programmes are required to be implemented during design and investigation, construction, first reservoir filling, early operation period and operation & maintenance phases of the life cycle of Dam. It is desirable that all gates, electricity, public announcement system, power generator backups etc are thoroughly checked before arrival of the monsoon. As it is clear from the results that u/s water level has significant effect on the Dam break flood, the following flood conditions may be considered for different level of alertness:

1) If u/s water level reaches at top of the Dam, it may be considered as an emergency. At this point only a few minutes are available for taking any action. All the staff from the Dam site should be alerted to move to a safe place. The district administration and the corporation's head office shall be informed about the possibility of Dam failure.

2) If u/s water level rises above the Dam top and Dam begins to fail, it may be considered as a disaster condition. At this stage, nothing can be done. Information in this regard should be given to the head office and district administration.

   i) If upstream water level is at or below FRL and flood is of the order of 20% to 30% of PMF, it may be considered as **normal flood** condition and normal routine may be maintained.

   ii) If upstream water level is rising above FRL, it may be considered as **Level-1 emergency**. In this condition at least four gates must be kept fully operational. All concerned officials should be alerted so that they may reach at the Dam site to take suitable actions. Preventive actions may be carried out simultaneously. A suitable warning and notification procedure may be laid. The local officials should be informed about the situation.

   iii) If upstream water level reaches above MWL and still rising, it may be considered as **Level-2 emergency.** It is seen from the results that around four hour is available to carry out suitable action at this condition. All communication systems and safety measures should be operational now.

Public announcement system or centralized siren system may be used. A flood warning may be issued to the public downstream so that they may reach a higher and safe place.

iv) If upstream water level reaches at the top of the Dam, it may be considered as **Level-3 emergency**. At this point only a few minutes are available for taking any action. All the staff from the Dam site should be alerted to move to a safe place. The district level office and the corporation's head office should be informed about the possibility of Dam failure.

v) If upstream water level is rising above the Dam top and Dam has started to fail. It may be considered as a **disaster** condition. Any information in this regard should be immediately provided to civil administration for necessary rescue operations.

The following measures can be taken to avoid the loss of lives and property:

- To establish an effective Dam Safety Surveillance and monitoring program including rapid analysis and interpretation of instrumentation and observation data; periodic inspection and safety reviews/evaluation by an independent panel of experts.
- To formulate and implement an Emergency Action Plan to minimize to the maximum extent possible, the probable loss of life and damage to property in the event of failure of Dam.

13.12.1 Surveillance

The surveillance and monitoring programs are required to be implemented during design and investigation, construction, early operation period and operation and maintenance phases of the life cycle of the Dam. An affective flood forecasting system is required by establishing hourly gauge reading at suitable upstream locations with real time communication at the top. An effective Dam safety surveillance, monitoring and observation along with periodic inspection, safety reviews and evaluation must be put in place. These programs will be implemented in five phases in the life cycle of a Dam *viz*.,

i) design and investigation phase,

ii) construction phase,

iii) first reservoir filling,

iv) early operation period, and

v) operation and maintenance phase.

13.12.2 Emergency Action Plan

An emergency is defined as a condition of serious nature which develops unexpectedly and endangers downstream property and human life and requires immediate attention. Emergency Action Plan shall include all potential indicators of likely failure of the Dam, since the primary concern is for timely and reliable identification and evaluation of potential emergency.

This plan presents warning and notification procedures to be followed in case of potential failure of the Dam. The purpose is to provide timely warning to nearby residents and alert key personnel responsible for taking action in case of an emergency.

13.12.3 Administrative and Procedural Aspects

The Administrative and Procedural Aspects of Emergency Action Plan consists of a flowchart depicting the names, addresses and telephone numbers of the responsible officials. In order of hierarchy, the following system will usually be appropriate. In the event of potential emergency, the observer at the site is required to report it to the Engineer-in-charge through a wireless system, if available, or by the fastest communication system available. The Engineer-in-charge shall be responsible for contacting the Civil Administration, *viz*. Deputy Commissioner. In order to oversee all the operations required to tackle the emergency situations, a centralized control room would be set up by the project authorities at Udaipur.

Each person would be made aware of his/her responsibilities/ duties and the importance of work assigned under the Emergency Action Plan. All the villages falling under the flood prone zone or on the margins would be connected through wireless communication system with backup of standby telephone lines. A centralized siren alert system would be installed at all the Village Panchayats so that in the event of a warning all villagers can be alerted through sirens rather than informing everybody through messengers which is not feasible in such emergency situations.

13.12.4 Preventive Action

Once the likelihood of an emergency situation is suspected, action has to be initiated to prevent a failure. The point at which each situation reaches an emergency status shall be specified and at that stage the vigilance and surveillance shall be upgraded. At this stage, a thorough inspection of the Dam shall be carried out to locate any visible signs of distress.

The anticipated need of equipment shall be evaluated and if these are not available at the Dam site, the exact locations and availability of these equipments shall be identified. A plan shall be drawn on priority for inspection of the Dam. The Dam, its sluices and non-overflow sections will be properly illuminated.

13.12.5 Communication System

An efficient communication system and a downstream warning system is absolutely essential for the success of an emergency plan especially in the present case because of inadequacy of time. The difference between a high flood and a Dam break situation shall be made clear to the downstream people. All of the villages falling under the flooding zone or on margins are required to be connected through wireless system backed by stand-by telephone lines. A centralized siren system is to be installed at Panchayats so that in event of a warning, all villagers can be alerted, through messengers which may not be possible in this case.

13.12.6 Merits of Satellite Communication System

Keeping the disaster scenario in mind, any terrestrial system such as land lines, etc. is likely to be the first casualty in earthquakes or floods. The restoration of such systems is time consuming. Moreover the maintenance of such lines becomes a great problem in emergency even for the technical personnel who are required to reach the site of fault, which may be struck by the disaster. So the system cannot be put back into operation soon. The fault repairs and restoration of communication services are usually not possible for a considerable period of time after the calamity has struck. Moreover, it is critical that the communication systems are restored at the earliest so that relief/medical teams and other personnel can be arranged at the earliest possible time. All the subsidiary help depends solely on the communication system. As this criteria is paramount, existing systems such as telephones and telex, etc. are practically of little use in case of such events and situations. Similarly, microwave links are expected to be down due to collapse of towers, etc. Restoration of towers and alignment of equipment is again a time consuming activity.

Keeping in view the urgency of services and their dependability during emergency relevant to the disaster conditions, satellite based systems present an ideal solution. The satellite based system usually comprises following components.

i) A small dish of approximately one meter diameter

ii) Associated radio equipment

iii) A power source

The deployment of the system is not dependent on the restoration of land routes. The existing satellite based communication systems are designed in such a manner that they are able to withstand fairly high degree of demanding environmental conditions. Secondly, the restoration of the satellite based system can be undertaken by carrying maintenance personnel and equipment by helicopters at a very short notice. Even the fresh systems could be inducted in a matter of an hour or so because most of these are designed for transportability by air. The deployment

takes usually less than an hour. The power requirements are not large and can be met by sources such as UPS/batteries/ generators.

13.12.7 Financial Outlay for Installation of VSAT Communication System

The cost of deployment and maintenance of a telecommunication system in disaster prone areas is not as important as the availability, reliability and quick restoration of the system. The cost of both satellite bandwidth and the ground components of the satellite communication system has been decreasing rapidly like that of V-SAT (Very Small Aperture Terminal) based systems supporting a couple of voice and data channels. Some highly superior communication systems in VSAT without time delay are marketed by National agencies like HECL, HFCL and HCL Comet. There are two different types of systems with the above mentioned capabilities available in the market viz. SCPCDAMA and TDMA. However, the first one named SCPCDAMA has been recommended for the Ratle H.E. project. Two such systems would be installed at suitable upstream and downstream locations. The estimated cost of installation of such a communication system has been given in Table 13.3.

13.12.8 Evacuation Plans

Emergency Action Plan includes evacuation plans and procedures for implementation based on local needs. These are:

- Demarcation/prioritization of areas to be evacuated.
- Notification procedures and evacuation instructions.
- Safe routes, transport and traffic control.
- Shelter areas
- Functions and responsibilities of members of evacuation team.

The flood prone zone in the event of break of Ratle Dam shall be marked properly at the village locations with adequate factor of safety. As the flood wave takes sufficient time in reaching these villages, its populace shall be informed well in time through wireless and sirens etc. so that people may climb on hills or to some elevated place beyond the flood zone which has been marked.

The Evacuation Team would comprise of:

i) D.M./ his Nominated Officer (To peacefully relocate the people to places at higher elevation with state administration)

ii) Engineer-in-Charge of the Project (Team Leader)

iii) S.P./Nominated Police Officer (To maintain law and order)

iv) C.M.O. of the area (To tackle morbidity of affected people)

v) Sarpanch/ Affected Village Representative to execute the resettlement operation with the aid of state machinery and project proponents

vi) Sub-committees at village level

The Engineer-in-Charge will be responsible for the entire operation including prompt determination of the flood situation from time to time. Once the red alert is declared the whole state machinery will come into swing and will start evacuating people in the inundation areas delineated in the inundation map. For successful execution, annually Demo exercise will be done. DM is to monitor the entire operation.

13.12.9 Notifications

Notification procedures are an integral part of any emergency action plan. Separate procedures shall be established for slowly and rapidly developed situations and failure. Notifications will include communications of either an alert situation or an alert situation followed by a warning situation. An alert situation will indicate that although failure or flooding is not imminent, a more serious situation can occur unless conditions improve. A warning situation will indicate that flooding is imminent as a result of an impending failure of the Dam. It will normally include an order for evacuation of delineated inundation areas. For a regular watch on the flood level situation, it is necessary that two or more people man the flood cell so that an alternative person is available for notification round the clock.

In addition, a few guidelines to be generally followed by the inhabitants of flood prone areas, which form part of public awareness for disaster mitigation include:

- Listen to the radio for advance information and advice.
- Disconnect all electrical appliances and move all valuable personal and household goods and all clothing out of reach of flood water.
- Move vehicles, farm animals and movable goods to the highest ground nearby.
- Move all dangerous pollutants and insecticides out of reach of water.
- Do not enter flood waters on foot, if it can be avoided.

13.13 COST ESTIMATES FOR DISASTER MANAGEMENT

The estimated total cost of execution of disaster management plan including the equipment would be ₹ **117.60 lakh** and it is given in Table 13.6.

Table 13.7: Estimated cost of setting up of a satellite communication system & disaster management plan

Sl. No	Product	Amount (₹ in lakh)
A.	Setting up of V-SAT communication system	
1.	Product Name: SCPCDAMA (two sites) @ ` 20.00 lakh per site a) Antenna 2 x 2.4 M b) RF 2 x 2 W c) Modem 2 x 1No.	40.00
2.	Generators 2 No. (2 KVA)	6.00
3.	UPS 2 Nos. (2 KVA)	4.00
4.	Installation and maintenance of system, maintenance and running cost of UPS, generators, etc. @ 10% of the total cost for 6 years	21.60
B.	Installation of alert systems, Setting up of control room, etc.	10.00
C.	Notification and publication procedures, Miscellaneous etc	6.00
D.	Preparation of Disaster Management Act Plan	30.00
	Total	**117.60**

14 ENVIRONMENTAL MONITORING PROGRAMME

14.1 INTRODUCTION

Environmental monitoring provides feedback about the actual environmental impacts of a project. Monitoring results help judge the success of mitigation measures in protecting the environment. They are also used to ensure compliance with environmental standards, and to facilitate any needed project design or operational changes.

Monitoring shall be performed during all stages of the project (namely: construction, commissioning, and operation) to ensure that the impacts are no greater than predicted, and to verify the impact predictions. The monitoring program will indicate where changes to procedures or operations are required, in order to reduce impacts on the environment or local population. The monitoring program for the Ratle HE Project will be undertaken to meet the following objectives:

- To monitor the environmental conditions of the Chenab river and the reservoir as impacted by the Ratle HE Project;
- To check on whether mitigation and benefit enhancement measures have actually been adopted, and are proving effective in practice;

To provide information on the actual nature and extent of key impacts and the effectiveness of mitigation and benefit enhancement measures which, through a feedback mechanism, can improve the planning and execution of future, similar projects.

Automatic Weather Station has already been installed at site and real time data is being collected. This data can be made available to State Pollution Control Board as and when demanded.

14.2 WATER QUALITY

Construction Phase

The water quality monitoring should be carried out in seasonal intervals i.e. four times a year. Six sampling sites have been identified as detailed in **Table 14.1**. The parameters to be monitored include pH, Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), Total Dissolved Solids (TDS), etc. The total cost for analysis the samples work out to be ₹ **4.00 lakhs** per year. The monitoring is proposed to be for a period of 7 years during construction period.

Operation phase

The surface water quality of the proposed reservoir and Chenab River can be monitored thrice a year (summer, pre and post-monsoon seasons). The proposed parameters to be monitored include; pH, temperature, electrical conductivity, turbidity, total dissolved solids, calcium, magnesium, total hardness, chlorides, Sulphates, Nitrates, DO, COD, BOD, Iron, Zinc and Manganese. The sampling sites are dam, downstream of dam and in submergence area. The total cost of analysis will be ₹ **2.00 lakhs** per year.

During project operation phase, a Sewage Treatment Plant (STP) is proposed to be set up to treat the effluent from the labour colony. It is envisaged to analyze a sample once every month each before and after treatment from the STP. The parameters to be analyzed include pH, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS) and Total Dissolved Solids (TDS), Total coliforms and Fecal coliforms. The cost of analysis would be ₹ **1.00 lakh/ year**. Thus, total cost for analysis in project operation works out to **(2.00 + 1.00)** ₹ **3.00 lakh/ year**.

Table 14.1: Water Quality Monitoring Schedule

Physical & Chemical Parameter	**Sampling Location in Construction Phase**	**Monitoring**
Temperature, Electrical Conductivity, Turbidity, pH, DO, BOD, TDS, Total Hardness, Total alkalinity, Chloride, Nitrate, Phosphate, Total coliforms, fecal coliforms	Dam Site	Once in 3 months (seasonal)
	Near Colony Area	
	In Downstream of Dam	
Physical & Chemical Parameter	**Sampling Location in Operation Phase**	
pH, temperature, electrical conductivity, turbidity, total dissolved solids, calcium, magnesium, total hardness, chlorides, Sulphates, Nitrates, DO, COD, BOD, Iron, Zinc and Manganese, Total coliforms, fecal coliforms	Dam Site	Summer, pre and post monsoon
	Near Colony Area	
	In Downstream of Dam	

14.3 AIR QUALITY

Construction Phase

The ambient air quality monitoring during construction phase will be carried out as per the requirement of State Pollution Control Board. Every year monitoring is proposed to be done for the following three seasons:

- Summer
- Pre - monsoon
- Post - monsoon

The frequency of monitoring could be twice a week for four consecutive weeks at each station for each season. The parameters to be monitored are PM_{10}, $PM_{2.5}$, Sulphurdioxide (SO_2) and Nitrogen Oxides (NOx). Every year, ambient air quality is to be monitored for (3 stations x 2 days/week x 4 weeks x 3 seasons) 72 days. A total cost of ₹ **3.50 lakh/year** has been earmarked for this purpose.

Operation Phase

Same schedule, as followed during construction phase, should be continued for operation phase as well.

Table 14.2: Air Quality Monitoring Schedule

Air Quality	Sampling Location	Monitoring
SO_2 NO_x PM_{10} $PM_{2.5}$	Darabshala	Summer Pre - monsoon Post - monsoon
	Bhadat	
	Thatri	

14.4 NOISE

Construction Phase

Noise emissions from vehicular movement, operation of various construction equipments may be monitored during construction phase at major construction sites. The frequency of monitoring could be once in a month. For monitoring of noise generators, an Integrating Sound Level Meter will be required for which an amount of ₹ **1.00 lakh** per year has been earmarked.

Operation Phase

Same schedule, as followed during construction phase, should be continued for operation phase as well.

14.5 FINANCIAL REQUIREMENT

A sum of ₹ **82.00 lakh** have been allocated to implement various activities and programmes envisaged under EMP, the details are given in **Table 14.3**. The detailed matrix of EMP listing all the activities to monitored and implementing agency has been given in **Table 14.4**.

Table 14.3: Cost Estimates for Environmental Monitoring Programme

S. No.	Activities			Cost (₹ lakh)
1	Monitoring	Construction Phase (58 months)	Water quality	28.00
			Air quality	24.50
			Noise	7.00
			Total	**59.50**
		Operation Phase (for first 3 years)	Water quality	9.00
			Air quality	10.50
			Noise	3.00
			Total	**22.50**
Total (in ₹ Lakh)				**82.00**

Table 14.4: Matrix of Environmental Monitoring Plan

Sl. No.	Aspect	Source of Impact	Monitoring Methods & Parameters	Frequency	Executing Agency	Monitoring Agency
1.0	**Construction Phase**					
1.1	Local manpower absorption	Construction works	Contractor's report No. of people working in the project	Monthly	GVK Ratle Hydroelectric Project	SPCB, J&K
1.2	Erosion and landslides	Excavation, disposal, cut & fill and land clearing activities for access roads, disposal	Survey & observation Extent and degree of landslides and erosion	Monthly	GVK Ratle Hydroelectric Project	SPCB, J&K
1.3	Biodiversity	Land clearing activities fauna in the project area for access roads, colonies	Composition of flora and fauna	Twice in a year	State Forest Dept., J&K	GVK Ratle Hydroelectric Project
1.4	Revegetation & Afforestation	Land clearing, disposal works	Survey & observation Density of vegetation Survival rate of species planted	Every six months	State Forest Dept., J&K	GVK Ratle Hydroelectric Project
1.5	Soil erosion control measures	Excavation, landslides, cut & fill for road construction	Status/ Survival rate of bio-engineering and engineering structures for controlling soil erosion	Twice in a year	State Forest Dept., J&K	GVK Ratle Hydroelectric Project
1.6	Water Quality	Excavation, disposal, sewage disposal, land clearing activities and other chemical parameters	Surveys & sample collection and field measurements Turbidity, pH, T.D.S., D.O., Total coliform and E. coli	Monthly	GVK Ratle Hydroelectric Project	SPCB, J&K
1.7	Air Quality	Operation of DG sets, transportation of muck, road construction, mobilization of material, running of crushers	Survey & observation Levels of PM_{10}, $PM_{2.5}$, SO_2, NOx	Monthly	GVK Ratle Hydroelectric Project	SPCB, J&K

1.8	Public Health	Dust, noise, influx to labour	Regular medical checkups and camps	Monthly	GVK Ratle Hydroelectric Project	Public Health Dept., J&K
1.9	Health Delivery System		Status of water and vector borne diseases, improvement observed, if any, status of women and child health	Twice in a year	GVK Ratle Hydroelectric Project	Public Health Dept., J&K
1.10	Fish Management		Impact of project construction on fish, and aquatic life, if any Status of infrastructure developed for fish management like hatcheries	Once every Season	State Fisheries Directorate, J&K	GVK Ratle Hydroelectric Project
1.11	Restoration of Muck Disposal sites, construction areas		Status of protection measures, sausage/ gabion walls, etc. at the dumping sites. Whether dumping is done so as to avoid spillage of muck into the river, especially during rains Leveling and slope stabilization works at dumping sites. Status of afforestation/ turfing works on the dumping sites	Twice a year	Contractors & GVK Ratle Hydroelectric Project	SPCB, J&K
2.0	**Operation Phase**					
2.1	Water Quality and Quantity (for irrigation & domestic use)	Reservoir water regulation Diversion of water for power generation	Surveys, sample collection & field measurement Water discharge d/s of dam Water quality (turbidity, coliform, bacteria and others	Fortnightly during the lean period	GVK Ratle Hydroelectric Project	SPCB, J&K
2.2	Fish production	Reservoir regulation	Survey & observation	Monthly	State Fisheries Directorate J&K	GVK Ratle Hydroelectric Project

2.3	Aquatic weeds		Surveys & sample collection Kinds of species	Seasonal	GVK Ratle Hydroelectric Project	SPCB, J&K
2.4	Catchment conditions	Deforestation	Survey & observation of Barren areas for Afforestation	Every year	Forest Dept. J&K	GVK Ratle Hydroelectric Project
2.5	Accidents	Sudden discharge of water for power generation	Surveillance	Monthly	GVK Ratle Hydroelectric Project	Meteorological Department
2.6	Disaster	Heavy rainfall, flash flood situation	Surveillance and disaster management exercises, Regular information to people	Twice a year	State Meteorological Dept.	GVK Ratle Hydroelectric Project

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15 COST ESTIMATES

An amount of ₹ **26235.46 lakh** has been allocated for the implementation of different environmental management plans. The summary of total cost estimates for the execution of different plans is given in Table 15.1 below.

Table 15.1: Cost estimates for the implementation of various measures under EMP

S. No.	Management Plan	Amount (Rs. in lakh)
1	Biodiversity Management Plan	183.00
2	Catchment Area Treatment Plan	4681.57
3	Fishery Development and Management Plan	488.50
4	Solid Waste Management Plan	170.00
5	Public Health Delivery System	150.00
6	Energy Conservation Measures	30.00
7	Muck Disposal Plan	7500.00
8	Landscaping & Restoration of Quarry & Construction Areas	73.00
9	Air & Water Environment Management Plan	75.00
10	Reservoir Rim Treatment Plan	225.00
11	Compensatory Afforestation	138.92
12	Net Present Value (NPV)	1246.11
13	Compensation of Trees/ Poles / Sapling	73.94
14	Cost of damage to fence line & infrastructure	8.62
15	Rehabilitation & Resettlement Plan	1992.20
16	Dam Break Modeling &Disaster Management Plan	117.60
17	Local Area Development Plan @ 0.5% of project cost	3000.00
18	CSR Activities	3000.00
19	Local Skill Development	3000.00
20	Environmental Monitoring Programme	82.00
TOTAL		**26235.46**

Annexure-I

Subcatchment Name/Code	EIMU Code	EIMU Area (hectare) (EA)	Delivery Ratio (DR)	Weightage factor (WF)	Subcatchment Area (hectare) (SA)	EA * (WF)	T = Σ (EA * WF)	SYI = (T*DR*100)/SA
Agral (RAAG)	1	1520	0.8	15	4205	225	621	**1183**
	2	858		14		126		
	3	1827		15		270		
Balur (RABA)	1	2694	0.8	11	6189	297	713	**920**
	2	2149		13		273		
	3	1346		11		143		
Bhandin (RABH)	1	939	0.7	15	4399	135	690	**1098**
	2	527		15		75		
	3	1882		16		304		
	4	1051		16		176		
Borpathar (RABO)	1	1221	0.7	13	4297	156	508	**827**
	2	1147		13		143		
	3	1048		11		110		
	4	881		11		99		
Chhatra (RACH)	1	893	0.8	15	6500	135	1011	**1244**
	2	1157		18		216		
	3	1016		15		150		
	4	1497		15		225		
	5	1937		15		285		
Dangar (RADA)	1	776	0.7	11	5942	88	742	**880**

Subcatchment Name/Code	EIMU Code	EIMU Area (hectare) (EA)	Delivery Ratio (DR)	Weightage factor (WF)	Subcatchment Area (hectare) (SA)	EA * (WF)	T = Σ (EA * WF)	SYI = (T*DR*100)/SA
	2	1005		13		130		
	3	1179		13		156		
	4	1000		13		130		
	5	945		13		117		
	6	473		11		55		
	7	564		11		66		
Drubil (RADR)	1	1489	0.7	20	6548	300	1306	**1406**
	2	1322		20		260		
	3	1307		20		260		
	4	1777		20		360		
	5	653		18		126		
Gahan (RAGA)	1	2565	0.8	15	7019	390	994	**1136**
	2	1607		15		240		
	3	1326		13		169		
	4	1521		13		195		
Khawur (RAKH)	1	1485	0.7	15	7044	225	924	**924**
	2	715		18		126		
	3	635		15		90		
	4	785		15		120		
	5	1046		11		110		
	6	846		11		88		
	7	837		11		88		
	8	695		11		77		

Subcatchment Name/Code	EIMU Code	EIMU Area (hectare) (EA)	Delivery Ratio (DR)	Weightage factor (WF)	Subcatchment Area (hectare) (SA)	EA * (WF)	T = Σ (EA * WF)	SYI = (T*DR*100)/SA
Keshwan (RAKE)	1	1116	0.7	13	7095	143	1121	**1105**
	2	991		18		180		
	3	2849		15		420		
	4	2139		18		378		
Kurnag (RAKU)	1	1067	0.8	15	2755	165	418	**1194**
	2	572		11		66		
	3	468		17		85		
	4	648		17		102		
Kishtwar (RAKI)	1	1452	0.7	13	4166	195	562	**937**
	2	791		15		120		
	3	1923		13		247		
Macholi (RAMA)	1	1026	0.8	13	3535	130	505	**1154**
	2	1687		15		255		
	3	822		15		120		
Naidgam (RANA)	1	2972	0.7	17	5510	510	938	**1194**
	2	1393		18		252		
	3	1145		16		176		
Pantsalmarg (RAPA)	1	1138	0.8	11	4073	121	440	**859**
	2	717		11		77		
	3	979		11		110		
	4	1239		11		132		

Subcatchment Name/Code	EIMU Code	EIMU Area (hectare) (EA)	Delivery Ratio (DR)	Weightage factor (WF)	Subcatchment Area (hectare) (SA)	EA * (WF)	T = Σ (EA * WF)	SYI = (T*DR*100)/SA
Paribagh (RAPR)	1	3067	0.8	18	8251	558	1361	**1312**
	2	2835		18		504		
	3	2349		13		299		
Shalamar (RASH)	1	1282	0.7	13	3467	169	424	**848**
	2	534		11		55		
	3	445		11		44		
	4	1206		13		156		
Singpor (RASI)	1	4408	0.7	15	6476	660	998	**1075**
	2	799		13		104		
	3	1269		18		234		
Sat Kol (RASA)	1	775	0.8	11	3637	88	523	**1162**
	2	1059		15		165		
	3	627		15		90		
	4	595		15		90		
	5	581		15		90		
Simbol (RASM)	1	1549	0.75	17	4027	255	668	**1253**
	2	589		15		90		
	3	1889		17		323		
Sarwal (RASR)	1	1513	0.7	20	7130	300	1192	**1175**
	2	2644		17		442		
	3	1389		15		210		
	4	1584		15		240		

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Annexure-II

SUPREME COURT OF INDIA
RECORD OF PROCEEDINGS

I.A.No.1768 IN W.P.(C)No.202/1995

T.N. GODAVARMAN THIRUMULPAD — Petitioner(s)

VERSUS

UNION OF INDIA & ORS — Respondent(s)
(For Direction)

Date: 09/05/2008 These Petitions/appln.s was/were called on for hearing today.

UPON hearing counsel the Court made the following

ORDER

NPV MATTERS
I.A.Nos.826 in 566 with 955 in 566, 958, 985, 1001-1001A, 1013-1014, 1016-1018, 1019, 1046, 1047, 1164, 1180-1181, 1182-1183, 1196, 1208-1209, 1229, 1248-1249, 1253, 1301-1302, 1303-1304, 1313, 1314, 1318, 1319 in 1137, 1325, 1364, 1365-1366, 1370-1370A, 1371, 1384, 1435-1437, 1441 with 1634, 1475-1476, 1579, 1513, 1573, 1664, 1676, 1707, 1721, 1779 in 1164 in 566, 1785-1786 in IA 1441, 1980-1981, 1993, 2013, 2074-2076, 2077-2078 in 1441, 2230-2231, 2240-2241 in 1164, 2147-2148, 2149-2150 & 2153-2154 in I.A.566 in W.P.(C) No.202/1995

List the Public Utility Project matters, Hydel and Irrigation Projects matters, Construction of road on acquired land matter, transmission lines matters, Hydro Electric Power Projects matters, Mining in the same sequence on 18.7.2008.

The order dated 28.3.2008 is corrected as recorded separately.

CASE NO :
Writ Petition (civil) 202 of 1995

PETITIONER: T.N. Godavarman Thirumulpad

RESPONDENT: Union of India & Ors.

DATE OF JUDGMENT : 28/03/2008

BENCH:
CJI K.G. BALAKRISHNAN & DR. ARIJIT PASAYAT & S.H. KAPADIA

JUDGMENT
O R D E R
REPORTABLE

I.A. Nos. 826 IN 566 WITH 955 IN 566, 958, 985, 1001-1001A, 1013-14, 1016-1018, 1019, 1046, 1047, 1135-1136, 1164, 1180-1181, 1182-1183, 1196, 1208-1209, 1222-1223, 1224-1225, 1229, 1233 IN 1135-1136, 1248-1249, 1253, 1301-1302, 1303-1304, 1312,1313, 1314, 1318, 1319 IN 1137, 1325, 1364, 1365-1366, 1370-1370A, 1371, 1384, 1385-1386, 1387, 1434, 1435-1437, 1438, 1441 WITH 1634, 1475-1476, 1513, 1573, 1639 IN 1135-1136 IN IA 566, 1664, 1665, 1671, 1676, 1707, 1721, 1779 IN 1164 IN 566, 1785-1786 IN I.A. NO. 1441, 1980-1981, 1993, 2013, 2074-2076, 2077-2078 IN 1441 & 2098 IN 1233 IN 1135-1136, 2145-2146, 2147-2148, 2149-2150 &2153-2154 IN I.A. 566 IN W.P.(C) NO. 202/1995

It is undisputed fact that the forest in this country is an important and vital component to sustain the life support system on this planet. For various reasons, our forest is being slowly depleted. At the same time, as part of our developmental activities, some areas of the forest have to be used for non-forest purposes. The economic development shall not be at the cost of complete degradation of the forest or the environment and eco-system provided by the green area of the forest. Therefore, it was considered whether the user agency of such land which is required for developmental activities to compensate for the diversion of the forest and on the recommendations of the Central Empowered Committee (herein after being referred to as ("CEC"), it was decided by this Court that the user agency shall be required to make payment of net present value (NPV) of such diverted land so as to utilize this for getting back in the long run which are lost by such diversion. A scheme was submitted by Ministry of Environment and Forests (MOEF) alongwith an affidavit dated 22.3.2002. The CEC considered all relevant aspects including the scheme submitted by MOEF and filed a report on 9.8.2002. These reports were accepted by this Court. This Court in T.N. Godavaraman Thirumulpad Vs. Union of India 2006(1) SCC 1 finally directed that the question as to what amount of

NPV is required to be paid and to achieve these objectives, it was directed that the question is to be examined by experts. A Committee comprising of three experts including Mrs. Kanchan Chopra was appointed and this Court gave the following directions:-

(i) to identify and define parameters (scientific, biometric and social) on the basis of which each of the categories of values of forest land should be estimated.

(ii) To formulate a practical methodology applicable to different biogeographical zones of India for estimation of the values in monetary terms in respect of each of the above categories of forest values.

(iii) To illustratively apply this methodology to obtain actual numerical values for different forest types for each biogeographical zone in the country.

(iv) To determine on the basis of established principles of public finance, who should pay the costs of restoration and/or compensation with respect to each category of values of forests.

(v) Which projects deserve to be exempted from payment of NPV.

On the basis of the directions issued by this Court, a Committee consisting of Mrs. Kanchan Chopra gave a report and the same was examined by the CEC.

The report contains details study of the relevant factors. The Forest Survey of India, has since last two decades, been undertaking forest cover mapping of the country using satellite data obtained by the NRSA, Hyderabad. The methodology of mapping involves the geo-rectification of the satellite imagery using the Survey of India toposheets followed by the digital interpretation of the same and extensive ground truthing. It was found that the forest cover maps depicts mainly three tree canopy density classes, viz., very dense, moderately dense and open. There were other classifications in the Forest of India and "Champion and Seth" have classified the forests of India into 16 major groups. The major basis of classification included the climate, the soil and the past treatment as these factors determine the vegetation type of a given locality. CEC has classified the forest taking in view the ecological role and value of the forest and the purpose of the report, 16 major forest types have been further grouped into 6 ecological classes depending upon their ecological functions.

Eco-Class I- Consisting of Tropical Wet Evergreen Forests, Tropical Semi Evergreen Forests and Tropical Moist Deciduous Forests Eco-Class II –Consisting of Littoral and Swamp Forests Eco-Class III – Consisting of Tropical Dry Deciduous Forests Eco-Class IV- Consisting of Tropical Thorn Forests and Tropical Dry Evergreen Forests Eco-Class V – Consisting of Sub-tropical Board Leaved Hill Forests, Sub-Tropical Pine Forests and Sub Tropical Dry Evergreen Forests Eco-Class VI-Consisting of Montane Wet Temperate Forests, Himalayan Moist Temperate Forests, Himalayan Dry Temperate Forests, Sub Alpine Forest, Moist Alpine Scrub and Dry Alpine Scrub.

Based on the ecological importance of forest falling in different eco-value and canopy density lasses, relative weightage factors have also been taken into consideration. By using these relative weightage factors, the equalized forest area in eco-value Class I and very dense forest corresponding to forest falling in different eco-value and density classes have been compiled. For example, 17,977sq.km. of open forest of Eco-Class IV has been calculated to be equivalent to 7,558 sq.km. of very dense forest of Eco-Value Class I. Accordingly, the entire forest area of the country has been calculated and found to be equivalent to 5.2 lakh sq. km. forest area having highest ecological significance as that of forest falling in eco-value Class I with density above 70%.

The net present value per hectare of forest has been fixed based on this data. For calculating the average net percent value per hectare of forest in India, the following monetary value of goods and services provided by the forest have been considered:-

(i) Value of timber and fuel
(ii) Value of Non Timber Forest Products (NTFP)
(iii) Value of fodder
(iv) Value of Eco-tourism
(v) Value of bio-prospecting
(vi) Value of Ecological services of forest
(vii) Value of Flagship Species
(viii) Carbon Sequestration Value

Based on this, the NPV was fixed and the following recommendations have been made:-

(i) for non-forestry use/diversion of forest land, the NPV may be directed to be deposited in the Compensatory Afforestation Fund as per the rates given below:-

(in Rs.)

Eco-Value class Very Dense Forest Dense Forest Open Forest Class I
10,43,000
9,39,000
7,30,000
Class II
10,43,000
9,39,000
7,30,000
Class III
8,87,000
8,03,000
6,26,000
Class-IV
6,26,000
5,63,000
4,38,000

Class V
9,39,000
8,45,000
6,57,000
Class VI
9,91,000
8,97,000
6,99,000

(ii) the use of forest land falling National parks/ Wildlife Sanctuaries will be permissible only in totally unavoidable circumstances for public interest projects and after obtaining permission from the Hon'ble Court. Such permissions may be considered on payment of an amount equal to ten times in the case of national Parks and five times in the case of Sanctuaries respectively of the NPV payable for such areas. The use of non-forest land falling within the National Parks and Wildlife Sanctuaries may be permitted on payment of an amount equal to the NPV payable for the adjoining forest area. In respect of non-forest land falling within marine National Parks/Wildlife Sanctuaries, the amount may be fixed at five times the NPV payable for the adjoining forest area;

(iii) these NPV rates may be made applicable with prospective effect except in specific cases such as Lower Subhanshri Project, mining leases of SECL, Field Firing Ranges, wherein pursuant to the orders passed by this Hon'ble Court, the approvals have been accorded on lump-sum payment/no payment towards the NPV; and

(iv) for preparation and supply of district level maps and GPS equipments to the concerned State/UT Forest Departments and the regional offices of the MoEF, the Ad hoc CAMPA may be asked to provide an amount of Rs. 1.0 crore to the Forest Survey of India out of the interest received by it.

Ministry of Environment and Forests also has filed its response and has accepted the recommendations made by CEC. Various user agencies have filed its objections. We heard the learned senior Counsel Mr. Nariman and other learned senior Counsel who appeared before us. The main contention raised is that the NPV value was fixed on the basis of the net flow accruing over 20 years at a 5% social discount rate. This, according to the applicants , is too low. It has been contended that the Economic and Research Department of the Asian Development Bank is of the view that a survey of the social discount rate policies of individual countries show significant variations and the developing countries apply higher social discount rate. The paper published by Asian Development Bank shows that India should have a social discount rate 12%. It may be noted that the Expert Committee under the leadership of Mrs. Kanchan Chopra recommended 5%

social discount rate but the CEC has reduced further and accepted 4% social discount rate. It may be noted that the CEC had made consultation with eminent economists and it was of the view that the social discount rate should be around 2% in India. We do not find much force in the contention advanced by the learned Counsel who appeared for the user agents. The 10% suggested by them cannot be applied to the present case because 10% is the rate linked to assumptions about the opportunity cost of capital. One cannot apply that rate for social time preference in evaluating the benefits from an environmental resource such as forests. In project evaluation, the horizon is compatible with the life of the project whereas in forest matters, the horizon spans over several generations. Therefore, the rate of 10%, as suggested by the user agency cannot be accepted.

Another contention raised by the applicant(FIMI) is that the NPV is not fixed on site specific and, therefore, the fixation of the rate is based on surmises and conjectures and the same rate cannot be applied to the large extent of area covered by the forests. This question was elaborately considered by the CEC. Considering the large extent of this country and the forest being spread over in various parts of the State, it is difficult to fix the NPV based on the specific area. It is not feasible to fix NPV in each and every individual case. The entire forest area in each of the State/UT is calculated by considering the monetary value of the services provided by it. The average NPV per hectare of the forest area in the State has also been calculated. If NPV is to be calculated on the specific area, the process would be time consuming and in most of the cases, it may be beyond the capability of the Range Forest Officers or other officials posted at the grassroot level. Moreover, the NPV is linked with the type of the forest and no useful purpose would be served by carrying out NPV calculations in each case involving the diversion of forest areas.

We are of the view that the NPV now fixed is more scientific and is based on all available data. We accept the recommendations and we make it clear that the NPV rate now fixed would hold good for a period of three years and subject to variation after three years. The following exemptions have been recommended:-

(i) public works such as schools, hospitals, children play ground of non-commercial nature and the public welfare projects such as community centers in rural areas which require forest land upto 2 ha;

(ii) rural infrastructure and basic services such as the construction of the overhead tanks, village roads, etc.

(iii) the minor irrigation projects upto 10 ha. of storage area, municipal water supply projects, drinking water supply pipelines;

(iv) activities necessary for the ecological management, relocation of the villages from the sactruaries and the national parks, regularization of pre-1980 eligible encroachers;

(v) housing for the rehabilitation of tribals; laying of the underground optical fibre cables;

(vi) laying of the pipelines for the underground gas transportation;

(vii) the district and rural roads;

(viii) shifting cultivation;

(ix) roads constructed by Defence in border areas;

(x) construction of the transmission lines.

The above recommendations for exemptions are accepted. If, in any case, exemption is required by nature of the peculiar circumstances of the case, the same would be decided as and when necessary on a case to case base.

IN THE SUPREME COURT OF INDIA.

CIVIL ORIGINAL JURISDICTION

In Nos. 826 IN 566 WITH 955 IN 566, 958, 985, 1001-1001A, 1013-14, 1016-1018, 1019, 1046, 1047, 1135-1136, 1164, 1180-1181, 1182-1183, 1196, 1208-1209, 1222-1223, 1224-1225, 1229, 1233 IN 1135-1136, 1248-1249, 1253, 1301-1302, 1303-1304, 1312, 1313, 1314, 1318, 1319, IN 1137, 1325, 1364, 1365-1366, 1370-1370A, 1371, 1384, 1385-1386, 1387, 1434, 1435-1437, 1438, 1441 WITH 1634, 1475-1476, 1513, 1573, 1639 IN 1135-1136 IN IA 566, 1664, 1665, 1671, 1676, 1707, 1721, 1779 IN 1164 IN 566, 1785-1786 IN I.A. NO. 1441, 1980-1981, 1993, 2013, 2074-2076, 2077-2078 IN 1441 & 2098 IN 1233 IN 1135-1136, 2145-2146, 2147-2148, 2149-2150 & 2153-2154 IN I.A. 566 IN W.P. (C) NO. 202/1995

T.N. Godavarman Thirumulpad ……. Petitioners

Versus

Union of India & Ors. …… Respondents

O R D E R

On 28th March, 2008, we had passed an order regarding payment of Net Present Value (NPV) accepting the recommendations made by CEC which were more or less acceptable to MoEF. In that order we had also indicated that exemptions from payment of NPV have to be granted in respect of certain categories. However, it is brought to our notice that certain typographical mistakes had crept in that order as to categories to which such exemptions are to be granted. Therefore, we direct that as regards exemptions from payment of NPV, the last part of that order reading "We are of the view…….(x) construction of the transmission lines" on pages 10 to 11 shall stand substituted with the following :-

Category	CEC
i) Schools ii) Hospitals iii) Children's play ground of non-commercial nature. iv) Community centers in rural areas. v) Over-head tanks vi) Village tanks vii) Laying of underground drinking water pipeline upto 4 diameter and viii) Electricity distribution line upto 22 KV in rural areas.	Full exemption upto 1 ha. of forest land provided : (a) no felling of trees is involved; (b) alternate forest land is not available. (c) the project is of non-commercial nature and is part of the Plan/Non-Plan Scheme of Government; and (d) the area is outside National Park/Sanctuary
Relocation of villages form the National Parks/ Sanctuary to alternate forest land	Full exemption
Collection of boulders/silts from the river belts in the forest area.	Full exemption provided :- (a) area is outside National Park/Sanctuary; (b) no mining lease is approved/signed in respect of this area; (c) the works including the sale of boulders/silt are carried out departmentally or through Government undertaking or through the Economic Development Committee or Joint Forest Management Committee; (d) the activity is necessary for conservation and protection of forests; and (e) the sale proceeds are used for protection/conservation of forests.
Laying of underground optical fibre cable	Full exemption provided : (a) no felling of trees is involved; and (b) areas falls outside National Park/Sanctuary.
Pre-1980 regularization of encroachments and conversion of forest villages into revenue villages	Full exemption provided these are strictly in accordance with MoEF's Guidelines dated 18.9.1990.
Underground mining	50% of the NPV of the entire area

The above recommendations for exemptions are accepted. If, in any case, exemption is required by nature of the peculiar circumstances of the case, the same would be decided as and when necessary on a case to case basis.

New Delhi
May 9, 2008.

……Sd/-…….. CJI
(K.G. BALAKRISHNAN)

……Sd/-…….
(DR. ARIJIT PASAYAT)

……Sd/-…….
S.H. KAPADIA

Annexure III

SOCIO-ECONOMIC SURVEY OF PROJECT AFFECTED FAMILIES			
1	Project Name:		
	Village:		Development Block:
	Panchayat:		Tehsil:
	District:		
2	Personal Details		
	Name of the Respondent	Mr./ Mrs./Ms:	
	Nature of Employment		
	Gender	Male	Female
	Education		
	Religion		
	Caste	Open/OBC/S.C./S.T./N.T./V.J./Other ____.	
	BPL Family		
	Marital status	Married	Unmarried
	Total Annual Income (`)		

3	Family Constellation				
	Name	Age (yrs.)	Education	Occupation	Monthly Income (`)

4	Vulnerable Person				
	Disabled		Destitute		
	orphans		Widows		
	Unmarried Girl				
5	Homestead Land				
	No. of house/houses owned (area in ha)				
	Location:	At same village/		other village/place	
		Owner		Tenant	
	If Tenant	Years form tenant			
6	Whether living in village	Permanently	Temporarily		Not living
7	Whether the family is being displaced	Yes		No	

8	Immovable Properties	Total	No. acquired	No. Left
	House			
	Shop			
	Water-mills			
	Cattle-shed			
	Wells			

1

	Ponds			

9	Type of House	Concrete	Stone	Kaccha	No. of Rooms
	Separate Kitchen	Yes		No	
	Toilet Facility	Yes		No	
	Type of fuel used	Gas (LPG)	Kerosene	Wood	others
	Amenities	T.V.	Telephone	Fridge	Vehicle

10	Land holding & acquisition				
	Total land of the owner				
	Land to be acquired (ha)		Land left (ha)		
	Location of land (Area in acres/ha/any other)	Same village		Other village	
	Land under cultivation				
	Type of Land	Irrigated		Un-irrigated	
		Self tilled	by Labourers		
	Estimated loss due to loss of agricultural land, if any				
11	Cropping Pattern				
12	No. of trees owned				
	Names of trees				
	No. of trees likely to be affected				
	Estimated income from these trees, if any				

13	Livestock Population	Buffalo	Ox	Goat	Sheep	Horse	Mule	Cow
	No.							

14	Health Status			
	No. of Disabled Person (if any):	Physically	Polio	Mentally
	Name of the major diseases by which family			
15	Willingness to Accept			
a	Willing to accept the loss of land (homestead/agricultural)	Yes		No
b	Is ready to accept the proper compensation offered for the loss as per the State policy	Yes		No
c	If answers to above questions are No, then give reasons			
16	Would you welcome the project? (If No, give reasons)			

Surveyor's Name: **Signature of the respondent**

Date **Place**

Annexure VI

FAMILY AND INCOME DETAILS OF PAFs

Sr. No.	Name of Village	Name of Owner	Age	Education	Nature of Employment	Annual Income (Rs.)	SC	ST	Social Caste	BPL Family	No of Souls			
											Male	Female	Children	Total
1	Janwas	Mr.Ghulam, S/o. Mr. Chirya Gujjar	60	Nill	Agri	36000		1		1	3	1	1	5
2	Janwas	Mr.Yousaf, S/o Mr.Saya Gujjar	40	8th	Agri	30000		1		1	1	2	2	5
3	Janwas	Mr.Alladitta, S/o.Mr.Sabu Gujjar	43	8th	Agri	40000		1		1	3	2	6	11
4	Janwas	Ms.Dalvera	55	Nill	Agri	72000		1		1	4	4	2	10
5	Janwas	Mr.Noor hussain S/o Moh"d Yousf Gujjar	28	6th	Driver PVT	30000		1		1	1	1	4	6
6	Janwas	Mr.Liyaqat Ali, S/o.Mr.Yousaf	25	Nill	Agri	40000		1		1	2	1	2	5
7	Janwas	Mr. Gh. Nabi Gujjar	40	Nill	Agri	66000		1		1	3		1	4
8	Kandani	Mr.Ram Nath, S/o.Mr.Mangat Ram Thakar	58	8th	Business	250000					2	2	3	7
9	Kandani	Mr.Tara Chand, S/o.Ram Dayal	62	10th	Pensioner	240000					7	4	3	14
10	Kandani	Mr.Bansi Lal, S/o.Mr. Sardhu Ram Gupta	52	10th	Business	180000					3	2	0	5
11	Kandani	Mr. Kewal Krishan S/o.Mr. Sardhu Ram Gupta	47			150000					0	0	0	0
12	Kandani	Ms Somi Devi w/o Mr. Paras Ram Sharma	55	5th	Agrarian	20000					3	3	3	9
13	Kandani	Ms.Premi Devi, D/o.Mr.Ram Saran	50	Nill	Pensioner	60000				1	0	3	0	3
14	Kandani	Mr.Kishori Lal S/o. Mr.Jia Lal Sharma	41	10th	Service	150000					1	2	4	7
15	Kandani	Mr.Gian Chand, S/o.Mr.Tara Chand	60	5th	Business	60000					2	2	1	5
16	Kandani	Mr.Masood Ahmed, S/o.Mr.Mohd Shafi Sheikh	37	BUMS	Clinic -Pvt	360000					1	1	3	5
17	Kandani	Mr.Krishan Lal, S/o.Mr.Sena Ram Sharma	43	12th	Service	204000					1	2	4	7
18	Kandani	Mr.Sadhu Ram, S/o.Mr.Bhim	38	Nill	Labourer	40000				1	1	1	4	6

Sr. No.	Name of Village	Name of Owner	Age	Education	Nature of Employment	Annual Income (Rs.)	SC	ST	Social Caste	BPL Family	No of Souls			
											Male	Female	Children	Total
		Sen Sharma												
19	Kandani	Mr.Ravi Kumar, S/o.Mr.Jodh Ram Sharma	38	8th	Miller	240000					1	1	3	5
20	Kandani	Mr.Jagdish Raj, S/o.Mr.Bhagat Ram	52	8th	Service	36000					3	2		5
21	Kandani	Mr.Munshi Ram, S/o.Mr.Murli Lal Thakur	35	8th	Agri/Labrour	50000				1	1	3	3	7
22	Kandani	Mr.Des Raj, S/o.Mr.Mangat Ram Sharma	30	8th	Labourer	50000				1	1	1	3	5
23	Kandani	Mr.Jugal Kishore, S/o.Mr.Vidiya Lal Thakur	26	9th	Business	400000					3	2		5
24	Kandani	Mr.Ranjit Kumar, S/o.Khem Raj	26	8th	Agri/Labrour	72000					1	1	2	4
25	Kandani	Mr.Sadhu Ram, S/o.Jodh Ram	40	5th	Labourer	60000				1	1	2	2	5
26	Kandani	Mr.Barfi Nath S/o.Roop Lal	44	5th	Labourer	96000				1	2	2	3	7
27	Kandani	Mr.Barfi Kumar, S/o. Gian Chand	45	10th	Shopkeeper	25000					2	1	1	4
28	Kandani	Mr.Abdul Rashid, S/o.Rasula Mochi	63	Nill	Cobler	70000			1	1	2	2	1	5
29	Kandani	Mr.Bansl Lal, S/o.Mr. Lakshmi Chand	35	PG	Business	60000					3	3	0	6
30	Kandani	Rita Devi wd/o Mohan Lal, S/o. Jodh Ram	30	Nill	hw	24000				1		1	3	4
31	Kandani	Mr.Kishori Lal, S/o.Prem Nath	26	8th	Agri/Labrour	60000				1	4	3	4	11
32	Kandani	Mr.Gh.Hassan, S/o.Abdullah Mochi	45	2nd	Labourer	40000			1	1	1	2	3	6
33	Kandani	Mr.Ismal, S/o. Lassa Mochi	50	Nill	Labourer	20000			1	1	1	0	0	1
34	Kandani	Mr.Kishori Lal, S/o. Mr.Sarab Dayal	30	5th	Mason	120000					2	2	3	7
35	Kandani	Mr.Bodh Raj S/o. Sena Ram Thakur	35	8th	Labourer	36000					1	1	4	6
36	Kandani	Mr.Shadi Lal, S/o. Naib Chand	50	8th	Service	240000					5	2	2	9
37	Kandani	Mr.Des Raj, S/o. Mr.Kripa Ram	70	Nill	Business	96000					3	2	2	7
38	Kandani	Mr.Rajesh Kumar S/o. Mr.Ram Chand Gupta	43	10th	Business	360000					1	1	2	4
39	Kandani	Mr.Rattan Chand,	56	8th	Agrarian	180000					2	3	6	11

Sr. No.	Name of Village	Name of Owner	Age	Education	Nature of Employment	Annual Income (Rs.)	SC	ST	Social Caste	BPL Family	No of Souls			
											Male	Female	Children	Total
		S/o.Mr.Sansar Singh												
40	Kandani	Mr.Bodh Raj S/o. Sardhu Ram Gupta	60	8th	Business	360000					3	3	3	9
41	Kandani	Mr.Gh Nabi S/o. Gh.Qadir Qazi	58	12th	Pensioner	270000					4	1	2	7
42	Kandani	Mr.Kuldip Kumar, S/o.Murli Lal	32	Nill	Agri/Labour	20000				1	1	1	3	5
43	Kandani	Mr.Rakesh &Rajesh kumar, S/o Des Ram Thakur	36	12th	Service/Agri	180000					3	2	2	7
44	Kandani	Mr.Mohan Lal, S/o. Roop Lal Brahman	25	8th	Labour	60000				1	1	1	2	4
45	Kandani	Mr.Roop Chand S/o Beem Sen Sharma	75	Nill	Miller	20000				1	5	5	18	28
46	Kandani	Mr. Roop Lal S/o Roop Chand Sharma	45	Nill	Agri/Labour	36000				1	3	1	3	7
47	Kandani	Mr. Moh'd Iqbal Wani	32	Nill	Agri/Labour	48000				1	1	1	3	5
48	Kandani	Mr.Gh Nabi S/o. Ab. Gani Butt	42	8th	Agri/Labour	150000					2	1	4	7
49	Kandani	Mr.Darshan S/o Chuni Lal Gupta	55	10th	Business	360000					3	2	2	7
50	Kandani	Jodh Ram S/o Aagya Ram Thakur	60	Nill	Agrarian					1	6	1		7
51	Kandani	Madan lal S/o Sardhu Ram Gupta	56	B.Ed	Govt.Teacher	384000					3	3		6
52	Kandani	Munshi Ram S/o Roop Lal Sharma	40	5th	Shopkeeper	96000				1	2	1	3	6
53	Kandani	Madan lal S/o Des Raj Gupta	38	8th	Business	48000				1	3	1	2	5
54	Kandani	Ratan lal S/o Sardhu Ram Gupta	58	8th	Business	50000					3	3		6
55	Kandani	Shesh Ram S/o Parsa Ram Sharma	30	5th	Business	60000					1	1	2	4
56	Kandani	Jeep Lal S/o Jodh Ram Sharma	30	12th	Labour	36000				1	3	3	1	7
57	Kandani	Ragu Nath S/o Hans Raj Sharma	28	12th	Business	120000					2	2	3	7
58	Kandani	Swami Raj S/o Tara Chand Thakur	50	Nill	Business	96000					1	1	1	3
59	Kandani	Shadi Lal Sharma S/o Jodh Ram Sharma	30	6th	Business	36000				1	3	4	9	16
60	Kandani	Sanjay Sharma S/o Bodh Raj Rajput	34	10th	Business	240000				1	1	1	2	4
61	Kandani	Mr. Ravi Kumar S/o Bodh Raj	32	1oth	Business	360000					1	1	1	3

Sr. No.	Name of Village	Name of Owner	Age	Education	Nature of Employment	Annual Income (Rs.)	SC	ST	Social Caste	BPL Family	No of Souls			
											Male	Female	Children	Total
		Rajput												
62	Agral	Mr.Darshan Gupta	55		Business						3	2	2	7
63	Agral	Ms.Sushma Devi, W/o. Tek Chand Shaan	35	Nill	House Wife	40000				1	3	1		4
64	Agral	Mr.Dev Dutt, S/o. Prem Nath	60	5th	Agrarian	720000					6	5	5	16
65	Agral	Mr.Kunj Lal, S/o. Sant Ram Gupta	78	Nill	Shop/Mill	360000					4	4	5	13
66	Agral	Mr.Swami Raj S/o. Mr.Sena Ram Thakur	40	Nill	Mill/Labour	36000				1	1	2	4	7
67	Agral	Mr.Dev Raj, S/o.Jia Lal Sharma	45	8th	Business	200000					2	3	0	5
68	Agral	Mr.Sadhu Ram, S/o.Sobha Ram Sharma	55	8th	Business	250000					3	2	3	8
69	Agral	Mr.Suresh Kumar, S/o .Mr. Hem Raj Thakur	36	8th	Service	192000					3	4	4	11
70	Agral	Mr.Vilayat Chand, S/o. Gosson Ram Sharma	42	10th	Service	360000					4	3	1	8
71	Agral	Mr.Roop Chand S/o Bhim Sen Sharma	75	Nill	Miller	20000				1	2	4	15	21
72	Dugga	Mr.Sondia Gujjar S/o Mehar Din	85	Nill	Agrarian	30000		1		1	1			1
73	Dugga	Mr.Mohd. Shafi, S/o.Sondia Gujjar	40	8th	Agrarian	24000		1		1	1	2	5	8
74	Dugga	Mr.Farid Ahmed, S/o.Sondia Gujjar	38	Nill	Agrarian	24000		1		1	1	1	4	6
75	Dugga	Mr.Bashir Ahmed, S/o.Sondia	48	Nill	Agrarian	42000		1		1	3	3	1	7
76	Dugga	Mr.Nazir Ahmed, S/o.Basir Ahmed	28	Nill	Agri/Labour	30000		1		1	1	1	2	4
77	Dugga	Mr.Hasham Din, S/o.Mundu Gujjar	60	8th	Agrarian	36000		1		1	2	2		4
78	Dugga	Mr.Abdul Rashid, S/o . Hasham Din Gujjar	32	8th	Labour	96000		1		1	1	1	4	6
79	Dugga	Mr.Kalu, S/o.Hasham Din	31	3rd	Labour	36000		1		1	1	1	4	6
80	Dugga	Mr.Ali Hussain, S/o.Mr.Hasham Din	28	8th	Labour	48000		1		1	1	1	2	4
81	Dugga	Mr.Mian Hussain, S/o. Mr.Hasham Din	30	5th	Labour	36000		1		1	1	1	3	5

Sr. No.	Name of Village	Name of Owner	Age	Education	Nature of Employment	Annual Income (Rs.)	SC	ST	Social Caste	BPL Family	No of Souls			
											Male	Female	Children	Total
82	Dugga	Ab.Salam Matoo S/o Ab.Rashid Matoo	50	12th	Contractor	600000					2	1	2	5
83	Dugga	Abdul Kalam S/o Ab. Rashid Matoo	42	PG	Pvt Teacher	30000					1	1	1	3
84	Dugga	Shahid Rashid S/o Ab. Rashid Matoo	36	10th	Sarpanch	36000				1	1	2	1	4
85	Dugga	Ab. Majid S/o Gh. Rasool Matoo	75	8th	Agrarian	180000					4	4	5	13
86	Dugga	Late Mr.Ghulam S/o Mohamdu Shiekh				168000				1	3	3	11	17
87	Dugga	Shareefa Begam W/o Fateh Moh'd Shiekh	67	Nill	House Wife	96000				1	4	5	11	20
88	Dugga	Abdul Latif S/o Moh'd Ramzan Shiekh	52	8th	Agrarian	180000				1	2	2	3	7
89	Dugga	Late , Khushi Moh'd S/o Gh Rasool Matoo				240000					3	3	3	9
90	Dugga	Kartar Singh S/o Chhater Singh	60	11th	Pensioner	264000					2	2		4
91	Dugga	Bashir Ahmad S/o Moh'd Abdullah Zargar	60	9th	Agrarian	108000				1	4	4	6	14
92	Dugga	Ab. Rashid S/o Fateh Zargar	70	Nill	Agrarian	120000				1	7	5	5	17
93	Dugga	Ab. Majid S/o Fateh Zarger	65	8th	Rtd. Person	180000					3	4	4	11
94	Dugga	Moh'd Abbas S/o Moh'd Abdullah Matoo	56	11th	Service	360000					1	1	1	3
95	Dugga	Ab. Kabir S/o Moh'd Ramzan Shiekh	45	Nill	Agrarian	12000				1	1	1	2	4
96	Dugga	Moh'd Shafi S/o Samad Zargar	64	10th	Rtd. Person	120000					4	5	5	14
97	Dugga	Moh'd Iqbal S/o Gh.Rasool Shiekh	60	8th	Rtd. Person	192000					5	4	10	19
98	Dugga	Moh'd Yaseen S/o Gh. Haider Matoo	33	12th	Agrarian	36000				1	2	2	1	5
99	Dugga	Gh.Haider S/o Gh. Ahmad Najar	60	5th	Carpenter	240000				1	7	6	17	30
100	Dugga	Moh'd Amin S/o Gh. Haider Matoo	45	12th	Govt. Service	156000					2	2	2	6
101	Dugga	Moh'd Hussain S/o Gh.Haider Matoo	40	10th	Govt. Service	108000					1	1	3	5
102	Dugga	Gh.Qadir S/o Gh. Mustafa Zargar	80	5th	Agrarian	144000				1	6	7	11	24

Sr. No.	Name of Village	Name of Owner	Age	Education	Nature of Employment	Annual Income (Rs.)	SC	ST	Social Caste	BPL Family	No of Souls			
											Male	Female	Children	Total
103	Bhandera	Gh.Hassan, S/o.Mangata Lohar	52	8th	Govt. Service	240000			1		3	2	1	6
104	Bhandera	Gh.Qadir, S/o.Mangata Lohar	40	Nill	Black Smith	30000			1	1	1	1	4	6
105	Bhandera	Gh.Ali, S/o.Mangta Lohar	51	9th	Govt. Service	216000			1		1	2	5	8
106	Bhandera	Gh.Mohi-ud-din' S/o. Rasool Lohar	45	10th	Black Smith	60000			1	1	3	3	1	7
107	Bhandera	Moh'd Iqbal' S/o Gh Hassan Lohar	33	12th	Govt. Service	96000			1		1	1	4	6
108	Bhandera	Gh. Moh'd S/o Mangata Lohar	50	8th	Black Smith	36000			1	1	4	2	5	11
109	Sangna	Mr.Roop Lal, S/o.Baldev				20000				1	3	2	3	8
110	Sangna	Mr.Ragu Nath, S/o.Faghir Chand				30000				1	4	3	7	14
111	Sangna	Mr.Omkar, S/o.Lal Chand				30000				1	5	5	3	13
112	Sangna	Mr.Rosan Lal, S/o.Paras Ram				15000				1	2	1	3	6
113	Sangna	Mr.Kansi Ram, S/o. Mangat Ram	55	8th	Govt. Service	180000					2	1		3
114	Sangna	Isher Lal, S/o.Dula Ram	48	Nill	Agri/Labour	144000					4	4	3	11
115	Sangna	Mr.Sena Ram, S/o.Roopa Lal Thakur	85	Nill	Agrarian	60000					7	5	2	14
116	Sangna	Mr.Bhabi Chand, S/o.Khazan Chand Thakur	52	Nill	Agrarian	144000				1	5	3	0	8
117	Sangna	Mr.Sewa Ram, S/o. Bhagat Ram Thakur	55	5th	Agrarian	180000				1	2	2	5	9
118	Sangna	Mr.Bini Kumar, S/o.Sena Ram Thakur	36	Nill	Agri/Labour	36000					1	3	4	8
119	Sangna	Mr.Raj kumar, S/o.Tek Chand Thakur	32	5th	Agri/Labour	36000				1	2	1	3	6
120	Sangna	Ram Lal S/o Gurudayal Thakur	40	Nill	Mason	48000					1	1	2	4
121	Bugrana	Mehar Singh S/o Hari Das Bhagat Son-Bhagat Singh	62	10th	Rtd. Teacher	120000	1			1	3	2	1	6
122	Bugrana	Mehar Singh S/o Hari Das Bhagat Son-Nanak Singh	56	3rd	Agrarian	48000	1				2	3	1	6
123	Bugrana	Late Sardu Devi D/o Chand Ram	57	Nill	Govt. Service	192000	1				2	3	4	9
124	Bugrana	Late Muktu Devi D/o Chand Ram	85	Nill	Agrarian	60000	1			1	8	5		13

Sr. No.	Name of Village	Name of Owner	Age	Education	Nature of Employment	Annual Income (Rs.)	SC	ST	Social Caste	BPL Family	No of Souls			
											Male	Female	Children	Total
125	Bugrana	Late Gouri Lal S/o Laj Ram Bhagat Wd - Leela Devi	65	Nill	Agrarian	24000	1			1	2	3	2	7
126	Bugrana	Dawan Chand S/o Laj Ram Bhagat	60	Nill	Agrarian	48000	1			1	2	3	4	9
127	Bugrana	Sewa Ram S/o Laj Ram Bhagat	48	10th	Agrarian	24000	1			1	1	1	2	4
128	Dhar	Late Ram Saran S/o Gurudayal Thakur	58	Nill	House Wife	120000				1	4	3	3	10
129	Khori	Ashok Kumar S/o Raj Singh Bhagat	30	10th	Govt. Service	180000	1			1	5	3	2	10
130	Khori	Jagdesh Raj S/o Tara Chand Bhagat	55	5th	Agrarian	24000	1			1	3	4	4	11
131	Khori	Abdullah S/o Mukhta Malik	65	4th	Agrarian	24000				1	2	2	1	5
132	Lass	Manzoor Ahmad S/o Late Gh. Moh'd Matoo	58	B.A	Rtd. BDO	180000					2	3	1	6
133	Lass	Javid Iqbal S/o Late Gh.Moh'd Matoo	51	10th	Govt Service	240000					2	3	1	6
134	Lass	Irshad Ahmad S/o Gh. Moh'd Matoo	42	B.Sc	Agrarian	36000				1	1	1		2
135	Bhadat	Late Aaya Singh S/o Heera Bhagta			Farmer	24000					1	3	3	7
136	Bhadat	Farroq Ahmad (Abdulla S/o Aliya Butt)	45	nil	Labour					1	1	1	2	4
137	Bhadat	Fakir Moh'd (Abdulla S/o Aliya Butt)	62	nil	Labour					1	3	2		5
138	Bhadat	Babu Ram s/o Paras Ram Thakur	45	nil	Farmer	24000				1	3	1		4
139	Bhadat	Shadi Lal	50	nil							3	2		5
140	Bhadat	Gurdeb Singh S/o Hemat Singh	65	10	Labour		1			1	3	3		6
141	Bhadat	Hem Raj s/o Chandu Lal	50	8	Labour	18000	1			1	3	1	1	5
142	Bhadat	Krishan Singh S/o Hemat Singh	76	8	Farmer	24000	1			1	3	2		5
143	Bhadat	Madhu Lal s/o Heera Bhagta	80	nil	Farmer		1				4	4	7	15
144	Bhadat	Kala Singh s/o Bisakh Bhagat	40	nil	Labour		1			1	2	1	3	6
145	Bhadat	Mohan Singh s/o Narayan Singh	78	10	Medicine Shop					1	4	3	4	11
146	Bhadat	Naam Kour d/o Narayan Singh	80	nil	hw						4	5	2	11

Sr. No.	Name of Village	Name of Owner	Age	Education	Nature of Employment	Annual Income (Rs.)	SC	ST	Social Caste	BPL Family	No of Souls			
											Male	Female	Children	Total
147	Bhadat	Sai Das s/o Chandu Lal	42	nil	Labour		1			1	2	1	4	7
148	Bhadat	Sewa Singh S/o Hemat Singh	46	6	Farmer	12000	1			1	1	1	2	4
149	Bhadat	Manzor Ahmad s/o Quadir Butt	38	8		18000					2	1	3	6
150	Bhadat	Smt. Shanti Devi w/o Brij Lal	60	nil	hw		1			1	4	3	4	11
151	Bhadat	Surjeet Singh S/o Hemat Singh	39	5	Farmer	18000	1			1	1	1	5	7
152	Bhadat	Yashpal S/o Madhu Lal Bhagta	40	5	Farmer		1				2	3		5
153	Bhadat	Bhudi Singh s/o Rattan Singh	73	nil	Farmer					1	5	6	20	31
154	Bhadat	Karam Singh s/o Late Fakir Chand s/o Heera Bhagat	45	nil	Farmer	36000				1	2	3	2	7
155	Bhadat	Fakir Chand s/o Anant Ram Thakur	70	nil	Farmer	24000					4	4	1	9
156	Joshana	Abdul Majid s/o Gh. Rasool matoo	80		Contracter						2	2	1	5
157	Joshana	Tariq Parvaiz s/o Abdul Majid	54	12	Teacher	360000					2	4	3	9
158	Joshana	Moh'd Iqbal s/o Abdul Majid	55	10	Service	130000					1	1		2
159	Joshana	Babu Ram s/o Siri Lal Parihar	32	10	SPO Polise	36000					1	1	2	4
160	Joshana	Bansi Lal s/o Bhagata	50	8	Ret Ser					1	3	1	1	5
161	Joshana	Bishroop s/o Bhabi Chand s/o Bhagta Parihar	46	10	Service PHE	180000					1	1	4	6
162	Joshana	Sain Das Parihar s/o Bhopa Ram	60	10	Retired Polise						2	2		4
163	Joshana	Bodh Raj Parihar s/o Naib Chand	75			60000					6	7	5	18
164	Joshana	Brij Lal s/o Chuni Lal Parihar	65			180000					5	1	1	7
165	Joshana	Chandu Lal s/o Jagat Ram Parihar	62		Agri						4	1	2	7
166	Joshana	Darshan Lal s/o Siri Lal Parihar	43	10	Agri	24000					1	1	3	5
167	Joshana	Des Raj s/o Sant Ram Parihar	60	10	Retired CRPF	96000					3	2		5
168	Joshana	Dharam Singh s/o Chani Lal	63			36000				1	2	1	3	6
169	Joshana	Mohinder Parihar s/o Dharam Singh	32			24000					1	1	5	7
170	Joshana	Bipen Parihar s/o Dharam Singh	28	12		36000					1	1	3	5
171	Joshana	Hans Raj s/o Heera Lal Parihar	60	5	Agri	360000				1	3			3
172	Joshana	Bipin Kumar s/o Late Hari Lal s/o Beli Ram	32	10	Agri	60000					3		1	4

Sr. No.	Name of Village	Name of Owner	Age	Education	Nature of Employment	Annual Income (Rs.)	SC	ST	Social Caste	BPL Family	No of Souls			
											Male	Female	Children	Total
173	Joshana	Hem Raj s/o Naib Chand Thakar	75		Agri						5	3	4	12
174	Joshana	Hem Raj s/o Roop Lal Parihar	70		Contractor	72000					2	1		3
175	Joshana	Late Jia Lal s/o Jagat Ram				2.4					2	3	3	8
176	Joshana	Late Jia Lal Jagat Ram (Daughter) Rita Devi	45	Nill	House Wife	1.8					2	1	3	6
177	Joshana	Khem Raj s/o Prem Nath	38	12	Agri						1	1	2	4
178	Joshana	Koisahlya Devi w/o Shakti Raj	41		hw					1	2	2	1	5
179	Joshana	Kuldeep Kumar s/o Sant Ram		12	business	50000					1	2	2	5
180	Joshana	Kamla Jit s/o Late Satpal s/o Sant Ram Bhandari	20	BA	Unemployed						1	3		4
181	Joshana	Lkahmi Chand s/o Beli Ram	70		Agri	24000				1	3	2		5
182	Joshana	Rabel Chand S/o Heera Lal	80	5	Agru	360000					6	4	4	14
183	Joshana	Radha Krishan S/o Herra Lal	56	5							4	3	4	11
184	Joshana	Ram Krishen S/o Chuni Lal Parihar	57	10	Govt Ser.						5	2		7
185	Joshana	Ramesh Kumar s/o Siri Lal	28	12	Agri						2	3	3	8
186		Ashok Kumar s/o Shri Lal	38	10	Agri					1				
187	Joshana	Rattan Lal s/o Beli Ram Parihar	47	8	Agri/ Labour	48000				1	2	2	3	7
188	Joshana	Satish Kumar s/o Siri Lal	50	10	Agri					1	1	3	4	8
189	Joshana	Sewa Ram s/o Prem Nath	53	10	Service						3	1		4
190	Joshana	Ajay Parihar s/o Swami Raj	30	12	Polise					1	3	1		4
191	Joshana	Sarinder Parihar s/o Tara Chand s/o Mangtu	50	12	Service	240000					4	2		6
192	Joshana	Shadi Lal s/o Tara Chand	55	8	Retired CRPF	360000					3	3	1	7
193	Joshana	Tilak Raj s/o Tara Chand	35	5	Carpenter						1	1	3	5
194	Joshana	Sunder Lal s/o Tara Chand (Gomti Dvi mother)	35	10	Home Guard					1	1	2	2	5
195	Joshana	Vipin Kumar S/o Dharam Singh Parihar	28	12	SPO Polise	36000					1	1	3	5
196	Joshana	Ram Kishen s/o Sham Lal Parihar	60	5	Ret Army	240000					2	3	2	7
197	Joshana	Prahlad s/o Sham Lal Parihar	65	Engi	Rtd AEE PHE	360000					3	5	3	11
198	Joshana	Mohan Lal s/o Sham Lal Parihar	82	7	Ret Army	480000					4	3	1	8

Sr. No.	Name of Village	Name of Owner	Age	Education	Nature of Employment	Annual Income (Rs.)	SC	ST	Social Caste	BPL Family	No of Souls			
											Male	Female	Children	Total
199	Joshana	Munshi Ram s/o Sham Lal Parihar (son Suraj)	72	8	Rtd PHE	54000					2	1	5	8
200	Joshana	Om Prakash s/o Munshi Ram	38	12	Agri	48000					1	1	2	4
201	Joshana	Vijay Prakash s/o Munshi Ram	46	10	Polise						1	1	2	4
202	Joshana	Ved Prakash s/o Munshi Ram	43	10	Driver	48000					1	1	2	4
203	Joshana	Late Ghyan Chand s/o Heera Lal Parihar				150000					2	2		4
204	Salana	Beli Ram s/o Roop Lal	65	10	Retired	100000					3	3	4	10
205	Salana	Bhabhi chand s/o Gurudiyal	62	8	Retired	60000					3	2	1	6
206	Salana	Late Lakhmi Chand s/o Gurudyal Singh Thakur									1	2	1	4
207	Salana	Des Raj s/o Gurudyal Singh Thakur	40	12	Service	120000					1	1	1	3
208	Salana	Puran Chand s/o Gurudyal Singh Thakur	50	12	Retired	120000					1	2	1	4
209	Salana	Faqir Chand s/o Bhim Singh	66	nil	Agi	120000				1	3	3		6
210	Salana	Gayatri Devi w/o Late Gian Chand s/o Chur Singh	55	nil	hw	132000					3	3	3	9
211	Salana	Hans Raj s/o Sant Ram	65	10	Teacher (rtd)	100000					4	4	4	12
212	Salana	Hem Raj s/o Roop Lal	60	nil	Farmer	24000					4	1	1	6
213	Salana	Om Raj s/o Jodha Ram	42	nil	Labour						1	2	1	4
214	Salana	Jameet Ram s/o Chur Singh	56	nil	Farmer	40000					4	4	5	13
215	Salana	Jia Lal s/o Bhabhi Chand Thakur	46	nil	Farmer					1	2	1	1	4
216	Salana	Kashmir Singh s/o Jant Ram	45	nil	Labour	40000					3	1		4
217	Salana	Lakmi Chand s/o Roop Lal Thakur	55	Nil	Agri	18000				1	2		2	4
218	Salana	Pardeep Singh s/o Janta Ram Thakur	40	nil	Labour	30000					1	1	2	4
219	Salana	Ram Krishan s/o Roop Lal Rathore	55	10	Govt Serv	180000					3	3		6
220	Salana	Sewa Ram s/o Janta Ram	38	nil	Labour	36000					1	1	3	5
221	Salana	Shadi Lal s/o Paras Ram Thakur	55	nil	Farmer	24000				1	3	1		4
222	Salana	Lal Devi w/o Prem Nath Thakur	75	nil	hw						4	4	6	14
223	Salana	Om Devi w/o Gyan Chand	58	nil	hw	24000					4	4	5	13

Sr. No.	Name of Village	Name of Owner	Age	Education	Nature of Employment	Annual Income (Rs.)	SC	ST	Social Caste	BPL Family	No of Souls			
											Male	Female	Children	Total
224	Salana	Somi Devi w/o late Faquir Chand	48	nil	hw	36000					1	2		3
225	Salana	Gian Chand s/o Sant Ram Parihar	60	BE	Consultant						3	3		6
226	Salana	Somi Raj s/o Des Ram Parihar	50	10	Govt Servant	300000					3	3	2	8
227	Salana	Shakti Raj s/o Siri Lal	38	12	Contractor	480000					1	1	2	4
228	Salana	Hari Lal s/o Tej Ram	65	nil	Farmer	36000					2	2	2	6

Annexure V

PROPERTY DETAILS OF PAFs

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
1	Janwas	Mr.Ghulam, S/o. Mr. Chirya Gujjar	1	1					1	2	20		20	
2	Janwas	Mr.Yousaf, S/o Mr.Saya Gujjar	1	2					1	4	5		5	
3	Janwas	Mr.Alladitta, S/o.Mr.Sabu Gujjar	1	1					1	4	20		20	
4	Janwas	Ms.Dalvera	1	2					1	4	10		10	
5	Janwas	Mr.Noor hussain S/o Moh"d Yousf Gujjar	1						1	2	5		5	
6	Janwas	Mr.Liyaqat Ali, S/o.Mr.Yousaf	1	1					1	4	20		20	
7	Janwas	Mr. Gh. Nabi Gujjar		1				1			8			
8	Kandani	Mr.Ram Nath, S/o.Mr.Mangat Ram Thakar	1	2			10		1	8	18		8	
9	Kandani	Mr.Tara Chand, S/o.Ram Dayal	1	1			2		1	4	8	5		5
10	Kandani	Mr.Bansi Lal, S/o.Mr. Sardhu Ram Gupta	1				1		1	3		4		4
11	Kandani	Mr. Kewal Krishan S/o.Mr. Sardhu Ram Gupta						1		2		4		4
12	Kandani	Ms Somi Devi w/o Mr. Paras Ram Sharma	1				1	1		2	15			
13	Kandani	Ms.Premi Devi, D/o.Mr.Ram Saran	1	1			2		1	5	1		1	
14	Kandani	Mr.Kishori Lal S/o. Mr.Jia Lal Sharma					4		1		3			3
15	Kandani	Mr.Gian Chand,	1	1			5		1	10	7		7	

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
		S/o.Mr.Tara Chand												
16	Kandani	Mr.Masood Ahmed, S/o.Mr.Mohd Shafi Sheikh	1				1		1	7		4		4
17	Kandani	Mr.Krishan Lal, S/o.Mr.Sena Ram Sharma					4	1			1	9		9
18	Kandani	Mr.Sadhu Ram, S/o.Mr.Bhim Sen Sharma					1	1		2	1	10		10
19	Kandani	Mr.Ravi Kumar, S/o.Mr.Jodh Ram Sharma	1			2	1		1	3		15		15
20	Kandani	Mr.Jagdish Raj, S/o.Mr.Bhagat Ram	1	1					1	3	10	3		3
21	Kandani	Mr.Munshi Ram, S/o.Mr.Murli Lal Thakur	1	1			1		1	7	4	4		4
22	Kandani	Mr.Des Raj, S/o.Mr.Mangat Ram Sharma	1						1	5		7		7
23	Kandani	Mr.Jugal Kishore, S/o.Mr.Vidiya Lal Thakur	1	1					1	10	2	3	2	3
24	Kandani	Mr.Ranjit Kumar, S/o.Khem Raj	1						1	3	3	3		3
25	Kandani	Mr.Sadhu Ram, S/o.Jodh Ram	1	1				1		3	10	3		3
26	Kandani	Mr.Barfi Nath S/o.Roop Lal	1	1				1		4	4	2		2
27	Kandani	Mr.Barfi Kumar, S/o. Gian Chand					1		1	1		1		1
28	Kandani	Mr.Abdul Rashid, S/o.Rasula Mochi	1	1			1		1	5	1	1	1	1
29	Kandani	Mr.Bansl Lal, S/o.Mr. Lakshmi Chand	1					1	1	3	4	4		4
30	Kandani	Rita Devi wd/o Mohan Lal, S/o. Jodh Ram					1	1		1	4			
31	Kandani	Mr.Kishori Lal, S/o.Prem Nath	1	1					1	3	5	3		3
32	Kandani	Mr.Gh.Hassan, S/o.Abdullah Mochi	1	1			1	1		2	15	2		2
33	Kandani	Mr.Ismal, S/o. Lassa Mochi	1					1		1		2		2
34	Kandani	Mr.Kishori Lal, S/o.	1						1	2	2	4		4

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
		Mr.Sarab Dayal												
35	Kandani	Mr.Bodh Raj S/o. Sena Ram Thakur	1	1	3			4	1	6	1	10	1	10
36	Kandani	Mr.Shadi Lal, S/o. Naib Chand	1	1					1	7	50	6		6
37	Kandani	Mr.Des Raj, S/o. Mr.Kripa Ram	1				2	1		4		12		12
38	Kandani	Mr.Rajesh Kumar S/o. Mr.Ram Chand Gupta	1				2		1	10	1		1	
39	Kandani	Mr.Rattan Chand, S/o.Mr.Sansar Singh	1	1					1	5	10	6		6
40	Kandani	Mr.Bodh Raj S/o. Sardhu Ram Gupta	1				1		1	3		6		6
41	Kandani	Mr.Gh Nabi S/o. Gh.Qadir Qazi	2						1	3	2	6		16
42	Kandani	Mr.Kuldip Kumar, S/o.Murli Lal	2	1			2		1	8	15	5		5
43	Kandani	Mr.Rakesh & Rajesh kumar, S/o Des Ram Thakur	1						1	3	10	6		6
44	Kandani	Mr.Mohan Lal, S/o. Roop Lal Brahman	1	1				1	1	2	1	3		3
45	Kandani	Mr.Roop Chand S/o Beem Sen Sharma				1		1			15	1		1
46	Kandani	Mr. Roop Lal S/o Roop Chand Sharma	1	1					1	3	1	6		6
47	Kandani	Mr. Moh'd Iqbal Wani	1	1					1	2		3		3
48	Kandani	Mr.Gh Nabi S/o. Ab. Gani Butt	1						1	2	2	5		5
49	Kandani	Mr.Darshan S/o Chuni Lal Gupta	1	1			4		1	15	3	11	3	11
50	Kandani	Jodh Ram S/o Aagya Ram Thakur	1		1				1	2	30	5	6	5
51	Kandani	Madan lal S/o Sardhu Ram Gupta	1						1	4		4		4
52	Kandani	Munshi Ram S/o Roop Lal Sharma	1				1	1		2	3	2		2

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
53	Kandani	Madan lal S/o Des Raj Gupta	1				1	1		3		5		5
54	Kandani	Ratan lal S/o Sardhu Ram Gupta					1		1		1	2		2
55	Kandani	Shesh Ram S/o Parsa Ram Sharma					1	1				16		1
56	Kandani	Jeep Lal S/o Jodh Ram Sharma	1				1	1			5	3	1	3
57	Kandani	Ragu Nath S/o Hans Raj Sharma	1				1		1		20			8
58	Kandani	Swami Raj S/o Tara Chand Thakur					1	1			10			2
59	Kandani	Shadi Lal Sharma S/o Jodh Ram Sharma					1	1			20	1		1
60	Kandani	Sanjay Sharma S/o Bodh Raj Rajput	1				1	1		2		2.5		2.5
61	Kandani	Mr. Ravi Kumar S/o Bodh Raj Rajput					1			2		2.5		2.5
62	Agral	Mr.Darshan Gupta	1	1			4		1	15	3	11	3	11
63	Agral	Ms.Sushma Devi, W/o. Tek Chand Shaan	1	1			3		1	9		6		6
64	Agral	Mr.Dev Dutt, S/o. Prem Nath	1	1		5	1		1	6	8	19	8	19
65	Agral	Mr.Kunj Lal, S/o. Sant Ram Gupta	1			2	3	1		5	20	14		14
66	Agral	Mr.Swami Raj S/o. Mr.Sena Ram Thakur	1	2		1		1		3	11	4	1	4
67	Agral	Mr.Dev Raj, S/o.Jia Lal Sharma	1	1		1	2		1	5	3	4	3	4
68	Agral	Mr.Sadhu Ram, S/o.Sobha Ram Sharma	2	1			2		1	7	5	10	5	10
69	Agral	Mr.Suresh Kumar, S/o .Mr. Hem Raj Thakur	1	2				1		5	20	4		4
70	Agral	Mr.Vilayat Chand, S/o. Gosson Ram Sharma	1	1			1		1	4	1o	3		3

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
71	Agral	Mr.Roop Chand S/o Bhim Sen Sharma				1		1		1	15	1		1
72	Dugga	Mr.Sondia Gujjar S/o Mehar Din	1	1		1		1		6	18	3	18	3
73	Dugga	Mr.Mohd. Shafi, S/o.Sondia Gujjar	1	1		1			1	6	3	17	3	17
74	Dugga	Mr.Farid Ahmed, S/o.Sondia Gujjar	1	1		1			1	5	3	17	3	17
75	Dugga	Mr.Bashir Ahmed, S/o.Sondia	1	1					1	5	3	15	3	15
76	Dugga	Mr.Nazir Ahmed, S/o.Basir Ahmed	1						1	1		15		15
77	Dugga	Mr.Hasham Din, S/o.Mundu Gujjar	1	1		1		1		3	3	11	3	11
78	Dugga	Mr.Abdul Rashid, S/o . Hasham Din Gujjar	1	1				1		3		13		13
79	Dugga	Mr.Kalu, S/o.Hasham Din	1	1				1		2		13		13
80	Dugga	Mr.Ali Hussain, S/o.Mr.Hasham Din	1	1					1	4		12		12
81	Dugga	Mr.Mian Hussain, S/o. Mr.Hasham Din	1	1				1		3		11		11
82	Dugga	Ab.Salam Matoo S/o Ab.Rashid Matoo									11		11	
83	Dugga	Abdul Kalam S/o Ab. Rashid Matoo									11		11	
84	Dugga	Shahid Rashid S/o Ab. Rashid Matoo									11		11	
85	Dugga	Ab. Majid S/o Gh. Rasool Matoo									26		6	
86	Dugga	Late Mr.Ghulam S/o Mohamdu Shiekh									12		1	
87	Dugga	Shareefa Begam W/o Fateh Moh'd Shiekh									12		1	

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
88	Dugga	Abdul Latif S/o Moh'd Ramzan Shiekh									16		2	
89	Dugga	Late , Khushi Moh'd S/o Gh Rasool Matoo									14		4	
90	Dugga	Kartar Singh S/o Chhater Singh									7	12		12
91	Dugga	Bashir Ahmad S/o Moh'd Abdullah Zargar									22	2	4	2
92	Dugga	Ab. Rashid S/o Fateh Zargar									25			
93	Dugga	Ab. Majid S/o Fateh Zarger									50			6
94	Dugga	Moh'd Abbas S/o Moh'd Abdullah Matoo									5			10
95	Dugga	Ab. Kabir S/o Moh'd Ramzan Shiekh									6		1	
96	Dugga	Moh'd Shafi S/o Samad Zargar									15		1	
97	Dugga	Moh'd Iqbal S/o Gh.Rasool Shiekh									25		9	
98	Dugga	Moh'd Yaseen S/o Gh. Haider Matoo									3		2	
99	Dugga	Gh.Haider S/o Gh. Ahmad Najar									50			16
100	Dugga	Moh'd Amin S/o Gh. Haider Matoo									3		2	
101	Dugga	Moh'd Hussain S/o Gh.Haider Matoo									3		2	
102	Dugga	Gh.Qadir S/o Gh. Mustafa Zargar									60		10	
103	Bhandera	Gh.Hassan, S/o.Mangata Lohar	1	1			1	1		11	36		36	
104	Bhandera	Gh.Qadir, S/o.Mangata	1	1			1	1		3	6		6	

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
		Lohar												
105	Bhandera	Gh.Ali, S/o.Mangta Lohar	1	1				1		16	17		17	
106	Bhandera	Gh.Mohi-ud-din' S/o. Rasool Lohar	1	1			1	1		7	7	2	7	2
107	Bhandera	Moh'd Iqbal' S/o Gh Hassan Lohar	1	1			1	1		3	4		4	
108	Bhandera	Gh. Moh'd S/o Mangata Lohar	1	1			1	1		5	3		3	
109	Sangna	Mr.Roop Lal, S/o.Baldev	1		1			1		2				
110	Sangna	Mr.Ragu Nath, S/o.Faghir Chand	1		1			1		2				
111	Sangna	Mr.Omkar, S/o.Lal Chand			1			1		1				
112	Sangna	Mr.Rosan Lal, S/o.Paras Ram	1		1			1		2				
113	Sangna	Mr.Kansi Ram, S/o. Mangat Ram			2			1		2	16		6	
114	Sangna	Isher Lal, S/o.Dula Ram	1		2			1		3	4		1	
115	Sangna	Mr.Sena Ram, S/o.Roopa Lal Thakur			1			1		1	20			
116	Sangna	Mr.Bhabi Chand, S/o.Khazan Chand Thakur	1				1	1		2	6		1	
117	Sangna	Mr.Sewa Ram, S/o. Bhagat Ram Thakur			1			1		1	6			2
118	Sangna	Mr.Bini Kumar, S/o.Sena Ram Thakur	1	1	1			1		3	6		5	
119	Sangna	Mr.Raj kumar, S/o.Tek Chand Thakur			1			1		2	6		1	
120	Sangna	Ram Lal S/o Gurudayal Thakur			1			1		2	8		3	
121	Bugrana	Mehar Singh S/o Hari Das Bhagat Son-Bhagat Singh									25	17		
122	Bugrana	Mehar Singh S/o Hari Das									20			

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
		Bhagat Son-Nanak Singh												
123	Bugrana	Late Sardu Devi D/o Chand Ram Son - Munsi Ram Bhagat									16	18.5	2	18.5
124	Bugrana	Late Muktu Devi D/o Chand Ram Husband Chhatu Ram									16	18.5	2	18.5
125	Bugrana	Late Gouri Lal S/o Laj Ram Bhagat Wd - Leela Devi									10			
126	Bugrana	Dawan Chand S/o Laj Ram Bhagat									10			
127	Bugrana	Sewa Ram S/o Laj Ram Bhagat									10			
128	Dhar	Late Ram Saran S/o Gurudayal Thakur. Wd - Gouri Devi									20		2	7
129	Khori	Ashok Kumar S/o Raj Singh Bhagat									13		3	
130	Khori	Jagdesh Raj S/o Tara Chand Bhagat									10			8
131	Khori	Abdullah S/o Mukhta Malik									4			
132	Lass	Manzoor Ahmad S/o Late Gh. Moh'd Matoo									25			
133	Lass	Javid Iqbal S/o Late Gh.Moh'd Matoo									20			
134	Lass	Irshad Ahmad S/o Gh. Moh'd Matoo									20			
135	Bhadat	Late Aaya Singh S/o Heera Bhagta												
136	Bhadat	Farroq Ahmad (Abdulla S/o Aliya Butt)									8		4	

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
137	Bhadat	Fakir Moh'd (Abdulla S/o Aliya Butt)									8			
138	Bhadat	Babu Ram s/o Paras Ram Thakur									25		3	5.5
139	Bhadat	Shadi Lal											3	5.5
140	Bhadat	Gurdeb Singh S/o Hemat Singh									2	25		
141	Bhadat	Hem Raj s/o Chandu Lal												
142	Bhadat	Krishan Singh S/o Hemat Singh									8			
143	Bhadat	Madhu Lal s/o Heera Bhagta									20		4	14
144	Bhadat	Kala Singh s/o Bisakh Bhagat									15		1	13
145	Bhadat	Mohan Singh s/o Narayan Singh									48			
146	Bhadat	Naam Kour d/o Narayan Singh									40		16	
147	Bhadat	Sai Das s/o Chandu Lal									30		3	
148	Bhadat	Sewa Singh S/o Hemat Singh									4		1	10
149	Bhadat	Manzor Ahmad s/o Quadir Butt (Buyed land from Sew Ram)									3		2	
150	Bhadat	Smt. Shanti Devi w/o Brij Lal									40		4	
151	Bhadat	Surjeet Singh S/o Hemat Singh									4		1	10
152	Bhadat	Yashpal S/o Madhu Lal Bhagta										3		3
153	Bhadat	Bhudi Singh s/o Rattan Singh									7	12	5	5
154	Bhadat	Karam Singh s/o Late									3	6		

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
		Fakir Chand s/o Heera Bhagat												
155	Bhadat	Fakir Chand s/o Anant Ram Thakur												
156	Joshana	Abdul Majid s/o Gh. Rasool matoo									10			
157	Joshana	Tariq Parvaiz s/o Abdul Majid									10			
158	Joshana	Moh'd Iqbal s/o Abdul Majid									10			
159	Joshana	Babu Ram s/o Siri Lal Parihar									4		4	
160	Joshana	Bansi Lal s/o Bhagata												
161	Joshana	Bishroop s/o Bhabi Chand s/o Bhagta Parihar									35		1	
162	Joshana	Sain Das Parihar s/o Bhopa Ram												
163	Joshana	Bodh Raj Parihar s/o Naib Chand									1	14	1	14
164	Joshana	Brij Lal s/o Chuni Lal Parihar									4			3
165	Joshana	Chandu Lal s/o Jagat Ram Parihar									20			
166	Joshana	Darshan Lal s/o Siri Lal Parihar									4		4	
167	Joshana	Des Raj s/o Sant Ram Parihar									12		1	14
168	Joshana	Dharam Singh s/o Chani Lal									45			
169	Joshana	Mohinder Parihar s/o Dharam Singh												
170	Joshana	Bipen Parihar s/o Dharam Singh												

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
171	Joshana	Hans Raj s/o Heera Lal Parihar									10		10	
172	Joshana	Bipin Kumar s/o Late Hari Lal s/o Beli Ram									6			
173	Joshana	Hem Raj s/o Naib Chand Thakar												
174	Joshana	Hem Raj s/o Roop Lal Parihar									21		21	
175	Joshana	Late Jia Lal s/o Jagat Ram									15			
176	Joshana	Late Jia Lal Jagat Ram (Daughter) Rita Devi W/o Rattan Lal									12			
177	Joshana	Khem Raj s/o Prem Nath									1	14	1	14
178	Joshana	Koisahlya Devi w/o Shakti Raj									70		20	
179	Joshana	Kuldeep Kumar s/o Sant Ram									3	8	3	8
180	Joshana	Kamla Jit s/o Late Satpal s/o Sant Ram Bhandari									3	8	3	8
181	Joshana	Lkahmi Chand s/o Beli Ram									10		10	
182	Joshana	Rabel Chand S/o Heera Lal									10		6	
183	Joshana	Radha Krishan S/o Herra Lal									15		5	
184	Joshana	Ram Krishen S/o Chuni Lal Parihar									5			
185	Joshana	Ramesh Kumar s/o Siri Lal									8		6	
186		Ashok Kumar s/o Shri Lal												
187	Joshana	Rattan Lal s/o Beli Ram Parihar									16			
188	Joshana	Satish Kumar s/o Siri Lal									4		4	

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
189	Joshana	Sewa Ram s/o Prem Nath									1	14	1	14
190	Joshana	Ajay Parihar s/o Swami Raj											3	14
191	Joshana	Sarinder Parihar s/o Tara Chand s/o Mangtu									15		5	
192	Joshana	Shadi Lal s/o Tara Chand									15		5	
193	Joshana	Tilak Raj s/o Tara Chand									15		5	
194	Joshana	Sunder Lal s/o Tara Chand (Gomti Dvi mother)									18	17	8	17
195	Joshana	Vipin Kumar S/o Dharam Singh Parihar									5		1	
196	Joshana	Ram Kishen s/o Sham Lal Parihar									8.75		8.75	
197	Joshana	Prahlad s/o Sham Lal Parihar									8.75		8.75	
198	Joshana	Mohan Lal s/o Sham Lal Parihar									8.75		8.75	
199	Joshana	Munshi Ram s/o Sham Lal Parihar (son Suraj)									12		12	
200	Joshana	Om Prakash s/o Munshi Ram												
201	Joshana	Vijay Prakash s/o Munshi Ram												
202	Joshana	Ved Prakash s/o Munshi Ram												
203	Joshana	Late Ghyan Chand s/o Heera Lal Parihar									5			
204	Salana	Beli Ram s/o Roop Lal												
205	Salana	Bhabhi chand s/o Gurudiyal									35		1	5
206	Salana	Late Lakhmi Chand s/o Gurudyal Singh Thakur									35		1	5

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
207	Salana	Des Raj s/o Gurudyal Singh Thakur									35		1	5
208	Salana	Puran Chand s/o Gurudyal Singh Thakur									35		1	5
209	Salana	Faqir Chand s/o Bhim Singh									30		5	
210	Salana	Gayatri Devi w/o Late Gian Chand s/o Chur Singh									40		4	
211	Salana	Hans Raj s/o Sant Ram									40		8	
212	Salana	Hem Raj s/o Roop Lal									25		1	18
213	Salana	Om Raj s/o Jodha Ram									40		1	10
214	Salana	Jameet Ram s/o Chur Singh									35		5	
215	Salana	Jia Lal s/o Bhabhi Chand Thakur									4			
216	Salana	Kashmir Singh s/o Jant Ram									12		1	5
217	Salana	Lakmi Chand s/o Roop Lal Thakur									15		9	
218	Salana	Pardeep Singh s/o Janta Ram Thakur									20		1	5
219	Salana	Ram Krishan s/o Roop Lal Rathore									10			
220	Salana	Sewa Ram s/o Janta Ram									10		1	5
221	Salana	Shadi Lal s/o Paras Ram Thakur									25		3	7
222	Salana	Lal Devi w/o Prem Nath Thakur									20		15	
223	Salana	Om Devi w/o Gyan Chand									30		1	5
224	Salana	Somi Devi w/o late Faquir Chand									45		2	

Sr. No.	Name of Village	Name of Owner	Property Under Acquisition					Type of House			Total Land		LAND (Losing)	
			House	Cattle-shed	Kotha	Water Mill	Shop	Kaccha	Paaka	No. of Rooms	Kanal	Maral	Kanal	Maral
225	Salana	Gian Chand s/o Sant Ram Parihar									20		6	
226	Salana	Somi Raj s/o Des Ram Parihar									9		9	
227	Salana	Shakti Raj s/o Siri Lal									8		8	
228	Salana	Hari Lal s/o Tej Ram									25		6	

Annexure VI

DETAILS OF PAFs (TENANTS)

Sr. No.	Name of Owner	Tenant Name	Tenant From Year	Age	Education	Employment	TOT Annual Income	BPL Family	No of Souls				Rented Property	
									Male	Female	Child	Total	House	Shop
1	Mr. Ram Nath	Raghu Nath Sharma S/o Hans Raj Sharma	8	32	12th	Business	180000		2	2	7	11	1	1
2	Mr. Ram Nath	Mr. Kaku Ram S/o Sadhu Ram Gupta	18	62	4th	Business	22000		2	2		4	1	1
3	Mr. Ram Nath	Mr. Raj Kumar S/o Kaku Ram Gupta	16	30	10th	Business	180000	1	1	1	1	3	1	1
4	Mr. Kishori Lal	Mr. Ravi Kant S/o Ram Lal Sharma	8	32	10th	Business	300000	1	4	2		6	1	1
5	Mr. Gayan Chand	Mr. Sundeep Kumar	8	30	10th	Business	20000		1	1	2	4	1	1
6	Ms. Somi Davi	Mr. Seva Ram S/o Nath Ram Sharma	8	42	8th	Business	180000		3	1	3	7		
7		Sanjay Kumar S/o Mohan Lal Thakur	40	34	10th	Business	120000		1	1	2	4	1	1
8		Raj Kumar S/o Swami Raj Sharma	5	30	12th	Business	36000		1	1	3	5	1	1
9	Gh. Nabi Butt	Javid Ahmad S/o Gh. Hassan Wani	4	35	5th	Labour	72000	1	1	1	5	7	1	
10		Lekh Raj S/o Tara Chand Sharma	5	32	10th	Labour/ GREF	48000		1	1		4	1	
11	Sushma Devi	Anju Devi D/o Late Jodh Ram Sharma	5	19	5th	Tailor	72000	1	1	3		4	1	1
12		Anita Devi W/o Banori Lal Sharma	5	22	5th	Tailor	96000	1	1	1	2	4	1	

N.B.: All the tenants are in Kandini village

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ANNEXURE-I

850MW RATLE HE PROJECT, DISTRICT KISHTWAR, UT JAMMU AND KASHMIR

SIX MONTHLY COMPLIANCE REPORT ON ENVIRONMENTAL ASPECTS
(for the period October 2022 to March 2023)

1	**Name of Project**	Ratle Hydro-Electric Project (850MW)
2	**Type of Project**	Hydro-Electric Project (Run of the River scheme)
3	**Clearance letters OM No. and date**	
	(a) Environment Clearance	(a) MoEF&CC letter No. J-12011/39/2010-IA.I dated 12.12.2012 MoEF&CC letter No. J-12011/39/2010-IA.I dated 27.09.2021 (approval accorded for transfer of EC in the name of RHPCL).
	(b) Forest Clearance	(b) Order No. 234-FST of 2012 dated 27.04.2012 of GOJK (for diversion of 138.93 Ha Forest land) and No. 108-FST of 2014 dated 05.03.2014 of GOJK (for diversion of 29.13 Ha Forest land). Vide communication No. 15-01/2021-Jammu dated 08.03.2022, approval accorded by MoEF&CC, GOI for change of User Agency from JKSPDC to RHPCL.
4	Locations	
	(a) District(s)	(a) Kishtwar
	(b) State	(b) Jammu and Kashmir
	(c) Latitude	(c) 33°10'43" N
	(d) Longitude	(d) 75°48'26" E

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5	Address for Correspondence (a) Address of concerned Project Head (with Pin code, Telephone/Fax no.) (b) Address of concerned HOD in Corporate Office (with Pin code, Telephone/Fax no.)	**(a) Chief Executive Officer** Ratle Hydroelectric Power Corporation Ltd. Ratle HE Project Shalimar Colony, Tehsil and District - Kishtwar, UT Jammu and Kashmir Pin code- 182 204 Telephone:- 01995-295171 email id: rhpcl@nhpc.nic.in (b) Regd. Office: **Chief Executive Officer** Ratle Hydroelectric Power Corporation Ltd. Room No. 08, Block No. 02, NHPC Regional Office, JDA Commercial Complex No. 01, Narwal, Jammu (UT J&K) - 180 006 email id: rhpcl@nhpc.nic.in
6	Details of Environmental Management Plan	Environmental Management Plans to be implemented at the Project as provided in the EMP Report are as follows:

Sl.No.	Environmental Management Plan
1	Biodiversity Management Plan
2	Catchment Area Treatment Plan
3	Fishery Development and Management Plan
4	Solid Waste Management Plan
5	Public Health Delivery System
6	Energy Conservation Measures
7	Muck Disposal Plan
8	Landscaping & Restoration of Quarry & Construction Areas
9	Air & Water Environment Management Plan
10	Reservoir Rim Treatment Plan
11	Compensatory Afforestation Plan
12	Rehabilitation & Resettlement Plan

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			13	Dam Break Modelling & Disaster Management Plan
			14	Local Area Development Plan
			15	CSR Activities
			16	Local Skill Development Plan
			17	Environmental Monitoring Programme
7	Breakup for Project area (Land details)	Forest Land : 138.93 ha Private Land : 55.52 ha State/Govt. Land : 233.96 ha River Bed land : 138.81 ha Total Land : 567.22 ha Note:- i) Above land details are as per GOJK Order No. 55-JK(POD) of 2022 dated 10-05-2022. ii)Vide GOJK Order No.108-FST of 2014 dated 05.03.2014, sanctioned has been accorded for diversion of 29.13ha social forestry land, which is part of 233.96ha State land mentioned above.		
8	Breakup of Project affected population with enumerations of those losing house/dwelling units only, agriculture land only, both house and agriculture land and landless labours / artisians. (a) SC/ST/Adivasis (b) Others	Details of PAFs Displaced PAFs : 80 Non Displaced PAFs : 160 Total PAFs : 240 a) Scheduled Tribe : 17 families b) Rural Artisans/ Small Traders : 62 families		
9	Financial Details (a) Project cost as originally planned and subsequent revised estimates and the year of price reference (b) Actual expenditure incurred on the Project so far	a) Original TEA approved cost (2012): Rs. 5517.02 Cr (completion cost) Cabinet Investment sanction approved (2021): Rs.5281.94Cr (Nov 2018 PL) b) Actual expenditure The cost of work done on the Project at the time of its taking over by JVC (as assessed by IIT, Delhi) : 120.86 Cr		

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		Expenditure incurred by RHPCL : Rs. 259.93 Cr (till March 2023)
	(c) Allocation made for Environment Management Plan	Allocations for EMP : Rs. 262.35 Cr (as approved by MoEF&CC)
	(d) Actual expenditure incurred on EMP so far	Details of expenditure already incurred on EMP prior to formation of RHPCL i.e. 01.06.2021 shall be incorporated in the report as and when the records of the Project are handed over by JKSPDC. The details of expenditure incurred on EMP upto March 2023 as available with the Project is given below:- i)Payment released on account of Forest Clearance: Rs.1773.07 Lakh (including Rs.179.71 Lakh on account of Compensatory Afforestation Programme) ii) Solid Waste Management Plan* : Rs.3.84 Lakh iii)Public health delivery system* : Rs.84.60 Lakh iv)Energy Conservation measure* : Rs.35.59 Lakh v)Muck Disposal Plan* : Rs.5.50 Cr vi)CSR Plan : Rs.44.14 Lakh vii)Air & Water Environment Management Plan*: Rs. 43.20 Lakh viii)Environmental Monitoring Programme*: Rs.6.58 Lakh *also includes the expenditure incurred by Contractor as per the Contract Agreement
10	Forest Land Requirements (a) Status of approval for diversion of Forest Land for non-forestry use	(a) Sanction accorded by GOJK for diversion of 138.93 Ha Forest land for use vide Order No. 234-FST of 2012 dated 27.04.2012 and for use of 29.13 Ha Social Forestry land vide Order No. 108-FST of 2014 dated 05.03.2014. Vide communication No. 08.03.2022, approval accorded by MoEF&CC, GOI for change of User Agency from JKSPDC to RHPCL.

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	(b) The status of clear felling of trees in Forest Land	(b) Clear felling status:- The status shall be suitably updated upon receipt of records from JKSPDC.
11	Status of Construction (a) Date of commencement (actual and/or planned) (b) Date of completion (actual and/or planned)	The work for Turnkey Execution of Ratle HE Project has been awarded to M/s MEIL on 18.01.2022. (a) Date of commencement of major works of the Project (actual): 18.01.2022 (b) Date of completion (planned): 10.02.2026 (60 months from the date of Investment approval).
12	Reasons for the delay (If the Project is yet to be started)	Not Applicable. (As per Cabinet Investment sanction dated 11.02.2021, Ratle HE Project is to be executed by JV of NHPC and JKSPDC with completion period of 60 months from the date of Investment approval)
13	Details of Site visits (a) By Monitoring Committee (b) By Regional Office	------- The status shall be suitably updated upon receipt of records from JKSPDC.
14.	Brief note on the status of compliance of the conditions stipulated by MOEF&CC	Details enclosed as **Appendix-I**.

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Appendix-I

STATUS OF COMPLIANCE OF CONDITIONS STIPULATED BY MoEF&CC, GOVT OF INDIA

(Environment Clearance letter No. J-12011/39/2010-IA.I dated 12.12.2012 and No. J-12011/39/2010-IA.I dated 27.09.2021)

<table>
<tr><th>Sl. No.</th><th>Specific Conditions</th><th>Compliance Status</th></tr>
<tr><td>i</td><td>The Catchment Area Treatment (CAT) Plan as proposed in the EIA/EMP Report shall be undertaken in consultation with the State Forest Department and major work shall be completed before impounding of reservoir.
<table>
<tr><th>Item</th><th>I Year</th><th>II Year</th><th>III Year</th><th>IV Year</th><th>Total</th></tr>
<tr><td colspan="6">Biological Measures</td></tr>
<tr><td>Afforestation (ha)</td><td>2243</td><td>1747</td><td>923</td><td>-</td><td>4913</td></tr>
<tr><td>Enrichment Plantation (ha)</td><td>-</td><td>112</td><td>79</td><td>-</td><td>191</td></tr>
<tr><td>Pasture Development</td><td>-</td><td>376</td><td>195</td><td>-</td><td>591</td></tr>
<tr><td>Nursery Development (Nos)</td><td>3</td><td>-</td><td>-</td><td>-</td><td>3</td></tr>
<tr><td>Watch & ward (Nos)</td><td>240</td><td>240</td><td>240</td><td>240</td><td>960</td></tr>
<tr><td colspan="6">Engineering Measures</td></tr>
<tr><td>Contour Bunding (ha)</td><td>434</td><td>409</td><td>324</td><td>171</td><td>1338</td></tr>
<tr><td>Check Dams (NOs)</td><td>50</td><td>25</td><td>30</td><td>20</td><td>125</td></tr>
</table></td><td>- J&K Forest Department has been requested vide letter No. RATLE/CEO/Env/2022/271 dated 04.07.2022 to take up the implementation of CAT Plan for Ratle HE Project.
- CAT Plan again submitted to J&K Forest Department vide letter dated 29.09.2022.
- In order to review and finalize the CAT Plan, following meetings were held by the J&K Forest Department:
▪ by Nodal Officer(FCA)/CCF, J&K on dated 25.11.2022.
▪ by Director, Department of Soil and Water Conservation, J&K on dated 30.01.2023.
▪ by Additional PCCF, Jammu on dated 01.02.2023.
- It has been suggested by the J&K Forest Department to make the CAT Plan site specific as per the relevant working Plans and to justify the area to be treated with respect to the catchment. Further updation of CAT Plan along with ground truthing also required.
- Proposal is under preparation for microplanning.
- The finalized CAT Plan shall be submitted to J&K Forest Department for approval and implementation thereof.</td></tr>
</table>

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ii	All the commitments made during the public hearing shall be fulfilled completely.	- Shall be complied - The R&R Plan of the Project was approved by GOJK in 2013 after consultations with all stakeholders and duly considering the aspirations and demands of local people. - As per provisions of MoU, the R&R Plan of Project has been updated in line with the rates provided in case of Kisharganga HE Project, J&K. - The revised R&R Plan has been submitted to GOJK which was discussed the meeting of the Standing Committee, J&K held on 11.01.2023 under the chairmanship of Chief Secretary, UT J&K. - The updated R&R Plan of Project shall be implemented as may be approved by Standing Committee/ Administrative Council, UT Jammu and Kashmir.
iii	The details of land holding of project affected persons whose land is being acquired shall be submitted to this ministry. The R&R benefits for the land losing households will be as per the National Rehabilitation and Resettlement Policy, 2007 (NRRP,2007) or as per the State Rehabilitation and Resettlement Policy, whichever is higher. Adequate publicity of the compensation package shall be made in the affected villages.	- R&R Package for Ratle HE Project was sanctioned by GOJK in 2013 vide Order No. 91-PDD of 2013 dated 21.03.2013 for a total amount of Rs. 110.00 Crore. - The above R&R Package includes the Rehabilitation and Resettlement Plan (Rs. 20.00 Crore) prepared on the basis of NRRP 2007, Local Area Development Plan including Skill Development Plan (Rs. 60.00 Crore) and Corporate Social Responsibility Plan (Rs.30.00 Crore). - As per R&R Plan approved by GOJK in 2013, the Deputy Commissioner, Kishtwar has been appointed as Commissioner R&R for implementation of R&R Plan. - A part of R&R benefits as per approved Plan stand already released to the beneficiaries however, the exact details of payment are awaited from JKSPDC.

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		- Now, as per MoU, the previously approved R&R Plan has been updated and submitted to JKPDD/ JKPDC and Department of DMRRR on 07.09.2021 and 05.11.2021 respectively for examination and approval thereof. - In September 2022, BOD of RHPCL has accorded approval to the revised Cost Estimate of R&R Plan. - The R&R Plan of Ratle HE Project came up for discussion in the meeting of the Standing Committee held on dated 11.01.2023 under the Chairmanship of Chief Secretary, UT J&K, however, the approval of R&R Plan by GOJK is yet awaited. - JKPDD and Department of DMRRR, J&K have been requested for expediting the approval of R&R Plan by GOJK so that R&R benefits could be timely released to the beneficiaries.
iv	A Monitoring Committee for R&R shall be constituted which must include representatives of project affected persons from SC/ST category and a women beneficiary.	- The proposal for constitution of Monitoring Committee shall be submitted shortly in line with approval of the R&R Plan by GOJK.
v	Consolidation and compilation of muck shall be carried-out only in the designated muck dumping sites as submitted in the EIA/EMP report. As per the proposed muck disposal plan, out of 24.4 lakh m3 of muck to be generated due to excavation, about 50% (i.e.12.2 lakh m3) will be utilized for construction purpose and the remaining 12.2 lakh m3 will be dumped at the 3 designated areas in an allocated area of 30.59 ha. The identified muck dumping sites shall be at-least 30m horizontally away from the edge of the river corresponding to high flood level (HFL).	- The approach road to Muck Disposal area-II (left bank of river Chenab, d/s of Dam axis) has been developed by the Contractor. - The approach road to Muck Disposal area-I (right bank of river Chenab, d/s of Dam axis) is under development. - As per the details provided by the Contractor, most of the excavated muck has been utilized in processing of aggregates, Tunnel works, construction of approach roads, protection works (Crate walls, RR Masonry walls etc.). - The disposal of muck shall be carried out at designated muck dumping sites as per Muck Disposal Plan proposed in the EMP Report.

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vi	Muck dumping sites should be handed over to Forest Department only after restoration including plantations etc.	- The Muck dumping sites shall be handed over to Forest Department only after their complete restoration.
vii	A provision of an additional unit of 30 MW has been made in the project, which will be running for 24 hours continuously to maintain a minimum discharge of 33.43, cumecs/sec, during the lean season from November-February (About 27% of lean season) at the downstream, shall be strictly adhered-to. Monsoon flow shall be at least 30% of the Monsoon discharge.	- The stipulated seasonal-flows shall be maintained during Project operation.
viii	An Auto mechanism / by pass arrangement in dam design shall be made to ensure release of environmental flow water in event of the 30 MW turbine or when it is put under maintenance.	Shall be complied - To ensure continuous release of environmental flow, the maintenance of 30MW turbine shall be planned only in Monsson season when all main Units are in operation 24X7. - Also to ensure continuous release of environmental flow in the event of 30MW turbine being under maintenance, the provision has been kept in Plant Control & Monitoring (SCADA) system for control of reservoir level and downstream release consideration for environmental flow.
ix	Continuous Monitoring system for environmental flow measurement shall be installed and data shall be displayed at appropriate site for information of civil society, stake holders and regulators. Six monthly results shall be submitted to the regional Office of the Ministry and SPCB.	Shall be complied
x	Real time telemetry and data acquisition system including all weather hydro metrological stations shall be installed for in-flow monitoring and advance flood warning. Advance flood warning and advance communication systems shall be installed in consultation with the downstream District Authorites.	Shall be complied - Case is under process for purchase of Automatic Water Level Recorder (AWLR) for its installation on river Chenab (upstream of Dam site), as part of Early Flood Warning System.

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xi	As proposed in the EMP, the compensatory Afforestation Programme on 277.84 ha of land with 13 plant species shall be undertaken in consultation with the State Forest Department. Native species should be preferred in plantation. The allocated grant of Rs.1467.59 lakhs for this purpose shall be fully utilized and not to be diverted for any other purpose.	- An amount of Rs.1773.07 Lakh has been paid to J&K Forest Department towards diversion of Forest land for Ratle HE Project out of which Rs.179.71 Lakh has been paid towards Compensatory Afforestation Programme. - The Kishtwar Forest Division, Doda Forest Division and Social Forestry Division, Kishtwar have been requested to provide the physical and financial progress of Compensatory Afforestation works carried out for Ratle HE Project, however, the details from Forest Department are awaited. - The Utilization Certificate shall be taken from J&K Forest Department to ensure that allocated grant is fully utilized and not diverted for any other purpose.
xii	Greenbelt development along the approach roads, residential areas, office complex, dam site and other working areas shall be undertaken. The allocated budget of Rs.73 lakhs for this purpose shall be fully utilized and not to be diverted to any other purpose.	- Matter under pursuance with J&K Forest Department. - Shall be undertaken through J&K Forest Department as proposed in EMP Report.
xiii	As proposed in the EMP, the Biodiversity Conservation and Wildlife Management Plans shall be taken up and implementation shall be included in the sixth monthly compliance report to be submitted to the Ministry, including its Regional Office.	- Biodiversity Conservation and Management Plan stands submitted to J&K Forest Department vide letter No. RATLE/GM(C-I)/2022/62 dated 29.09.2022. - Vide letter dated 14.11.2022, J&K Forest Department has been requested to expedite the approval of said Plan. - Subsequently, the matter was discussed with J&K Forest Department in review meeting held by Nodal Officer (FCA)/Chief Conservator of Forests, UT J&K on dated 25.11.2022. - The matter was again discussed in a meeting chaired by Conservator of

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		Forests, Chenab Circle, Doda at Kishtwar on 15.03.2023. - J&K Forest Department has been requested for an early approval of Biodiversity Conservation and Management Plan and its timely implementation.
xiv	Indigenous plant species should be used for implementation of Biodiversity Management Plan and for Compensatory Afforestation. Expertise from R&D Centers may be used for propagation techniques. Provision should also be made to include researchers to implement these Plans and carrying out plantation.	Shall be complied
xv	Equipment likely to generate high noise levels shall meet the ambient noise standards as notified under the noise Pollution (Regulation and Control) Rules 2000, as amended in 2010 under Environment Protection Act (EPA), 1986. For this, necessary insulation arrangement etc. to be ensured.	Being complied
xvi	A provision of Rs. 30 Crores earmarked towards the Local Area Development Activities (LADA) shall be fully utilized and not to be diverted for any other purpose. The implementation of activities as submitted to the Ministry shall be taken up as soon possible. In addition, a grant of Rs. 30 Crores earmarked for Corporate Social Responsibility (CSR) and Rs.30 Crores for skill development purpose shall also be duly utilized and not to be diverted for any other purpose.	- Implementation of Local Area Development Activities, Corporate Social Responsibility activities and Skill Development Plan shall be ensured by Commissioner R&R / Deputy Commissioner, Kishtwar in line with approval of R&R Package by GOJK.
xvii	LADA activities may be undertaken by M/s Ratle Hydro Electric Project Pvt. Ltd to enhance delivery mechanism for operational point of view.	- Implementation of LADA activities shall be ensured by Commissioner R&R/ District Administration in line with the approval of R&R Package by GOJK.

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xviii	Tie-ups shall be made with existing city hospitals for disposal of Bio-medical waste in case district hospital at Kishtwar does not have the facility for handling biomedical waste as proposed in the report.	Shall be complied
xix	Any other clearance from other organization/department, if required, shall be obtained before commencement of the project	Shall be complied
Sl. No.	**General Conditions**	**Compliance status**
i	Adequate arrangement for providing free fuel like kerosene/wood/LPG shall be made at project cost for the labour engaged in the construction work so that indiscriminate felling of trees is prevented.	The LPG from Depot(s) at Drabshalla and Kishtwar is being used as fuel for labour colonies.
ii	Medical facilities as well as recreational facilities shall also be provided to labourers.	- One Dispensary has been set up by Contractor at Project site which is being manned by One Doctor and 15 paramedical staff. Further, two Ambulances have also been deployed to cater to the health requirements of their staff and labour force. - One Dispensary has been set up at Project site by Project Authorities also. - In addition, one First Aid Centre cum Dispensary has been established by Ratle Project at Shalimar Colony which is being manned by one Doctor and 2 paramedical staff. - Recreational facilities shall also be ensured by the Contractor.
iii	All the labourers to be engaged for construction works shall be thoroughly examined by health personal and adequately treated before issuing them work permit.	Required health measures being taken up.

iv	No fugitive dust emissions should be observed at the construction sites. Water sprinkling arrangements should be made to suppress the fugitive emissions.	- Regular water sprinkling at work sites is being carried out to supress the fugitive dust emissions. - Fleet of three water Tankers is in service to cater to regular water sprinkling.
v	Potable drinking water and proper sanitary facilities shall be provided for the labour force and the local area people.	Being complied
vi	Restoration of construction area including dumping site of excavated materials shall be ensured by levelling, filling up of burrow pits, landscaping etc. The area should be properly treated with suitable plantation.	- Restoration of construction areas with proper treatment and plantation of suitable species shall be taken up upon completion of construction activities.
vii	Environmental parameters shall be monitored regularly and six monthly reports shall be submitted to the regional Office of the Ministry and State Pollution Control Board for review.	- The sampling & monitoring of environmental quality parameters has been carried out at Project sites in March 2023. The test reports are enclosed herewith as **Appendix-II**
viii	The project proponent shall also submit six monthly compliance reports of the stipulated EC conditions (both hard copies as well as by e-mail) to the respective Regional Office of MoEF and State Pollution Control Board. Monitoring report and compliance report shall be up-loaded on the web-site of project proponent.	- 06 monthly reports on the status of compliance of the stipulated EC conditions are being regularly submitted and the same are also being put on the website of RHPCL i.e. www.rhpcindia.com.
	Other Conditions mentioned in the EC Letter	
5.	The Project Proponent shall provide full cooperation and all required documents, data and access to the Officials of Regional Office of MoEF who would be monitoring the implementation of environmental safeguards.	Being complied

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6.	Besides the above stated conditions, M/s Ratle hydro Electric Project Pvt. Ltd and Government of Jammu & Kashmir shall also implement all other environmental safeguards, as proposed in the EIA/EMP report and other reports from time to time. The J&K Government may also like to monitor implementation of EMP at regular interval.	Being complied
7.	Any change in the scope of the project shall be intimated to the Ministry and fresh approval, if required, shall be taken from the Ministry.	- In case of requirement, the approval shall be taken from MoEF&CC, GOI.
10.	A Multi-disciplinary committee for monitoring the implementation of environmental safe guards during construction shall be constituted by the Project Proponent in consultation with the Ministry as early as possible. The Proponent shall suggest the members and their profile for approval of the Ministry. Proponent shall organize six monthly meetings of the committee and submit the monitoring report to the Ministry.	- Proposal for constitution of multi-disciplinary committee; shall be submitted shortly.
11.	A copy of the clearance letter shall be sent by the Proponent to local Panchayat, Zila parishad/Municipal Corporation, Urban local body and local NGO, if any, from whom suggestions / representations were received while processing the proposal. The clearance letter shall also be put on its web-sites by the project proponent.	- Environment Clearance letter of Ratle HE Project has been put on the website of RHPCL i.e. www.rhpcindia.com.
12.	The proponent should advertise at least in two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned informing that the project has been accorded environmental clearance and copies of clearance letter are available with the State Pollution Control Board/committee and may also be seen at Website of the Ministry of Environment and Forests at http://www.envfor.nic.in.	- Environment Clearance letter of Ratle HE Project has been put on the website of RHPCL i.e. www.rhpcindia.com.

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13	After 5 years of the commissioning of the Project, a study shall be undertaken regarding impact of the project on the environment and downstream ecology. The study shall be undertaken by an independent agency, to be decided in consultation with the Ministry.	Shall be complied
14	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) including the respective Regional office of MoEF and Zonal Office of CPCB and SPCB.	- 06 monthly reports on the status of compliance of the stipulated EC conditions are being regularly submitted.

*The previous records of Project regarding implementation of EMPs in compliance to the EC conditions are yet to be handed over by JKSPDC. The above information shall be suitably updated upon receipt of records and shall also be submitted to MoEF&CC for kind information.

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कार्यालय: कमरा नंबर 08, ब्लॉक नंबर 02, एनएचपीसी क्षेत्रीय कार्यालय, जेडीए वाणिज्यिक परिसर नंबर 01, नरवाल, जम्मू, (जम्मू और कश्मीर) - 180006
Office : Room No. 08, Block No. 02, NHPC Regional Office, JDA Commercial Complex No. 01, Narwal, Jammu, (J&K) – 180006
Camp Office : NHPC Office Complex, Sector-33, Faridabad – 121003 (Haryana)
CIN: U40105JK2021GOI012380 E-mail id: rhpcl@nhpc.nic.in

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ANNEXURE-II

Ratle HE Project (850 MW)

(Status Report as on 31.03.2023)

Ratle Hydro-Electric Project is a run-of-river scheme proposed on river Chenab in District Kishtwar of UT Jammu and Kashmir with installed capacity of 850MW. The Project envisages construction of 133mtr high (from deepest foundation level) Concrete Gravity Dam, an underground Power House to accommodate 4 units of capacity 205MW each and one Auxiliary Unit of capacity 30MW.

Initially, the construction of Project was taken up by J&K State Power Development Corporation through M/s GVK however the work was stopped in 2014. The plan for execution of Project was revived by Ministry of Power, GOI in 2018 in consultation with Govt. of Jammu and Kashmir. The MoU was signed on 03.02.2019 and subsequently, supplementary MoU was signed on 03.01.2021 between NHPC (51%) and JKSPDC (49%) for formation of new Joint Venture for execution of Ratle HE Project. The new JV with the name "Ratle Hydroelectric Power Corporation Ltd." was incorporated on 01.06.2021 for execution of 850MW Ratle HE Project.

1. Status of Clearances:

Clearance	Status
Appraisal by CEA	TEA accorded by CEA on 19.12.2012. TEA further transferred in the name of RHPCL vide communication No. CEA-SY-25-50/1/2019-PAC Division/438-43 dated 29.12.2021
Forest Clearance	Accorded by GOJK in favour of JKSPDC on 27.04.2012 (for diversion of 138.93 Ha Forest land) and on 05.03.2014 (for diversion of 29.13 Ha Forest land) respectively. Vide communication No. 15-01/2021-Jammu dated 18.01.2022 and 08.03.2022, approval accorded by MoEF&CC, GOI for change of User Agency from JKSPDC to RHPCL.
Environment Clearance	Accorded by MoEF&CC vide letter No. J-12011/39/2010-IA.I dated 12.12.2012. The EC was transferred by MoEF&CC in the name of RHPCL vide communication No. J-12011/39/2010-IA.I dated 27.09.2021.
Indus water Clearance	Accorded by MoWR (Indus Wing) on 16.08.2012. Vide letter dated 02.07.2021, MoWR (Indus Wing) has confirmed the validity of IWT Clearance of the Project in favour of RHPCL.
PIB/CCEA Clearance	Cabinet has accorded the Investment sanction of Rs. 5281.94Cr for implementation of 850MW Ratle HE Project communicated vide MoP letter dated 11.02.2021.
R&R Plan Approval	Vide Order No. 91-PDD of 2013 dated 21.03.2013, GOJK had accorded the sanction to R&R Package of the Project for a total

	amount of Rs. 110 Crore. As per provisions of MoU, the R&R Plan of Project has been updated in line with the rates provided in case of Kishanganga HE Project, J&K and submitted to GOJK for approval. The approval of R&R Plan by GOJK is awaited.

2. **Award of construction works**

The work for Turnkey Execution of Ratle HE Project has been awarded to M/s MEIL on 18.01.2022. The works of DT lining, Dam stripping, excavation of MAT, CVT and other associated components are under progress by the Contractor. As per Investment sanction accorded to the Project by GOI, the Project is scheduled to be completed by February 2026.

3. **Status of Land Acquisition and transfer of land to RHPCL**

As mentioned in GOJK Order No. 55-JK (PDD) of 2022 dated 10-05-2022 (in terms of Administrative Council Decision No. 48/3/2022 dated 15-03-2022), State land measuring 233.96 Ha and Private land measuring 55.52 Ha has been acquired by JKSPDC through concerned Revenue Collectorate(s) of J&K Govt. for construction of Ratle HE Project in terms of Jammu and Kashmir State Land Acquisition Act. The Awarded amount on account of acquisition of land stands already deposited with concerned Revenue Collectorate(s) and after disbursement of compensation among the land Owners, the Land Awards have been issued by GOJK in favour of JKSPDC. Vide aforementioned Govt. Order dated 10.05.2022, JKPDD has been authorized to lease out land acquired by JKPDC for development of 850MW Ratle HEP to RHPCL. The sanction has also been accorded by GOJK for use of land measuring 138.81 Ha falling under river bed. The land acquired for Ratle HE Project has been physically taken over by RHPCL from JKSPDC. However, the formal lease deed for Project land is yet to be executed for which the matter is being regularly pursued with JKSPDC/JKPDD.

4. **Status of R&R Plan Implementation**

Vide Order No. 91-PDD of 2013 dated 21.03.2013 issued by GOJK in terms of Cabinet decision No. 44/7/2013 dated 15.03.2013, the sanction had been accorded to the R&R Package of 850MW Ratle HE Project for a total amount of Rs. 110.00 Crore. The above R&R Package sanctioned by GOJK includes the R&R Plan (Rs. 20.00 Crore), Local Area Development Plan including Skill Development Plan (Rs. 60.00 Crore) and Corporate Social Responsibility Plan (Rs.30.00 Crore). A part of R&R benefits as per the approved Plan stands already released to the beneficiaries however, the exact details of payment are awaited from JKSPDC.

In compliance to provisions of the MoU signed for incorporation of RHPCL, the rates of various provisions have been updated as per the rates provided in case of Kishanganga HE Project of NHPC and the updated R&R Plan of Ratle HE Project has

been submitted to JKPDC / JKPDD and Department of DMRRR vide communication dated 07.09.2021 and 05.11.2021 for further examination. In September 2022, BOD of RHPCL has accorded approval to the revised Cost Estimate of R&R Plan for placing the proposal before Standing Committee/ Administrative Council, UT J&K. The R&R Plan of Ratle HE Project was discussed in the meeting of the Standing Committee held on dated 11.01.2023 under the Chairmanship of Chief Secretary, UT J&K, however, the approval of R&R Plan by GOJK is yet awaited. JKPDD and Department of DMRRR, J&K have been requested for expediting the approval of R&R Plan by GOJK so that R&R benefits could be timely released to the beneficiaries.

5. Status of Infrastructure works

i) The construction of access roads leading to major structures like Dam, DT, Power House etc. have been completed.
ii) The layout for the Project colony at Drabshalla is being finalized by the team of Architects hired by RHPCL.
iii) A temporary Office setup has been developed at Project site, Drabshalla and the same is under use by the Project.
iv) 33/11 KV receiving station for Ratle HE Project has been constructed (partially) through JKPDD. The matter is being taken up with concerned Department of J&K Govt. for bringing the same into functional stage.
v) A Dispensary has been set up at Project site and another at Shalimar Office which is being manned by one Doctor and two paramedical staff.
vi) The security posts have also been constructed at work sites.
vii) A Quality Control Lab has been established at site through Contractor and is operational.
viii) The demarcation of Project land is under progress by District Revenue Authorities in association with Project Officials.

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Annexure 9

ANNEXURE-I

850MW RATLE HE PROJECT, DISTRICT KISHTWAR, UT JAMMU AND KASHMIR

SIX MONTHLY COMPLIANCE REPORT ON ENVIRONMENTAL ASPECTS
(for the period April 2023 to September 2023)

1	Name of Project	Ratle Hydro-Electric Project (850MW)
2	Type of Project	Hydro-Electric Project (Run of the River scheme)
3	Clearance letters OM No. and date	
	(a) Environment Clearance	(a) MoEF&CC letter No. J-12011/39/2010-IA I dated 12.12.2012 MoEF&CC letter No. J-12011/39/2010-IA I dated 27.09.2021 (approval accorded for transfer of EC in the name of RHPCL).
	(b) Forest Clearance	(b) Order No. 234-FST of 2012 dated 27.04.2012 of GOJK (for diversion of 138.93 Ha Forest land) and No. 106-FST of 2014 dated 05.03.2014 of GOJK (for diversion of 29.13 Ha Forest land). Vide communication No. 15-01/2021-Jammu dated 08.03.2022, approval accorded by MoEF&CC, GOI for change of User Agency from JKSPDC to RHPCL
4	Locations	
	(a) District(s)	(a) Kishtwar
	(b) State	(b) Jammu and Kashmir
	(c) Latitude	(c) 33°10'43" N
	(d) Longitude	(d) 75°48'26" E

कार्यालय: कमरा नंबर 08, ब्लॉक नंबर 02, एनएचपीसी क्षेत्रीय कार्यालय, रेहाड़ी वाणिज्यिक परिसर नगरोटा, जम्मू (जम्मू और कश्मीर) - 180006
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Camp Office: NHPC Office Complex, Sector-33, Faridabad – 121003 (Haryana)
CIN: L40101HR2002GOI012360 E-mail id: rhpcl@nhpc.nic.in

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5	Address for Correspondence (a) Address of concerned Project Head (with Pin code, Telephone/Fax no.)	(a) Chief Executive Officer Ratle Hydroelectric Power Corporation Ltd. Ratle HE Project Shelimar Colony, Tehsil and District - Kishtwar, UT Jammu and Kashmir Pin code- 182 204 Telephone - 01995-295171 email id: rhpcl@nhpc.nic.in
	(b) Address of concerned HOD in Corporate Office (with Pin code, Telephone/Fax no.)	(b) Regd. Office: Chief Executive Officer Ratle Hydroelectric Power Corporation Ltd. Room No. 08, Block No. 02, NHPC Regional Office, JDA Commercial Complex No. 01, Narwal, Jammu (UT J&K) - 180 006 email id: rhpcl@nhpc.nic.in
6	Details of Environmental Management Plan	Environmental Management Plans to be implemented at the Project as provided in the EMP Report are as follows:

Sl.No.	Environmental Management Plan
1	Biodiversity Management Plan
2	Catchment Area Treatment Plan
3	Fishery Development and Management Plan
4	Solid Waste Management Plan
5	Public Health Delivery System
6	Energy Conservation Measures
7	Muck Disposal Plan
8	Landscaping & Restoration of Quarry & Construction Areas
9	Air & Water Environment Management Plan
10	Reservoir Rim Treatment Plan
11	Compensatory Afforestation Plan
12	Rehabilitation & Resettlement Plan

			13 Dam Break Modelling & Disaster Management Plan 14 Local Area Development Plan 15 CSR Activities 16 Local Skill Development Plan 17 Environmental Monitoring Programme
7	Breakup for Project area (Land details)	Forest Land : 138.93 ha Private Land : 55.52 ha State/Govt. Land : 233.96 ha River Bed land : 138.81 ha Total Land : 567.22 ha Note:- i) Above land details are as per GOJK Order No. 55-JK(PDD) of 2022 dated 10.05.2022. ii) Vide GOJK Order No.108-FST of 2014 dated 05.03.2014, sanctioned has been accorded for diversion of 29.13ha social forestry land, which is part of 233.96ha State land mentioned above
8	Breakup of Project affected population with enumerations of those losing house/dwelling units only, agriculture land only both house and agriculture land and landless labours / artisans. (a) SC/ST/Adivasis (b) Others	Details of PAFs Displaced PAFs : 80 Non Displaced PAFs : 160 Total PAFs : 240 a) Scheduled Tribe : 17 families b) Rural Artisans/ Small Traders : 62 families (Above details are as per R&R Plan of Ratle HE Project approved by GOJK in 2013)	
9	Financial Details (a) Project cost as originally planned and subsequent revised estimates and the year of price reference (b) Actual expenditure incurred on the Project so far	a) Original TEA approved cost (2012): Rs. 5517.02 Cr (completion cost) Cabinet investment sanction approved (2021): Rs.5281.94Cr (Nov 2018 PL) b) Actual expenditure The cost of work done on the Project at the time of its taking over by JVC (as assessed by IIT, Delhi) 120.86 Cr	

		Expenditure incurred by RHPCL : Rs. 393.60 Cr (till September 2023)
	(c) Allocation made for Environment Management Plan	Allocations for EMP : Rs. 282.35 Cr (as approved by MoEF&CC)
	(d) Actual expenditure incurred on EMP so far	Details of expenditure already incurred on EMP prior to formation of RHPCL i.e. 01.06.2021 shall be suitably updated upon receipt of the records of the Project from JKSPDC. The details of expenditure incurred on EMP upto Sept 2023 as available with the Project is given below - i)Payment released on account of Forest Clearance : Rs. 1773.07 Lakh (including Rs. 179.71 Lakh on account of Compensatory Afforestation Programme) ii) Solid Waste Management Plan* : Rs.6.04 Lakh iii)Public health delivery system* : Rs.90.58 Lakh iv)Energy Conservation measure* : Rs.63.59 Lakh v)Muck Disposal Plan* : Rs.7.98 Cr vi)CSR Plan : Rs.62.14 Lakh vii)Air & Water Environment Management Plan* : Rs. 68.26 Lakh viii)Environmental Monitoring Programme** : Rs 7.38 Lakh *also includes the expenditure incurred by Contractor as per the Contract Agreement
10	Forest Land Requirements (a) Status of approval for diversion of Forest Land for non-forestry use	(a) Sanction accorded by GOJK for diversion of 138.93 Ha Forest land for use vide Order No. 234-FST of 2012 dated 27.04.2012 and for use of 29.13 Ha Social Forestry land vide Order No. 108-FST of 2014 dated 05.03.2014. Vide communication No. 08.03.2022, approval accorded by MoEF&CC, GOI for change of User Agency from JKSPDC to RHPCL.

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	(b) The status of clear felling of treea in Forest Land	(b) Clear felling status:- The status shall be suitably updated upon receipt of records from JKSPDC.
11	Status of Construction (a) Date of commencement (actual and/or planned) (b) Date of completion (actual and/or planned)	The work for Turnkey Execution of Ratle HE Project has been awarded to M/s MEIL on 18.01.2022. (a) Date of commencement of major works of the Project (actual) 18.01.2022 (b) Date of completion (planned) 10.02.2026 (60 months from the date of investment approval)
12	Reasons for the delay (if the Project is yet to be started)	Not Applicable. (As per Cabinet Investment sanction dated 11.02.2021, Ratle HE Project is to be executed by JV of NHPC and JKSPDC with completion period of 60 months from the date of investment approval)
13	Details of Site visits (a) By Monitoring Committee (b) By Regional Office	..... The status of visits prior to 01.06.2021, if any, shall be suitably updated upon receipt of records from JKSPDC.
14.	Brief note on the status of compliance of the conditions stipulated by MOEF&CC	Details enclosed as Appendix-I.

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Appendix-I

STATUS OF COMPLIANCE OF CONDITIONS STIPULATED BY MoEF&CC, GOVT OF INDIA

(Environment Clearance letter No. J-12011/39/2010-IA I dated 12.12.2012 and No. J-12011/39/2010-IA.I dated 27.09.2021)

Sl. No.	Specific Conditions	Compliance Status
i	The Catchment Area Treatment (CAT) Plan as proposed in the EIA/EMP Report shall be undertaken in consultation with the State Forest Department and major work shall be completed before impounding of reservoir.	- J&K Forest Department was requested vide letter No. RATLE/CEO/Env/2022/271 dated 04.07.2022 for implementation of CAT Plan. - CAT Plan was again submitted to J&K Forest Department vide letter dated 29.09.2022 - In order to review and finalize the CAT Plan, following meetings were held by the J&K Forest Department • by Nodal Officer(FCA)/CCF, J&K on dated 25.11.2022. • by Director, Department of Soil and Water Conservation, J&K on dated 30.01.2023. • by Additional PCCF, Jammu on dated 01.02.2023. - It has been suggested by the J&K Forest Department to make the CAT Plan site specific as per the relevant working Plans and to justify the area to be treated with respect to the catchment, along with ground truthing. - National Environmental Engineering Research Institute (NEERI), Nagpur has been requested for microplanning and preparation of site specific CAT Plan. - The revised CAT Plan shall be submitted to J&K Forest Department for approval and implementation.

Item	I Year	II Year	III Year	IV Year	Total
Biological Measures					
Afforestation (ha)	2243	1747	923	-	4913
Enrichment Plantation (ha)	-	112	79	-	191
Pasture Development	-	376	195	-	591
Nursery Development (Nos)	3	-	-	-	3
Watch & ward (Nos)	240	240	240	240	960
Engineering Measures					
Contour Bunding (ha)	434	409	324	171	1338
Check Dams (Nos)	50	25	30	20	125

ii	All the commitments made during the public hearing shall be fulfilled completely.	- Shall be complied - The R&R Plan of the Project was approved by GOJK in 2013 after consultations with all stakeholders and duly considering the aspirations and demands of local people. - As per provisions of MoU, the R&R Plan of Project has been updated in line with the rates provided in case of Kishanganga HE Project, J&K. - The Standing Committee headed by Chief Secretary, UT J&K has accorded in-principle approval to the revised R&R Plan of Ratle HEP. The final approval of revised R&R Plan is under progress by GOJK. - After final approval, the revised R&R Plan of Project shall be implemented through Commissioner R&R, Ratle HE Project (Deputy Commissioner, Kishtwar).
iii	The details of land holding of project affected persons whose land is being acquired shall be submitted to this ministry. The R&R benefits for the land losing households will be as per the National Rehabilitation and Resettlement Policy, 2007 (NRRP, 2007) or as per the State Rehabilitation and Resettlement Policy, whichever is higher. Adequate publicity of the compensation package shall be made in the affected villages.	- R&R Package for Ratle HE Project was sanctioned by GOJK in 2013 vide Order No. 91-PDD of 2013 dated 21.03.2013 for a total amount of Rs. 110.00 Crore. - The above R&R Package includes the Rehabilitation and Resettlement Plan (Rs. 20.00 Crore) prepared on the basis of NRRP 2007, Local Area Development Plan including Skill Development Plan (Rs. 50.00 Crore) and Corporate Social Responsibility Plan (Rs 30.00 Crore). - As per R&R Plan approved by GOJK in 2013, the Deputy Commissioner, Kishtwar has been appointed as Commissioner R&R for implementation of R&R Plan. - A part of R&R benefits as per approved Plan of 2013 stand already released to the beneficiaries.

		- Now, as per MoU, the rates of previously approved R&R Plan have been revised and the updated R&R Plan has been submitted to GOJK on 07.09.2021 for examination and approval thereof. - In September 2022, BOD of RHPCL has accorded approval to the revised Cost Estimate of R&R Plan. - The In-principle approval has been accorded to the R&R Plan of Ratle HE Project by the Standing Committee headed by Chief Secretary, J&K. - The final approval of R&R Plan by GOJK is under progress. - After final approval, the revised R&R Plan of Project shall be implemented through Commissioner R&R, Ratle HE Project (Deputy Commissioner, Kishtwar).
iv	A Monitoring Committee for R&R shall be constituted which must include representatives of project affected persons from SC/ST category and a women beneficiary.	- The proposal for constitution of Monitoring Committee shall be submitted shortly in line with final approval of the R&R Plan by GOJK.
v	Consolidation and compilation of muck shall be carried-out only in the designated muck dumping sites as submitted in the EIA/EMP report. As per the proposed muck disposal plan, out of 24.4 lakh m3 of muck to be generated due to excavation, about 50% (i.e 12.2 lakh m3) will be utilized for construction purpose and the remaining 12.2 lakh m3 will be dumped at the 3 designated areas in an allocated area of 30.59 ha. The identified muck dumping sites shall be at-least 30m horizontally away from the edge of the river corresponding to high flood level (HFL).	- The approach roads to Muck Disposal area-I & II (downstream of Dam site) on right bank and left bank of river Chenab respectively, have been developed by the Contractor. - As per the details provided by the Contractor, most of the excavated muck has been utilized in processing of aggregates, Tunnel works, construction of approach roads, protection works (Crate walls, RR Masonry walls etc.). - The disposal of muck shall be carried out at designated muck dumping sites as per Muck Disposal Plan proposed in the EMP Report.

vi	Muck dumping sites should be handed over to Forest Department only after restoration including plantations etc	- The Muck dumping sites shall be handed over to Forest Department only after their complete restoration.
vii	A provision of an additional unit of 30 MW has been made in the project, which will be running for 24 hours continuously to maintain a minimum discharge of 33.43. cumecs/sec, during the lean season from November-February (About 27% of lean season) at the downstream, shall be strictly adhered to. Monsoon flow shall be at least 30% of the Monsoon discharge.	- The stipulated seasonal flows shall be maintained during Project operation
viii	An Auto mechanism / by pass arrangement in dam design shall be made to ensure release of environmental flow water in event of the 30 MW turbine or when it is put under maintenance.	Shall be complied - To ensure continuous release of environmental flow, the maintenance of 30MW turbine shall be planned only in Monsson season when all main Units are in operation 24X7. - Also to ensure continuous release of environmental flow in the event of 30MW turbine being under maintenance, the provision has been kept in Plant Control & Monitoring (SCADA) system for control of reservoir level and downstream release consideration for environmental flow.
ix	Continuous Monitoring system for environmental flow measurement shall be installed and data shall be displayed at appropriate site for information of civil society, stake holders and regulators. Six monthly results shall be submitted to the regional Office of the Ministry and SPCB.	Shall be complied
x	Real time telemetry and data acquisition system including all weather hydro metrological stations shall be installed for in-flow monitoring and advance flood warning. Advance flood warning and advance communication systems shall be installed in consultation with the downstream District Authorities.	Shall be complied - An Automatic Water Level Recorder (AWLR) has been installed on river Chenab (upstream of Dam site), as part of Early Flood Warning System.

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XI	As proposed in the EMP, the compensatory Afforestation Programme on 277.64 ha of land with 13 plant species shall be undertaken in consultation with the State Forest Department. Native species should be preferred in plantation. The allocated grant of Rs.1467.59 lakhs for this purpose shall be fully utilized and not to be diverted for any other purpose.	- An amount of Rs.1773.07 Lakh has been paid to J&K Forest Department towards diversion of Forest land for Ratle HE Project out of which Rs.179.71 Lakh has been paid towards Compensatory Afforestation Programme. - The Kishtwar Forest Division, Doda Forest Division and Social Forestry Division, Kishtwar have been requested to provide the physical and financial progress of Compensatory Afforestation works carried out for Ratle HE Project, however, the details from Forest Department are awaited. - The Utilization Certificate shall be taken from J&K Forest Department to ensure that allocated grant is fully utilized and not diverted for any other purpose.
XII	Greenbelt development along the approach roads, residential areas, office complex, dam site and other working areas shall be undertaken. The allocated budget of Rs.73 lakhs for this purpose shall be fully ublized and not to be diverted to any other purpose.	- Shall be undertaken through J&K Forest Department as proposed in EMP Report.
XIII	As proposed in the EMP, the Biodiversity Conservation and Wildlife Management Plans shall be taken up and implementation shall be included in the sixth monthly compliance report to be submitted to the Ministry, including its Regional Office	- Biodiversity Conservation and Management Plan stands submitted to J&K Forest Department vide letter No RATLE/GM(C-I)/2022/62 dated 29.09.2022 - Vide letter dated 14.11.2022, J&K Forest Department has been requested to expedite the approval of said Plan - Subsequently, the matter was discussed with J&K Forest Department in review meeting held by Nodal Officer (FCA)/Chief Conservator of Forests, UT J&K on dated 25.11.2022. - The matter was again discussed in a meeting chaired by Conservator of

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		Forests, Chenab Circle, Doda at Kishtwar on 15.03.2023. - Vide letter No. Ratle/CEO/2023/E-49 dated 09.11.2023, J&K Forest Department has been requested for an early finalization and approval of Biodiversity Conservation and Management Plan and its timely implementation.
xiv	Indigenous plant species should be used for implementation of Biodiversity Management Plan and for Compensatory Afforestation. Expertise from R&D Centers may be used for propagation techniques. Provision should also be made to include researchers to implement these Plans and carrying out plantation.	Shall be complied
xv	Equipment likely to generate high noise levels shall meet the ambient noise standards as notified under the noise Pollution (Regulation and Control) Rules 2000, as amended in 2010 under Environment Protection Act (EPA), 1986. For this, necessary insulation arrangement etc. to be ensured.	Being complied
xvi	A provision of Rs. 30 Crores earmarked towards the Local Area Development Activities (LADA) shall be fully utilized and not to be diverted for any other purpose. The implementation of activities as submitted to the Ministry shall be taken up as soon possible. In addition, a grant of Rs. 30 Crores earmarked for Corporate Social Responsibility (CSR) and Rs.30 Crores for skill development purpose shall also be duly utilized and not to be diverted for any other purpose.	- Implementation of Local Area Development Activities, Corporate Social Responsibility activities and Skill Development Plan shall be ensured by Commissioner R&R / Deputy Commissioner, Kishtwar in line with final approval of R&R Package by GOJK.
xvii	LADA activities may be undertaken by M/s Ratle Hydro Electric Project Pvt. Ltd to enhance delivery mechanism for operational point of view.	- Implementation of LADA activities shall be ensured by Commissioner R&R/ District Administration in line with final approval of R&R Package by GOJK.

xviii	Tie-ups shall be made with existing city hospitals for disposal of Bio-medical waste in case district hospital at Kishtwar does not have the facility for handling biomedical waste as proposed in the report.	Shall be complied
xix	Any other clearance from other organization/department if required shall be obtained before commencement of the project	Shall be complied
Sl. No.	**General Conditions**	**Compliance status**
i	Adequate arrangement for providing free fuel like Kerosene/wood/LPG shall be made at project cost for the labour engaged in the construction work so that indiscriminate felling of trees is prevented	The LPG from Depot(s) at Drapshalla and Kishtwar is being used as fuel for labour colonies.
ii	Medical facilities as well as recreational facilities shall also be provided to labourers.	- One Dispensary has been set up by Contractor at Project site which is being manned by One Doctor and 13 paramedical staff. Further, two Ambulances have also been deployed to cater to the health requirements of their staff and labour force. - One Dispensary has been set up at Project site by Project Authorities also. - In addition, one First Aid Centre cum Dispensary has been established by Ratle Project at Shalmar Colony which is being manned by one Doctor and 2 paramedical staff. - Recreational facilities shall also be ensured by the Contractor.
iii	All the labourers to be engaged for construction works shall be thoroughly examined by health personal and adequately treated before issuing them work permit	Required health measures being taken up by the major Contractor.

iv	No fugitive dust emissions should be obeerved at the construction sites. Water sprinkling arrangements should be made to suppress the fugitive emissions.	- Regular water sprinkling at work sites is being carried out to supress the fugitive dust emissions. - Fleet of three water Tankers is in service to cater to regular water sprinkling.
v	Potable drinking water and proper sanitary facilities shall be provided for the labour force and the local area people.	Being complied
vi	Restoration of construction area including dumping site of excavated materials shall be ensured by levelling, filling up of burrow pits, landscaping etc. The area should be properly treated with suitable plantation.	- Restoration of construction areas with proper treatment and plantation of suitable species shall be taken up upon completion of construction activities.
vii	Environmental parameters shall be monitored regularly and six monthly reports shall be submitted to the regional Office of the Ministry and State Pollution Control Board for review.	- The sampling & monitoring of environmental quality parameters has been carried out at Project sites. The test reports are enclosed herewith as **Appendix-II**.
viii	The project proponent shall also submit six monthly compliance reports of the stipulated EC conditions (both hard copies as well as by e-mail) to the respective Regional Office of MoEF and State Pollution Control Board. Monitoring report and compliance report shall be up-loaded on the web-site of project proponent.	- 06 monthly reports on the status of compliance of the stipulated EC conditions are being regularly submitted and the same are also being put on the website of RHPCL i.e. www.rhpcindia.com
Other Conditions mentioned in the EC Letter		
5.	The Project Proponent shall provide full cooperation and all required documents, data and access to the Officials of Regional Office of MoEF who would be monitoring the implementation of environmental safeguards.	Being complied

6.	Besides the above stated conditions, M/s Ratle hydro Electric Project Pvt. Ltd and Government of Jammu & Kashmir shall also implement all other environmental safeguards, as proposed in the EIA/EMP report and other reports from time to time. The J&K Government may also like to monitor implementation of EMP at regular interval.	Being complied
7.	Any change in the scope of the Project shall be intimated to the Ministry and fresh approval, if required, shall be taken from the Ministry.	- In case of any change the prior approval shall be taken from MoEF&CC, GOI.
10.	A Multi-disciplinary committee for monitoring the implementation of environmental safe guards during construction shall be constituted by the Project Proponent in consultation with the Ministry as early as possible. The Proponent shall suggest the members and their profile for approval of the Ministry. Proponent shall organize six monthly meetings of the committee and submit the monitoring report to the Ministry.	- The request for constitution of multi-disciplinary committee to oversee the implementation of environmental safeguard measures at Ratle HE Project, has been submitted to MoEF&CC, IRO, Jammu.
11.	A copy of the clearance letter shall be sent by the Proponent to local Panchayat, Zila parishad/Municipal Corporation, Urban local body and local NGO, if any, from whom suggestions / representations were received while processing the proposal. The clearance letter shall also be put on its web-sites by the project proponent.	- Environment Clearance letter of Ratle HE Project has been put on the website of RHPCL i.e. www.rhpcindia.com
12.	The proponent should advertise at least in two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned informing that the project has been accorded environmental clearance and copies of clearance letter are available with the State Pollution Control Board/committee and may also be seen at Website of the Ministry of Environment and Forests at http://www.envior.nic.in.	- Environment Clearance letter of Ratle HE Project has been put on the website of RHPCL i.e. www.rhpcindia.com.

13	After 5 years of the commissioning of the Project, a study shall be undertaken regarding impact of the project on the environment and downstream ecology. The study shall be undertaken by an independent agency, to be decided in consultation with the Ministry.	Shall be complied
14	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) including the respective Regional office of MoEF and Zonal Office of CPCB and SPCB.	Six monthly reports on the status of compliance of stipulated EC conditions are being regularly submitted.

*The previous records of Project regarding implementation of EMPs in compliance to the EC conditions are yet to be handed over by JKSPDC. The above information shall be suitably updated upon receipt of records and shall also be submitted to MoEF&CC for kind information.

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ANNEXURE-II

Ratle HE Project (850 MW)

(Status Report as on 30.09.2023)

Ratle Hydro-Electric Project is a run-of-river scheme proposed on river Chenab in District Kishtwar of U.T Jammu and Kashmir with installed capacity of 850MW. The Project envisages construction of 133mtr high (from deepest foundation level) Concrete Gravity Dam, an underground Power House to accommodate 4 units of capacity 205MW each and one Auxiliary Unit of capacity 30MW.

Initially, the construction of Project was taken up by J&K State Power Development Corporation through M/s GVK however the work was stopped in 2014. The plan for execution of Project was revived by Ministry of Power, GOI in 2018 in consultation with Govt. of Jammu and Kashmir. The MOU was signed on 03.02.2019 and subsequently, supplementary MoU was signed on 03.01.2021 between NHPC (51%) and JKSPDC (49%) for formation of new Joint Venture for execution of Ratle HE Project. The new JV with the name "Ratle Hydroelectric Power Corporation Ltd." was incorporated on 01.06.2021 for execution of 850MW Ratle HE Project.

1. **Status of Clearances:**

Clearance	Status
Appraisal by CEA	TEA accorded by CEA on 19.12.2012. TEA further transferred in the name of RHPCL vide communication No. CEA-SY-25-50/1/2019-PAC Division/438-43 dated 29.12.2021
Forest Clearance	Accorded by GOJK in favour of JKSPDC on 27.04.2012 (for diversion of 138.93 Ha Forest land) and on 05.03.2014 (for diversion of 29.13 Ha Forest land) respectively. Vide communication No. 15-01/2021-Jammu dated 18.01.2022 and 08.03.2022, approval accorded by MoEF&CC, GOI for change of User Agency from JKSPDC to RHPCL.
Environment Clearance	Accorded by MoEF&CC vide letter No. J-12011/39/2010-IA.I dated 12.12.2012. The EC was transferred by MoEF&CC in the name of RHPCL vide communication No. J-12011/39/2010-IA.I dated 27.09.2021
Indus water Clearance	Accorded by MoWR (Indus Wing) on 16.08.2012. Vide letter dated 02.07.2021, MoWR (Indus Wing) has confirmed the validity of IWT Clearance of the Project in favour of RHPCL.
PIB/CCEA Clearance	Cabinet has accorded the investment sanction of Rs. 5281.94Cr for implementation of 850MW Ratle HE Project communicated vide MoP letter dated 11.02.2021.
R&R Plan Approval	Vide Order No. 91-PDD of 2013 dated 21.03.2013, GOJK had accorded the sanction to R&R Package of the Project for a total

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	amount of Rs. 110 Crore. As per provisions of MoU, the R&R Plan of Project has been updated in line with the rates provided in case of Kishanganga HE Project, J&K and submitted to GOJK for approval. The In-principle approval to the updated R&R Plan has been accorded by the Standing Committee headed by Chief Secretary, J&K. The final approval of the R&R Plan by GOJK is under progress

2. **Award of construction works**

The work for Turnkey Execution of Ratle HE Project has been awarded to M/s MEIL on 18.01.2022. The diversion of river Chenab through Diversion Tunnel has been achieved on 27.01.2024. The excavation of MAT and CVT has also been completed whereas the work on other associated components viz. TRTs, Pressure shafts, Power House, Surge chamber and Dam stripping is under progress by the Contractor. As per Investment sanction accorded to the Project by GOI, the Project is scheduled to be completed by February 2026.

3. **Status of Land Acquisition and transfer of land to RHPCL**

As mentioned in GOJK Order No. 55-JK (PDD) of 2022 dated 10-05-2022 (in terms of Administrative Council Decision No. 48/S/2022 dated 15-03-2022), State land measuring 233.96 Ha and Private land measuring 55.52 Ha has been acquired by JKSPDC through concerned Revenue Collectorate(s) of J&K Govt. for construction of Ratle HE Project in terms of Jammu and Kashmir State Land Acquisition Act. The Awarded amount on account of acquisition of land stands already deposited with concerned Revenue Collectorate(s) and the Land Awards have been issued by GOJK in favour of JKSPDC. Vide aforementioned Govt. Order dated 10.05.2022, JKPDD has been authorized to lease out land acquired by JKPDC for development of 850MW Ratle HEP to RHPCL. The sanction has also been accorded by GOJK for use of land measuring 138.81 Ha falling under river bed. The land acquired for Ratle HE Project has been physically taken over by RHPCL from JKSPDC. However, the formal lease deed for Project land is yet to be executed for which the matter is being regularly pursued with JKSPDC/JKPDD.

4. **Status of R&R Plan Implementation**

Vide Order No. 91-PDD of 2013 dated 21.03.2013 issued by GOJK in terms of Cabinet decision No. 44/7/2013 dated 15.03.2013, the sanction had been accorded to the R&R Package of 850MW Ratle HE Project for a total amount of Rs. 110.00 Crore. The above R&R Package sanctioned by GOJK includes the R&R Plan (Rs. 20.00 Crore), Local Area Development Plan including Skill Development Plan (Rs. 60.00 Crore) and Corporate Social Responsibility Plan (Rs.30.00 Crore). A part of R&R benefits as per the approved Plan stands already released to the beneficiaries.

कार्यालय: कमरा नंबर 08, ब्लॉक नंबर 02, एनएचपीसी क्षेत्रीय कार्यालय, जेडीए कमर्शियल परिसर नंबर 01, नरवाल, जम्मू (जम्मू और कश्मीर) - 180006
Office : Room No. 08, Block No. 02, NHPC Regional Office, JDA Commercial Complex No. 01, Narwal, Jammu (J&K) - 180006
Camp Office : NHPC Office Complex, Sector-33, Faridabad – 121003 (Haryana)
CIN: U40105JK2021GOI012380 E-mail id: mdoffice@rhpcl.nic.in

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In compliance to provisions of the MoU signed for incorporation of RHPCL, the rates of various provisions have been updated as per the rates provided in case of Kishanganga HE Project of NHPC and the updated R&R Plan of Ratle HE Project has been submitted to JKPDC / JKPDD and Department of DMRRR vide communication dated 07.09.2021 and 05.11.2021 for further examination. In September 2022, BOD of RHPCL has accorded approval to the revised Cost Estimate of R&R Plan. The Standing Committee headed by the Chief Secretary, J&K has accorded the in-principle approval to the updated R&R Plan of Ratle HE Project. The final approval of the R&R Plan by GOJK is under progress. GOJK has been requested by RHPCL for an early accord of final approval to the updated R&R Plan so that the R&R benefits could be timely released to the beneficiaries by Commissioner R&R, Ratle HE Project (Deputy Commissioner, Kishtwar).

5 Status of Infrastructure works

i) The construction of access roads leading to major structures like Dam, DT, Power House etc. have been completed.

ii) The Project colony at Drabshalla is under the stage of finalization by the team of Architects.

iii) A temporary Office setup has been developed at Project site, Drabshalla and the same is under use by the Project.

iv) 33/11 KV receiving station for Ratle HE Project has been constructed (partially) through JKPDD. The matter is being taken up with concerned Department of J&K Govt. for bringing the same into functional stage.

v) A Dispensary has been set up at Project site and another at Shalimar Office which is being manned by one Doctor and two paramedical staff.

vi) A Quality Control Lab has been established at site through Contractor and is operational.

vii) The security posts have also been constructed at work sites.

viii) The demarcation of Project land is under progress by District Revenue Authorities in association with Project Officials.

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Annexure-10

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ANNEXURE-I

850MW RATLE HE PROJECT, DISTRICT KISHTWAR, UT JAMMU AND KASHMIR

SIX MONTHLY COMPLIANCE REPORT ON ENVIRONMENTAL ASPECTS
(for the period October 2023 to March 2024)

1	**Name of Project**	Ratle Hydro-Electric Project (850MW)
2	**Type of Project**	Hydro-Electric Project (Run of the River scheme)
3	**Clearance letters OM No. and date**	
	(a) Environment Clearance	(a) MoEF&CC letter No. J-12011/39/2010-IA.I dated 12.12.2012 MoEF&CC letter No. J-12011/39/2010-IA.I dated 27.09.2021 (approval accorded for transfer of EC in the name of RHPCL).
	(b) Forest Clearance	(b) Order No. 234-FST of 2012 dated 27.04.2012 of GOJK (for diversion of 138.93 Ha Forest land) and No. 108-FST of 2014 dated 05.03.2014 of GOJK (for diversion of 29.13 Ha Forest land). Vide communication No. 15-01/2021-Jammu dated 08.03.2022, approval accorded by MoEF&CC, GOI for change of User Agency from JKSPDC to RHPCL.
4	Locations	
	(a) District(s)	(a) Kishtwar
	(b) State	(b) Jammu and Kashmir
	(c) Latitude	(c) 33°10'43" N
	(d) Longitude	(d) 75°48'26" E

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5	Address for Correspondence (a) Address of concerned Project Head (with Pin code, Telephone/Fax no.)	**(a) Chief Executive Officer** Ratle Hydroelectric Power Corporation Ltd. Ratle HE Project Shalimar Colony, Tehsil and District - Kishtwar, UT Jammu and Kashmir Pin code- 182 204 Telephone:- 01995-295171 email id: rhpcl@nhpc.nic.in
	(b) Address of concerned HOD in Corporate Office (with Pin code, Telephone/Fax no.)	(b) Regd. Office: **Chief Executive Officer** Ratle Hydroelectric Power Corporation Ltd. Room No. 08, Block No. 02, NHPC Regional Office, JDA Commercial Complex No. 01, Narwal, Jammu (UT J&K) - 180 006 email id: rhpcl@nhpc.nic.in
6	Details of Environmental Management Plan	Environmental Management Plans to be implemented at the Project as provided in the EMP Report are as follows:

Sl.No.	Environmental Management Plan
1	Biodiversity Management Plan
2	Catchment Area Treatment Plan
3	Fishery Development and Management Plan
4	Solid Waste Management Plan
5	Public Health Delivery System
6	Energy Conservation Measures
7	Muck Disposal Plan
8	Landscaping & Restoration of Quarry & Construction Areas
9	Air & Water Environment Management Plan
10	Reservoir Rim Treatment Plan
11	Compensatory Afforestation Plan
12	Rehabilitation & Resettlement Plan

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		13	Dam Break Modelling & Disaster Management Plan
		14	Local Area Development Plan
		15	CSR Activities
		16	Local Skill Development Plan
		17	Environmental Monitoring Programme
7	Breakup for Project area (Land details)	Forest Land : 138.93 ha Private Land : 55.52 ha State/Govt. Land : 233.96 ha River Bed land : 138.81 ha Total Land : 567.22 ha Note - i) Above land details are as per GOJK Order No. 55-JK(PDD) of 2022 dated 10.05.2022 ii) Vide GOJK Order No.108-FST of 2014 dated 05.03.2014, sanctioned has been accorded for diversion of 29.13ha social forestry land, which is part of 233.96ha State land mentioned above.	
8	Breakup of Project affected population with enumerations of those losing house/dwelling units only, agriculture land only, both house and agriculture land and landless labours / artisians. (a) SC/ST/Adivasis (b) Others	Details of PAFs Displaced PAFs : 80 Non Displaced PAFs : 160 Total PAFs : 240 a) Scheduled Tribe : 17 families b) Rural Artisans/ Small Traders : 62 families (Above details are as per R&R Plan of Ratle HE Project approved by GOJK in 2013)	
9	Financial Details (a) Project cost as originally planned and subsequent revised estimates and the year of price reference (b) Actual expenditure incurred on the Project so far	a) Original TEA approved cost (2012): Rs. 5517.02 Cr (completion cost) Cabinet Investment sanction approved (2021): Rs.5281.94Cr (Nov 2018 PL) b) Actual expenditure The cost of work done on the Project at the time of its taking over by JVC (as assessed by IIT, Delhi) : 120.86 Cr	

		Expenditure incurred by RHPCL : Rs. 600.74 Cr (till March 2024)
	(c) Allocation made for Environment Management Plan	Allocations for EMP : Rs. 262.35 Cr (as approved by MoEF&CC)
	(d) Actual expenditure incurred on EMP so far	Details of expenditure already incurred on EMP prior to formation of RHPCL i.e. 01.06.2021 shall be suitably updated upon receipt of records from JKSPDC. The details of expenditure incurred on EMP upto March 2024 as available with the Project is given below:- i)Payment released on account of Forest Clearance: Rs.1773.07 Lakh (including Rs.179.71 Lakh on account of Compensatory Afforestation Programme) ii) Solid Waste Management Plan* : Rs.13.92 Lakh iii)Public health delivery system* : Rs.112.63 Lakh iv)Energy Conservation measure* : Rs.73.03 Lakh v)Muck Disposal Plan* : Rs.8.97 Cr vi)CSR Plan : Rs.62.15 Lakh vii)Air & Water Environment Management Plan*: Rs. 99.73 Lakh viii)Environmental Monitoring Programme*:Rs.18.48 Lakh *also includes the expenditure incurred by Contractor as per the Contract Agreement
10	Forest Land Requirements (a) Status of approval for diversion of Forest Land for non-forestry use	(a) Sanction accorded by GOJK for diversion of 138.93 Ha Forest land for use vide Order No. 234-FST of 2012 dated 27.04.2012 and for use of 29.13 Ha Social Forestry land vide Order No. 108-FST of 2014 dated 05.03.2014. Vide communication No. 08.03.2022, approval accorded by MoEF&CC, GOI for change of User Agency from JKSPDC to RHPCL.

	(b) The status of clear felling of trees in Forest Land	(b) Clear felling status:- The status shall be suitably updated upon receipt of records from JKSPDC.
11	Status of Construction (a) Date of commencement (actual and/or planned) (b) Date of completion (actual and/or planned)	The work for Turnkey Execution of Ratle HE Project has been awarded to M/s MEIL on 18.01.2022. (a) Date of commencement of major works of the Project (actual): 18.01.2022 (b) Date of completion (planned): 10.02.2026 (60 months from the date of Investment approval).
12	Reasons for the delay (If the Project is yet to be started)	Not Applicable. (As per Cabinet Investment sanction dated 11.02.2021, Ratle HE Project is to be executed by JV of NHPC and JKSPDC with completion period of 60 months from the date of Investment approval)
13	Details of Site visits (a) By Monitoring Committee (b) By Regional Office	------ The status of visits prior to 01.06.2021, if any, shall be suitably updated upon receipt of records from JKSPDC.
14.	Brief note on the status of compliance of the conditions stipulated by MOEF&CC	Details enclosed as **Appendix-I**.

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Appendix-I

STATUS OF COMPLIANCE OF CONDITIONS STIPULATED BY MoEF&CC, GOVT OF INDIA

(Environment Clearance letter No. J-12011/39/2010-IA.I dated 12.12.2012 and No. J-12011/39/2010-IA.I dated 27.09.2021)

<table>
<tr><th>Sl. No.</th><th>Specific Conditions</th><th>Compliance Status</th></tr>
<tr><td>i</td><td>The Catchment Area Treatment (CAT) Plan as proposed in the EIA/EMP Report shall be undertaken in consultation with the State Forest Department and major work shall be completed before impounding of reservoir.
<table>
<tr><th>Item</th><th>I Year</th><th>II Year</th><th>III Year</th><th>IV Year</th><th>Total</th></tr>
<tr><td colspan="6">Biological Measures</td></tr>
<tr><td>Afforestation (ha)</td><td>2243</td><td>1747</td><td>923</td><td>-</td><td>4913</td></tr>
<tr><td>Enrichment Plantation (ha)</td><td>-</td><td>112</td><td>79</td><td>-</td><td>191</td></tr>
<tr><td>Pasture Development</td><td>-</td><td>376</td><td>195</td><td>-</td><td>591</td></tr>
<tr><td>Nursery Development (Nos)</td><td>3</td><td>-</td><td>-</td><td>-</td><td>3</td></tr>
<tr><td>Watch & ward (Nos)</td><td>240</td><td>240</td><td>240</td><td>240</td><td>960</td></tr>
<tr><td colspan="6">Engineering Measures</td></tr>
<tr><td>Contour Bunding (ha)</td><td>434</td><td>409</td><td>324</td><td>171</td><td>1338</td></tr>
<tr><td>Check Dams (NOs)</td><td>50</td><td>25</td><td>30</td><td>20</td><td>125</td></tr>
</table></td><td>- J&K Forest Department was requested vide letter No. RATLE/CEO/Env/2022/271 dated 04.07.2022 for implementation of CAT Plan.
- CAT Plan was again submitted to J&K Forest Department vide letter dated 29.09.2022.
- In order to review and finalize the CAT Plan, following meetings were held by the J&K Forest Department:
▪ by Nodal Officer(FCA)/CCF, J&K on dated 25.11.2022.
▪ by Director, Department of Soil and Water Conservation, J&K on dated 30.01.2023.
▪ by Additional PCCF, Jammu on dated 01.02.2023.
- It has been suggested by the J&K Forest Department to make the CAT Plan site specific as per the relevant working Plans and to justify the area to be treated with respect to the catchment, along with ground truthing.
- National Environmental Engineering Research Institute (NEERI), Nagpur has been requested for microplanning and preparation of site-specific CAT Plan.
- The revised CAT Plan shall be submitted to J&K Forest Department for approval and implementation.</td></tr>
</table>

ii	All the commitments made during the public hearing shall be fulfilled completely.	- Shall be complied - The R&R Plan of the Project was approved by GOJK in 2013 after consultations with all stakeholders and duly considering the aspirations and demands of local people. - As per provisions of MoU, the R&R Plan of Project has been updated in line with the rates provided in case of Kishanganga HE Project, J&K. - The Standing Committee headed by Chief Secretary, UT J&K has accorded In-principle approval to the revised R&R Plan of Ratle HEP. The final approval of revised R&R Plan is under progress by GOJK. - After final approval, the revised R&R Plan of Project shall be implemented through Commissioner R&R, Ratle HE Project (Deputy Commissioner, Kishtwar).
iii	The details of land holding of project affected persons whose land is being acquired shall be submitted to this ministry. The R&R benefits for the land losing households will be as per the National Rehabilitation and Resettlement Policy, 2007 (NRRP, 2007) or as per the State Rehabilitation and Resettlement Policy, whichever is higher. Adequate publicity of the compensation package shall be made in the affected villages.	- R&R Package for Ratle HE Project was sanctioned by GOJK in 2013 vide Order No. 91-PDD of 2013 dated 21.03.2013 for a total amount of Rs. 110.00 Crore. - The above R&R Package includes the Rehabilitation and Resettlement Plan (Rs. 20.00 Crore) prepared on the basis of NRRP 2007, Local Area Development Plan including Skill Development Plan (Rs. 60.00 Crore) and Corporate Social Responsibility Plan (Rs.30.00 Crore). - As per R&R Plan approved by GOJK in 2013, the Deputy Commissioner, Kishtwar has been appointed as Commissioner R&R for implementation of R&R Plan. - A part of R&R benefits as per approved Plan of 2013 stand already released to the beneficiaries.

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		- Now, as per MoU, the rates of previously approved R&R Plan have been revised and the updated R&R Plan has been submitted to GOJK on 07.09.2021 for examination and approval thereof. - In September 2022, BOD of RHPCL has accorded approval to the revised Cost Estimate of R&R Plan. - The In-principle approval has been accorded to the R&R Plan of Ratle HE Project by the Standing Committee headed by Chief Secretary, J&K. - The final approval of R&R Plan by GOJK is under progress. - After final approval, the revised R&R Plan of Project shall be implemented through Commissioner R&R, Ratle HE Project (Deputy Commissioner, Kishtwar).
iv	A Monitoring Committee for R&R shall be constituted which must include representatives of project affected persons from SC/ST category and a women beneficiary.	- The proposal for constitution of Monitoring Committee shall be submitted in line with final approval of the R&R Plan by GOJK.
v	Consolidation and compilation of muck shall be carried-out only in the designated muck dumping sites as submitted in the EIA/EMP report. As per the proposed muck disposal plan, out of 24.4 lakh m3 of muck to be generated due to excavation, about 50% (i.e.12.2 lakh m3) will be utilized for construction purpose and the remaining 12.2 lakh m3 will be dumped at the 3 designated areas in an allocated area of 30.59 ha. The identified muck dumping sites shall be at-least 30m horizontally away from the edge of the river corresponding to high flood level (HFL).	- The approach roads to Muck Disposal sites -I & II (downstream of Dam site) on right bank and left bank of river Chenab respectively, have been developed by the Contractor. - As per the details provided by the Contractor, most of the excavated muck has been utilized in processing of aggregates, Tunnel works, construction of approach roads, protection works (Crate walls, RR Masonry walls etc.). - The disposal of muck is being carried out at designated muck dumping site as per Muck Disposal areas proposed in the EMP Report.

कार्यालय: कमरा नंबर 08, ब्लॉक नंबर 02, एनएचपीसी क्षेत्रीय कार्यालय, जेडीए वाणिज्यिक परिसर नंबर 01, नरवाल, जम्मू, (जम्मू और कश्मीर) - 180006
Office : Room No. 08, Block No. 02, NHPC Regional Office, JDA Commercial Complex No. 01, Narwal, Jammu, (J&K) – 180006
Camp Office : NHPC Office Complex, Sector-33, Faridabad – 121003 (Haryana)
CIN: U40105JK2021GOI012380 E-mail id: rhpcl@nhpc.nic.in

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		- In the meantime, to avoid any spillage of muck, the Contractor has been asked to also explore the possibility for temporary stacking/ dumping of muck at some alternate location within Project land, which should be far away from the river.
vi	Muck dumping sites should be handed over to Forest Department only after restoration including plantations etc.	- The Muck dumping sites shall be handed over to Forest Department only after their complete restoration.
vii	A provision of an additional unit of 30 MW has been made in the project, which will be running for 24 hours continuously to maintain a minimum discharge of 33.43, cumecs/sec, during the lean season from November-February (About 27% of lean season) at the downstream, shall be strictly adhered-to. Monsoon flow shall be at least 30% of the Monsoon discharge.	- The stipulated seasonal-flows shall be maintained during Project operation.
viii	An Auto mechanism / by pass arrangement in dam design shall be made to ensure release of environmental flow water in event of the 30 MW turbine or when it is put under maintenance.	Shall be complied - To ensure continuous release of environmental flow, the maintenance of 30MW turbine shall be planned only in Monsson season when all main Units are in operation 24X7. - Also to ensure continuous release of environmental flow in the event of 30MW turbine being under maintenance, the provision has been kept in Plant Control & Monitoring (SCADA) system for control of reservoir level and downstream release consideration for environmental flow.
ix	Continuous Monitoring system for environmental flow measurement shall be installed and data shall be displayed at appropriate site for information of civil society, stake holders and regulators. Six monthly results shall be submitted to the regional Office of the Ministry and SPCB.	Shall be complied

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x	Real time telemetry and data acquisition system including all weather hydro metrological stations shall be installed for in-flow monitoring and advance flood warning. Advance flood warning and advance communication systems shall be installed in consultation with the downstream District Authorities.	- An Automatic Water Level Recorder (AWLR) has been installed on river Chenab (upstream of Dam site), as part of Early Flood Warning System. - An All-Weather Station has also been installed in the colony area and is operational.
xi	As proposed in the EMP, the compensatory Afforestation Programme on 277.84 ha of land with 13 plant species shall be undertaken in consultation with the State Forest Department. Native species should be preferred in plantation. The allocated grant of Rs.1467.59 lakhs for this purpose shall be fully utilized and not to be diverted for any other purpose.	- An amount of Rs.1773.07 Lakh has been paid to J&K Forest Department towards diversion of Forest land for Ratle HE Project out of which Rs.179.71 Lakh has been paid towards Compensatory Afforestation Programme. - Vide letter No. RATLE/GM(E)/2023/E-39 dated 16.10.2023, J&K Forest Department has been requested to provide the physical and financial progress of Compensatory Afforestation works carried out for Ratle HE Project, however, the details from Forest Department are awaited. - The Utilization Certificates shall be taken from J&K Forest Department to ensure that allocated grant is fully utilized and not diverted for any other purpose.
xii	Greenbelt development along the approach roads, residential areas, office complex, dam site and other working areas shall be undertaken. The allocated budget of Rs.73 lakhs for this purpose shall be fully utilized and not to be diverted to any other purpose.	- Shall be undertaken through J&K Forest Department as proposed in EMP Report.
xiii	As proposed in the EMP, the Biodiversity Conservation and Wildlife Management Plans shall be taken up and implementation shall be included in the six monthly compliance report to be submitted to the Ministry, including its Regional Office.	- Biodiversity Conservation and Management Plan stands submitted to J&K Forest Department vide letter No. RATLE/GM(C-I)/2022/62 dated 29.09.2022. - Vide letter dated 14.11.2022, J&K Forest Department has been requested

		to expedite the approval of said Plan. - Subsequently, the matter was discussed with J&K Forest Department in review meeting held by Nodal Officer (FCA)/Chief Conservator of Forests, UT J&K on dated 25.11.2022 and with Conservator of Forests, Chenab Circle, Doda at Kishtwar on 15.03.2023. - Vide letter No. Ratle/CEO/2023/E-49 dated 09.11.2023, J&K Forest Department has been requested for an early finalization and approval of Biodiversity Conservation and Management Plan and its timely implementation.
xiv	Indigenous plant species should be used for implementation of Biodiversity Management Plan and for Compensatory Afforestation. Expertise from R&D Centers may be used for propagation techniques. Provision should also be made to include researchers to implement these Plans and carrying out plantation.	Shall be complied
xv	Equipment likely to generate high noise levels shall meet the ambient noise standards as notified under the noise Pollution (Regulation and Control) Rules 2000, as amended in 2010 under Environment Protection Act (EPA), 1986. For this, necessary insulation arrangement etc. to be ensured.	Being complied
xvi	A provision of Rs. 30 Crores earmarked towards the Local Area Development Activities (LADA) shall be fully utilized and not to be diverted for any other purpose. The implementation of activities as submitted to the Ministry shall be taken up as soon possible. In addition, a grant of Rs. 30 Crores earmarked for Corporate Social Responsibility (CSR) and Rs.30 Crores for skill development purpose shall also be duly utilized and not to be diverted for any other purpose.	- Implementation of Local Area Development Activities, Corporate Social Responsibility activities and Skill Development Plan shall be ensured by Commissioner R&R / Deputy Commissioner, Kishtwar in line with final approval of R&R Package by GOJK.

xvii	LADA activities may be undertaken by M/s Ratle Hydro Electric Project Pvt. Ltd to enhance delivery mechanism for operational point of view.	- Implementation of LADA activities shall be ensured by Commissioner R&R/ District Administration in line with final approval of R&R Package by GOJK.
xviii	Tie-ups shall be made with existing city hospitals for disposal of Bio-medical waste in case district hospital at Kishtwar does not have the facility for handling biomedical waste as proposed in the report.	Shall be complied
xix	Any other clearance from other organization/department, if required, shall be obtained before commencement of the project	Shall be complied
Sl. No.	**General Conditions**	**Compliance status**
i	Adequate arrangement for providing free fuel like kerosene/wood/LPG shall be made at project cost for the labour engaged in the construction work so that indiscriminate felling of trees is prevented.	- Common mess facilities have been developed by MEIL for their workers at Drabshalla. - The LPG from Depot(s) at Drabshalla and Kishtwar is being used as fuel for labour colonies.
ii	Medical facilities as well as recreational facilities shall also be provided to labourers.	- One Dispensary has been set up by Contractor at Project site which is being manned by One Doctor and 13 paramedical staff. - Further, two Ambulances have also been deployed to cater to the health requirements of their staff and labour force. - In addition, one First Aid Centre has been established by Ratle Project at Shalimar Colony which is being manned by one Doctor and 2 paramedical staff. - Recreational facilities shall also be ensured by the Contractor.

iii	All the labourers to be engaged for construction works shall be thoroughly examined by health personal and adequately treated before issuing them work permit.	- Health measures for labourers being taken up by the major Contractor.
iv	No fugitive dust emissions should be observed at the construction sites. Water sprinkling arrangements should be made to suppress the fugitive emissions.	- Regular water sprinkling at work sites is being carried out to supress the fugitive dust emissions. - Fleet of three water Tankers is in service to cater to regular water sprinkling.
v	Potable drinking water and proper sanitary facilities shall be provided for the labour force and the local area people.	Being complied
vi	Restoration of construction area including dumping site of excavated materials shall be ensured by levelling, filling up of burrow pits, landscaping etc. The area should be properly treated with suitable plantation.	- Restoration of construction areas with proper treatment and plantation of suitable species shall be taken up upon completion of construction activities.
vii	Environmental parameters shall be monitored regularly and six monthly reports shall be submitted to the regional Office of the Ministry and State Pollution Control Board for review.	- The sampling & monitoring of environmental quality parameters has been carried out at Project sites. The test reports are enclosed herewith as **Appendix-II**.
viii	The project proponent shall also submit six monthly compliance reports of the stipulated EC conditions (both hard copies as well as by e-mail) to the respective Regional Office of MoEF and State Pollution Control Board. Monitoring report and compliance report shall be up-loaded on the web-site of project proponent.	- 06 monthly reports on the status of compliance of the stipulated EC conditions are being regularly submitted and the same are also being put on the website of RHPCL i.e. www.rhpcindia.com.
	Other Conditions mentioned in the EC Letter	
5.	The Project Proponent shall provide full cooperation and all required documents, data and access to the Officials of Regional Office of MoEF who would be monitoring the implementation of environmental safeguards.	Being complied

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6.	Besides the above stated conditions, M/s Ratle hydro Electric Project Pvt. Ltd and Government of Jammu & Kashmir shall also implement all other environmental safeguards, as proposed in the EIA/EMP report and other reports from time to time. The J&K Government may also like to monitor implementation of EMP at regular interval.	Being complied
7.	Any change in the scope of the Project shall be intimated to the Ministry and fresh approval, if required, shall be taken from the Ministry.	- In case of any change, the prior approval shall be taken from MoEF&CC, GOI.
10.	A Multi-disciplinary committee for monitoring the implementation of environmental safe guards during construction shall be constituted by the Project Proponent in consultation with the Ministry as early as possible. The Proponent shall suggest the members and their profile for approval of the Ministry. Proponent shall organize six monthly meetings of the committee and submit the monitoring report to the Ministry.	- In Dec 2023, the proposal was submitted to MoEF&CC, sub Office, Jammu for constitution of multi-disciplinary committee to oversee the implementation of environmental safeguard measures at Ratle HEP. - Subsequently, as suggested by MoEF&CC sub Office, Jammu, the proposal for MDMC has been submitted to MoEF&CC, New Delhi.
11.	A copy of the clearance letter shall be sent by the Proponent to local Panchayat, Zila parishad/Municipal Corporation, Urban local body and local NGO, if any, from whom suggestions / representations were received while processing the proposal. The clearance letter shall also be put on its web-sites by the project proponent.	- Environment Clearance letter of Ratle HE Project has been put on the website of RHPCL i.e. www.rhpcindia.com. (status shall be suitably updated upon receipt of records from JKSPDC)
12.	The proponent should advertise at least in two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned informing that the project has been accorded environmental clearance and copies of clearance letter are available with the State Pollution Control Board/committee and may also be seen at Website of the Ministry of Environment and Forests at http://www.envfor.nic.in.	- Environment Clearance letter of Ratle HE Project has been put on the website of RHPCL i.e. **www.rhpcindia.com.** (status shall be suitably updated upon receipt of records from JKSPDC)

13	After 5 years of the commissioning of the Project, a study shall be undertaken regarding impact of the project on the environment and downstream ecology. The study shall be undertaken by an independent agency, to be decided in consultation with the Ministry.	Shall be complied
14	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) including the respective Regional office of MoEF and Zonal Office of CPCB and SPCB.	- 06 monthly reports on the status of compliance of stipulated EC conditions are being regularly submitted.

*The previous records of Project regarding implementation of EMPs in compliance to the EC conditions are yet to be handed over by JKSPDC. The above information shall be suitably updated upon receipt of records and shall also be submitted to MoEF&CC for kind information.

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ANNEXURE-II

Ratle HE Project (850 MW)

(Status Report as on 31.03.2024)

Ratle Hydro-Electric Project is a run-of-river scheme proposed on river Chenab in District Kishtwar of UT Jammu and Kashmir with installed capacity of 850MW. The Project envisages construction of 133mtr high (from deepest foundation level) Concrete Gravity Dam, an underground Power House to accommodate 4 units of capacity 205MW each and one Auxiliary Unit of capacity 30MW.

Initially, the construction of Project was taken up by J&K State Power Development Corporation through M/s GVK however the work was stopped in 2014. The plan for execution of Project was revived by Ministry of Power, GOI in 2018 in consultation with Govt. of Jammu and Kashmir. The MoU was signed on 03.02.2019 and subsequently, supplementary MoU was signed on 03.01.2021 between NHPC (51%) and JKSPDC (49%) for formation of new Joint Venture for execution of Ratle HE Project. The new JV with the name "Ratle Hydroelectric Power Corporation Ltd." was incorporated on 01.06.2021 for execution of 850MW Ratle HE Project.

1. Status of Clearances:

Clearance	Status
Appraisal by CEA	TEA accorded by CEA on 19.12.2012. TEA further transferred in the name of RHPCL vide communication No. CEA-SY-25-50/1/2019-PAC Division/438-43 dated 29.12.2021
Forest Clearance	Accorded by GOJK in favour of JKSPDC on 27.04.2012 (for diversion of 138.93 Ha Forest land) and on 05.03.2014 (for diversion of 29.13 Ha Forest land) respectively. Vide communication No. 15-01/2021-Jammu dated 18.01.2022 and 08.03.2022, approval accorded by MoEF&CC, GOI for change of User Agency from JKSPDC to RHPCL.
Environment Clearance	Accorded by MoEF&CC vide letter No. J-12011/39/2010-IA.I dated 12.12.2012. The EC was transferred by MoEF&CC in the name of RHPCL vide communication No. J-12011/39/2010-IA.I dated 27.09.2021.
Indus water Clearance	Accorded by MoWR (Indus Wing) on 16.08.2012. Vide letter dated 02.07.2021, MoWR (Indus Wing) has confirmed the validity of IWT Clearance of the Project in favour of RHPCL.
PIB/CCEA Clearance	Cabinet has accorded the Investment sanction of Rs. 5281.94Cr for implementation of 850MW Ratle HE Project communicated vide MoP letter dated 11.02.2021.
R&R Plan Approval	Vide Order No. 91-PDD of 2013 dated 21.03.2013, GOJK had accorded the sanction to R&R Package of the Project for a total

amount of Rs. 110 Crore. As per provisions of MoU, the R&R Plan of Project has been updated in line with the rates provided in case of Kishanganga HE Project, J&K and submitted to GOJK for approval. The In-principle approval to the updated R&R Plan has been accorded by the Standing Committee headed by Chief Secretary, J&K. The final approval of the R&R Plan by GOJK is under progress.

2. **Award of construction works**

The work for Turnkey Execution of Ratle HE Project has been awarded to M/s MEIL on 18.01.2022. The diversion of river Chenab through Diversion Tunnel has been achieved on 27.01.2024. The excavation of MAT and CVT has also been completed whereas the work on other associated components viz. TRTs, Pressure shafts, Power House, Surge chamber and Dam stripping is under progress by the Contractor. As per Investment sanction accorded to the Project by GOI, the Project is scheduled to be completed by February 2026.

3. **Status of Land Acquisition and transfer of land to RHPCL**

As mentioned in GOJK Order No. 55-JK (PDD) of 2022 dated 10-05-2022 (in terms of Administrative Council Decision No. 48/3/2022 dated 15-03-2022), State land measuring 233.96 Ha and Private land measuring 55.52 Ha has been acquired by JKSPDC through concerned Revenue Collectorate(s) of J&K Govt. for construction of Ratle HE Project in terms of Jammu and Kashmir State Land Acquisition Act. The Awarded amount on account of acquisition of land stands already deposited with concerned Revenue Collectorate(s) and the Land Awards have been issued by GOJK in favour of JKSPDC. Vide aforementioned Govt. Order dated 10.05.2022, JKPDD has been authorized to lease out land acquired by JKPDC for development of 850MW Ratle HEP to RHPCL. The sanction has also been accorded by GOJK for use of land measuring 138.81 Ha falling under river bed. The land acquired for Ratle HE Project has been physically taken over by RHPCL from JKSPDC. However, the formal lease deed for Project land is yet to be executed for which the matter is being regularly pursued with JKSPDC/JKPDD.

4. **Status of R&R Plan Implementation**

Vide Order No. 91-PDD of 2013 dated 21.03.2013 issued by GOJK in terms of Cabinet decision No. 44/7/2013 dated 15.03.2013, the sanction had been accorded to the R&R Package of 850MW Ratle HE Project for a total amount of Rs. 110.00 Crore. The above R&R Package sanctioned by GOJK includes the R&R Plan (Rs. 20.00 Crore), Local Area Development Plan including Skill Development Plan (Rs. 60.00 Crore) and Corporate Social Responsibility Plan (Rs.30.00 Crore). A part of R&R benefits as per the approved Plan stands already released to the beneficiaries.

In compliance to provisions of the MoU signed for incorporation of RHPCL, the rates of various provisions have been updated as per the rates provided in case of Kishanganga HE Project of NHPC and the updated R&R Plan of Ratle HE Project has been submitted to JKPDC / JKPDD and Department of DMRRR vide communication dated 07.09.2021 and 05.11.2021 for further examination. In September 2022, BOD of RHPCL has accorded approval to the revised Cost Estimate of R&R Plan. The Standing Committee headed by the Chief Secretary, J&K has accorded the In-principle approval to the updated R&R Plan of Ratle HE Project. The final approval of the R&R Plan by GOJK is under progress. GOJK has been requested by RHPCL for an early accord of final approval to the updated R&R Plan so that the R&R benefits could be timely released to the beneficiaries by Commissioner R&R, Ratle HE Project (Deputy Commissioner, Kishtwar).

5. Status of Infrastructure works

i) The construction of access roads leading to major structures has been completed.
ii) The layout of Project colony at Drabshala is under the stage of finalization.
iii) A temporary Office setup has been developed at Project site, Drabshalla which is under use by the Project.
iv) 33/11 KV receiving station for Ratle HE Project has been constructed (partially) through JKPDD. Matter is being taken up with J&K Govt. making it functional stage.
v) A Dispensary has been set up at Project site and another at Shalimar Office which is being manned by one Doctor and two paramedical staff.
vi) A Quality Control Lab has been established at site through Contractor and is operational.
vii) The security posts have also been constructed at work sites.
viii) The demarcation of Project land is under progress through District Revenue Authorities.

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ITUWTSA NEW DELHI 2024

सन्दर्भ सं: / Ref. No. **RATLE/CEO/2024/**E-60 दिनांक / **Date**: 18-10-2024

Deputy Director
Ministry of Environment, Forests and Climate Change (MoEF&CC)
Sub Office
Jammu (UT of J&K)-180 004

Subject:-Env. Compliance report with respect to the observations made during the Project visit of Deputy Director, MoEF&CC, Sub Office, Jammu on 06.05.2024

Ref: 1) MoEF&CC Sub Office, Jammu's communication No. F. No. 07-92/2022-RO(NZ) of August 2024 endorsed vide email dated 19.08.2024

2) Env. Clearance granted to Ratle HE Project by MoEF&CC vide F. No. No. J-12011/39/2010-IA.I dated 12.12.2012 and F. No. J-12011/39/2010-IA.I dated 27.09.2021

Sir,

Kindly refer to your aforementioned communication (**Ref-1**) on the subject cited above vide which Ratle HPCL has received a copy of observations along with the monitoring report of 850MW Ratle HE Project with respect to the conditions of Env. Clearance letter.

The necessary env. safeguard measures are being taken up from time to time to comply with all the conditions contained in the Env. Clearance letter and as per the directions conveyed by MoEF&CC Sub Office, Jammu during the site visit.

In this regard, kindly find enclosed herewith the detailed Env. compliance report along with relevant documents with respect to the observations conveyed by MoEF&CC Sub Office, Jammu, for your kind consideration.

Thanking you,

Yours faithfully,

A. K. Nauriyal
Chief Executive Officer

Copy to:-

1. Compliance Monitoring Division, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi- for kind information please (email id: moefcc-monitring@gov.in)
2. Member Secretary, Jammu and Kashmir Pollution Control Committee, Forest Complex, Narwal, Jammu- for kind information please (email id: membersecretaryjkspcb@gmail.com)

(Part-I)

Compliance report w.r.t. monitoring of Ratle HE Project carried out by Deputy Director, MoEF&CC sub-Office, Jammu during Project visit on 6th May 2024

Sl. No.	Observation	Compliance report
i.	The construction work of the project has been initiated since 11.01.2022 but the work of CAT Plan has not been initiated yet **[Sp. Cond. No. (i)]**.	- The CAT Plan of Ratle HE Project prepared in 2012 by the Consultants is under updation/ revision for formulating a site specific Plan w.r.t. the working Plans of concerned Forest Divisions. - **Vide LOA dated 17.05.2024, the consultancy services of NEERI, Nagpur** have been hired for formulation of comprehensive site-specific CAT Plan and the microplanning of CAT Plan is under progress by NEERI. - After obtaining approval from PCCF(HoFF), J&K/ GOJK, the implementation of CAT Plan shall be started through J&K Forest Department (**Annexure-I**).
ii.	PP informed that the commitments will be fulfilled after the final approval of RR Plan **[Sp. Cond. No. (ii)]**.	- R&R Package for Ratle HE Project has been approved by GOJK vide Order dated 16.08.2024 (**Annexure-II**). - The R&R Plan, Local Area Development Plan (including Skill Development Activities) and CSR Activities are being processed for implementation through Commissioner R&R/ District Administration. The necessary budget provision for same has also been kept by RHPCL.
iii.	PP informed that RR plan has been approved by the standing committee but final approval has yet to be accorded. Hence, Rehabilitation and Resettlement plan has yet to be implemented **[Sp. Cond. No. (iii)]**.	- Revised R&R Plan for the Project has been approved by GOJK vide Order dated 16.08.2024. - The same is being processed for implementation through Commissioner R&R/ District Administration.

iv.	PP informed that Monitoring Committee for R&R will be constituted after finalization of RR plan **[Sp. Cond. No. (iv)]**.	- Earlier, the R&R Monitoring Committee for Ratle HE Project was constituted by GOJK in 2014 vide Order dated 12.02.2014. - However, after approval of revised R&R Plan by GOJK in August 2024, a new proposal shall be submitted shortly for re-constitution of R&R monitoring Committee.
v.	PP has not installed any Continuous Monitoring system for environmental flow measurement neither displayed this data nor submitted any data related to environmental flow to sub Regional office of Ministry **[Sp. Cond. No. (ix)]**.	- The Dam is not yet been constructed, as such, the river is flowing with its normal seasonal discharge. - The continuous monitoring system for environmental flow measurement shall be installed once the Dam structure is completed. - Accordingly, the data related to environmental flow shall be submitted to sub Regional office of Ministry, regularly.
vi.	PP has not installed the real time telemetry and data acquisition system including all weather hydro metrological stations for in-flow monitoring and advance flood warning. However, agree to comply before commissioning of the project **[Sp. Cond. No. (x)]**.	- An Automatic Water Level Recorder (AWLR) has been installed on river Chenab (upstream of Dam site), as part of Early Flood Warning System and the data is being monitored in real time and stored at NHPC Master Control Room (**Annexure-III**). - An All-Weather Station has also been installed by the Project at the colony area and the data is being collected round the clock (**Annexure-IV**).
vii.	Compensatory Afforestation Programme on 277.84 ha of land with 13 plant species has not been initiated yet. However, PP informed that 179.71 lakhs have been deposited to the State forest department for undertaking the Compensatory Afforestation Programme **[Sp. Cond. No. (xi)]**.	- Vide letter No. RATLE/CE/2024/E-47 dated 12.08.2024, J&K Forest Department has again been requested to provide the physical and financial progress of Compensatory Afforestation works against the funds amounting to Rs. 179.71 Lakh deposited with J&K Forest Department. - The details of Compensatory Afforestation works undertaken by J&K Forest Department are still awaited.

viii.	Biodiversity Conservation and Wildlife Management Plans has not been initiated yet. PP has not submitted any status report for the same **[Sp. Cond. No. (xiii)]**.	- Biodiversity Conservation and Management Plan stands submitted to J&K Forest Department vide letter No. RATLE/GM(C-I)/2022/62 dated 29.09.2022. - Subsequently, the matter was discussed with J&K Forest Department in review meeting held by Nodal Officer (FCA)/Chief Conservator of Forests, UT J&K on dated 25.11.2022 and with Conservator of Forests, Chenab Circle, Doda at Kishtwar on 15.03.2023 and 07.09.2024, respectively. - Vide letter No. RATLE/CE/2024/E-46 dated 12.08.2024, J&K Forest Department has again been requested for an early finalization and approval of Biodiversity Conservation and Wildlife Management Plan of Ratle HE Project. - The matter is under regular pursuance with J&K Forest Department for timely approval and implementation of the Plan.
ix.	PP has not initiated the Local Area Development Activities (LADA). However, informed that same will be implemented by the Deputy Commissioner, Kishtwar **[Sp. Cond. No. (xvi)]**.	- Local Area Development Activities (LADA) Component is a part of overall R&R Package approved by GOJK vide Order dated 16.08.2024 for a total cost of Rs.120.3216 Crore. - The Local Area Development Activities shall be undertaken shortly though Commissioner, R&R, Ratle HEP i.e. Deputy Commissioner, Kishtwar.
x.	PP informed that the LADA activities will be implemented by the Deputy Commissioner, Kishtwar **[Sp. Cond. No. (xvii)]**.	- Local Area Development Activities (LADA) Component is a part of overall R&R Package approved by GOJK vide Order dated 16.08.2024 for a total cost of Rs.120.3216 Crore. - The Local Area Development Activities shall be undertaken shortly though Commissioner, R&R, Ratle HEP i.e. Deputy Commissioner, Kishtwar.

xi.	PP has not submitted any detail of tie ups between existing city hospitals or district hospital Kishtwar for disposal of Bio-medical waste **[Sp. Cond. No. (xviii)]**.	- An agreement has been made with M/s Kashmir Health Care Systems, Pulwama, J&K (authorized by J&K Pollution Control Committee) vide No. KHCS/24/928 for collection of biomedical waste generated by M/s MEIL, Ratle HEP, Drabshalla and its scientific treatment at their facility at Pulwama, Kashmir, as per Bio Medical Waste (Management & Handling) Rules 2016 (**Annexure-V**).
xii.	PP has written a letter to the PHE Department for the permission of six bore well, but didn't submitted any clearance letter, Moreover the construction work of the project was initiated in 2022 but PP has obtained the CTE in 2024 under Consent No. PCC/digitat/ 24033871690 of 2024 **[Sp. Cond. No. (xix)]**.	- During initial phase of Project also in 2022, the Consent to Establish (CTE) had been obtained from J&K Pollution Control Committee in favour of 850 MW Ratle HE Project vide Order dated 16.06.2022 (**Annexure-VI**). - As intimated by M/s MEIl, they have applied to J&K PHE Department for permission to install Borewell and are awaiting NOC for the same.
xiii.	Water sprinkling arrangements has been made by PP to suppress the fugitive emissions. But fugitive dust emissions were observed near the dam site during the site visit **[Gen. Cond. No. (iv)]**.	- As intimated by M/s MEIL, a fleet of 3 Water Tankers is under deployment for sprinkling of water at work sites 24X7 for suppression of dust arising out of construction activities. The fleet of water Tankers will be further strengthened to enhance the water sprinkling to mitigate fugitive dust emissions effectively.
xiv.	PP has not constituted the MDMC committee yet **[Other Cond. No. (10)]**.	- In Dec 2023, the proposal was submitted to MoEF&CC, sub Office, Jammu for constitution of multi-disciplinary committee to oversee the implementation of environmental safeguard measures at Ratle HEP. - Subsequently, as suggested by MoEF&CC sub Office, Jammu, the proposal for constitution of MDMC has been submitted to MoEF&CC, New Delhi vide communication dated 12.09.2024 (**Annexure-VII**).

xv.	PP informed that the information about the grant of EC has been advertised in two local newspapers widely circulated in the region around the Project site, but not submitted the copy of the advertisement to sub office, Jammu **[Other Cond. No. (12)].**	- The information pertains to 2012-13 when the Project was being taken up by JKPDC. - The Jammu and Kashmir Power Development Corporation has been requested to provide a copy of the advertisement published in two local newspapers at that time of grant of EC to Ratle HE Project in 2012. The information is awaited from JKPDC. - As soon as the above information is received from JKPDC, the same shall be submitted to MoEF&CC sub Office, Jammu for kind information.
	EC letters and latest compliance reports are not uploaded on the company's website.	EC letters and the six monthly compliance reports have been uploaded on the website of RHPCL i.e. www.rhpcindia.com.

PART-II & PART-III
DESCRIPTIVE REPORT ON STATUS OF COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE (EC) & ENVIRONMENTAL MANAGEMENT
J-12011/39/2010-IA.1 dated 27.09.2021

1. SPECIFIC CONDITIONS:

<table>
<tr><th>S. No.</th><th>EC Conditions</th><th>Remarks of MoEF&CC Regional Office during the Site Visit</th><th>Compliance</th></tr>
<tr><td>(i)</td><td>The Catchment Area Treatment (CAT) Plan as proposed in the EIA/EMP Report shall be undertaken in consultation with the State Forest Department and major work shall be completed before impounding of reservoir.
<table>
<tr><th>Item</th><th>I Year</th><th>II Year</th><th>III Year</th><th>IV Year</th><th>Total</th></tr>
<tr><td colspan="6">Biological Measures</td></tr>
<tr><td>Afforestation (ha)</td><td>2243</td><td>1747</td><td>923</td><td></td><td>4913</td></tr>
<tr><td>Enrichment Plantation (ha)</td><td>-</td><td>112</td><td>79</td><td>-</td><td>191</td></tr>
<tr><td>Pasture Development</td><td></td><td>376</td><td>195</td><td>-</td><td>591</td></tr>
<tr><td>Nursery Development (Nos)</td><td>3</td><td>-</td><td>-</td><td></td><td>3</td></tr>
<tr><td>Watch & Ward 240 (Nos)</td><td>240</td><td>240</td><td>240</td><td>960</td><td></td></tr>
<tr><td colspan="6">Engineering Measures</td></tr>
<tr><td>Contour Bunding (ha)</td><td>434</td><td>409</td><td>324</td><td>171</td><td>1338</td></tr>
<tr><td>Check Dams (Nos)</td><td>50</td><td>25</td><td>30</td><td>20</td><td>125</td></tr>
</table></td><td>Not Complied: The construction work of the project has been initiated since 11.01.2022 but the work of CAT Plan has not been initiated yet.</td><td>Kindly refer Sl. No. i) of Part-I Compliance Report.</td></tr>
<tr><td>(ii)</td><td>All the commitments made during the public hearing shall be fulfilled completely.</td><td>Not Complied: PP informed that the commitments will be fulfilled after the final approval of RR Plan.</td><td>Kindly refer Sl. No. ii) of Part-I Compliance Report.</td></tr>
</table>

(iii)	The details of land holding of project affected persons whose land is being acquired shall be submitted to this ministry. The R&R benefits for the land losing households will be as per the National Rehabilitation and Resettlement Policy, 2007 (NRRP, 2007) or as per the State Rehabilitation and Resettlement Policy, whichever is higher. Adequate publicity of the compensation package shall be made in the affected villages.	**Not Complied:** PP informed that RR plan has been approved by the standing committee but final approval has yet to be accorded. Hence, Rehabilitation and Resettlement plan has yet to be implemented.	- R&R Package for Ratle HE Project has been approved by GOJK vide Order dated 16.08.2024 (**Annexure-II**). - JKPDC has been requested to provide the relevant information pertaining to previous period 2011 to 2013. - As soon as the information is received from JKPDC, the same will be submitted to MoEF&CC.
(iv)	A Monitoring Committee for R&R shall be constituted which must include representatives of project affected persons from SC/ST category and a women beneficiary.	**Not Complied:** PP informed that Monitoring Committee for R&R will be constituted after finalization of RR plan.	Kindly refer **Sl. No. iv)** of Part-I Compliance Report.
(v)	Consolidation and compilation of muck shall be carried-out only in the designated muck dumping sites as submitted in the EIA/EMP report. As per the proposed muck disposal plan, out of 24.4 lakh m3 of muck to be generated due to excavation, about 50% (i.e.12.2 lakh m3) will be utilized for construction purpose and the remaining 12.2 lakh m3 will be dumped at the 3 designated areas in an allocated area of 30.59 ha. The identified muck dumping sites shall be at-least 30m horizontally away from the edge of the river corresponding to high flood level (HFL).	**Not Complied:** PP has dumped the muck in the river at several places, moreover the designated site is less than 30m horizontally away from the edge of the river.	- Three (03) designated muck disposal sites stand handed over to M/s MEIL for proper disposal of muck. - The approach roads to Muck Disposal sites -I & II (have been developed by the Contractor. - Muck Disposal sites -I & II (downstream of Dam site) on right bank and left bank of river respectively, have been used by the Contractor for dumping of the muck. - As per the details provided by the Contractor, substantial amount of generated muck has been utilized by the Contractor. - Some part of generated muck has been temporarily stacked by MEIL along the river bank on right side and then across river left side for construction of coffer dykes/Dams, so as to isolate river area for construction of Main Dam. - The Contractor has confirmed that temporarily stacked muck/ muck dumped near the river will be suitably retrieved and relocated for use in the Project construction works.

			- To avoid any spillage of muck into the river, the dumping of muck on the right bank of river Chenab has been stopped since July 2024 under intimation to the District Administration/ GOJK. - Further, an alternative location within the acquired Project land is now being utilized by the Contactor for temporary storage/ stacking of muck.
(vi)	Muck dumping sites should be handed over to Forest Department only after restoration including plantations etc.	**Agree to Comply:** PP is agree to handed over the muck dumping site to Forest Department only after restoration including plantations etc.	--------
(vii)	A provision of an additional unit of 30 MW has been made in the project, which will be running for 24 hours continuously to maintain a minimum discharge of 33.43, cumecs/sec, during the lean season from November-February (About 27% of lean season) at the downstream, shall be strictly adhered-to. Monsoon flow shall be at least 30% of the Monsoon discharge.	**Agree to Comply:** The project is under construction phase, PP is agree to install an additional unit of 30 MW in the project, which will be running for 24 hours continuously to maintain a minimum discharge of 33.43, cumecs/sec, during the lean season.	--------
(viii)	An Auto mechanism /by pass arrangement in dam design shall be made to ensure release of environmental flow water in event of the 30 MW turbine or when it is put under maintenance.	**Agree to Comply:** The project is under construction phase, PP is agree to comply this condition before commissioning of the project.	--------
(ix)	Continuous Monitoring system for environmental flow measurement shall be installed and data shall be displayed at appropriate site for information of civil society, stake holders and regulators. Six monthly results shall be submitted to the regional Office of the Ministry and SPCB.	**Agree to Comply:** PP has not installed any Continuous Monitoring system for environmental flow measurement neither displayed this data nor	--------

		submitted any data related to environmental flow to sub Regional office of Ministry. However, agree to comply agree to comply before commissioning of the project.	
(x)	Real time telemetry and data acquisition system including all weather hydro metrological stations shall be installed for in-flow monitoring and advance flood warning. Advance flood warning and advance communication systems shall be installed in consultation with the downstream District Authorities.	**Not Complied:** PP has not installed the real time telemetry and data acquisition system including all weather hydro metrological stations for in-flow monitoring and advance flood warning. However, agree to comply before commissioning of the project.	Kindly refer **Sl. No. vi)** of Part-I Compliance Report.
(xi)	As proposed in the EMP, the Compensatory Afforestation Programme on 277.84 ha of land with 13 plant species shall be undertaken in consultation with the State Forest Department. Native species should be preferred in plantation. The allocated grant of Rs.1467.59 lakhs for this purpose shall be fully utilized and not to be diverted for any other purpose.	**Not Complied:** Compensatory Afforestation Programme on 277.84 ha of land with 13 plant species has not been initiated yet. However, 179.71 lakhs have been credited to the State forest department for undertaking the Compensatory Afforestation Programme.	Kindly refer **Sl. No. vii)** of Part-I Compliance Report.
(xii)	Greenbelt development along the approach roads, residential areas, office complex, dam site and other working areas shall be undertaken. The allocated budget of Rs.73 lakhs for this purpose shall be fully utilized and not to be diverted to any other purpose..	**Agree to Comply:** The project is under construction phase and PP informed that the green belt will be developed as per the CPCB guideline during the completion phase. The budget for the green belt has been allocated in the budget.	--------

(xiii)	As proposed in the EMP, the Biodiversity Conservation and Wildlife Management Plans shall be taken up and implementation shall be included in the sixth monthly compliance report to be submitted to the Ministry, including its Regional Office.	**Not Complied:** Biodiversity Conservation and Wildlife Management Plans has not been initiated yet. PP has not submitted any status report for the same.	Kindly refer **Sl. No. viii)** of Part-I Compliance Report.
(xiv)	Indigenous plant species should be used for implementation of Biodiversity Management Plan and for Compensatory Afforestation. Expertise from R&D Centers may be used for propagation techniques. Provision should also be made to include researchers to implement these Plans and carrying out plantation.	**Agree to Comply:** PP informed that implementation of Compensatory Afforestation and Biodiversity Management Plan will be undertaken by the State Forest Department as per the approved plan.	--------
(xv)	Equipment likely to generate high noise levels shall meet the ambient noise standards as notified under the noise Pollution (Regulation and Control) Rules 2000, as amended in 2010 under Environment Protection Act (EPA), 1986. For this, necessary insulation arrangement etc. to be ensured.	**Being Complied:** As per submitted data and during the monitoring the noise level was recorded below the ambient noise standards as notified under the noise Pollution (Regulation and Control) Rules 2000, as amended in 2010 under Environment Protection Act (EPA), 1986.	--------
(xvi)	A provision of Rs. 30 Crores earmarked towards the Local Area Development Activities (LADA) shall be fully utilized and not to be diverted for any other purpose. The implementation of activities as submitted to the Ministry shall be taken up as soon possible. In addition, a grant of Rs. 30 Crores earmarked for Corporate Social Responsibility (CSR) and Rs.30 Crores for skill development purpose shall also be duly utilized and not to be diverted for any other purpose	**Not Complied:** PP has not initiated the Local Area Development Activities (LADA). However, informed that same will be implemented by the Deputy Commissioner, Kishtwar.	Kindly refer **Sl. No. ix)** of Part-I Compliance Report.
(xvii)	LADA activities may be undertaken by M/s Ratle Hydro Electric Project Pvt. Ltd to enhance delivery mechanism for operational point of view.	**Not Complied:** PP informed that the LADA activities will be implemented by the Deputy Commissioner, Kishtwar.	Kindly refer **Sl. No. x)** of Part-I Compliance Report.

(xviii)	Tie-ups shall be made with existing city hospitals for disposal of Bio-medical waste in case district hospital at Kishtwar does not have the facility for handling biomedical waste as proposed in the report.	**Not Complied:** PP has not submitted any detail of tie ups between existing city hospitals or district hospital Kishtwar for disposal of Bio-medical waste.	Kindly refer **Sl. No. xi)** of Part-I Compliance Report.
(xix)	Any other clearance from other Organization/ department, if required, shall be obtained before commencement of the project.	**Not Complied:** PP has written a letter to the PHE Department for the six bore well, but didn't submitted any clearance letter, Moreover the construction work of the project was initiated in 2022 but PP has obtained the CTE in 2024 under Consent No. PCC/digital/ 24033871690 of 2024.	Kindly refer **Sl. No. xii)** of Part-I Compliance Report.
	B : GENERAL CONDITIONS:		
(i)	Adequate arrangement for providing free fuel like kerosene/wood/LPG shall be made at project cost for the labour engaged in the construction work so that indiscriminate felling of trees is prevented.	**Being Complied:** PP has established the mess for the staff and labour force engaged in the construction work.	--------
(ii)	Medical facilities as well as recreational facilities shall also be provided to labourers.	**Being Complied:** PP has established emergency first aid and medical care facility for the labourers.	--------
(iii)	All the labourers to be engaged for construction works shall be thoroughly examined by health personal and adequately treated before issuing them work permit.	**Being Complied:** PP informed that all the labourers to be engaged for construction works are being thoroughly examined by health personal prior to issuing them work permit.	--------

(iv)	No fugitive dust emissions should be observed at the construction sites. Water sprinkling arrangements should be made to suppress the fugitive emissions.	**Partially Complied:** Water sprinkling arrangements has been made by PP to suppress the fugitive emissions. But fugitive dust emissions were observed near the dam site during the site visit.	Kindly refer **Sl. No. xiii)** of Part-I Compliance Report.
(v)	Potable drinking water and proper sanitary facilities shall be provided for the labour force and the local area people.	**Being Complied:** Potable drinking water and proper sanitary facilities are being provided for the labour force.	--------
(vi)	Restoration of construction area including dumping site of excavated materials shall be ensured by levelling, filling up of burrow pits, landscaping etc. The area should be properly treated with suitable plantation.	**Agree to comply:** Currently the construction work is under progress for the dam construction and PP assured to comply this condition prior to commissioning of the project.	--------
(vii)	Environmental parameters shall be monitored regularly and six monthly reports shall be submitted to the regional Office of the Ministry and State Pollution Control Board for review.	**Being Complied:** PP is regularly submitting the six monthly compliance reports along with the data of monitoring to the Sub office of the Ministry.	--------
(viii)	The project proponent shall also submit six monthly compliance reports of the stipulated EC conditions (both hard copies as well as by e-mail) to the respective Regional Office of MoEF and State Pollution Control Board. Monitoring report and compliance report shall be up-loaded on the web-site of project proponent.	**Being Complied:** PP is regularly submitting the six monthly compliance reports to the Sub Office, Jammu and also uploading the monitoring report and compliance report on the web-site.	--------

Other Conditions:			
5.	The project proponent shall provide full cooperation and all required documents, data and access to the officials of Regional office of MOEF who would be monitoring the implementation of environmental safeguards.	**Being Complied:** PP has provided full cooperation and all required documents during the site visit.	--------
6.	Besides the above stated conditions M/S Ratle hydro Electric project Pvt. LTD and government of Jammu & Kashmir shall also be implement all other environmental safeguards, as proposed in EIA/EMP report and others reports from time to time. The J&K Government may also like to monitor implementation of EMP at regular interval.	Noted and agreed by the PP as informed during site visit.	--------
7.	Any change in the scope of the project shall be intimated to the Ministry and fresh approval, if required shall be taken from the Ministry.	Noted and agreed by the PP as informed during site visit.	--------
8.	Ministry reserve the right to add additional safeguard measures, subsequently, if found necessary and to take action including revoking of the clearance under the provisions of the environment Protection Act 1986 to ensure effective implementation of the suggested safeguard measures in the time bound and satisfactory manner.	Noted and agreed by the PP as informed during site visit.	--------
9.	The clearance letter is valid for a period of 10 years from the date of issue of this letter for commencement of construction work.	Noted and agreed by the PP as informed during site visit.	--------
10.	A multi-disciplinary committee for monitoring the implementation of environmental safeguards during construction shall be constituted by the project proponent in consultation with the Ministry as early as possible. The proponent shall Suggest the members and their profile for approval of ministry. Proponent shall organize six monthly meetings of the committee and submit the monitoring report to the ministry.	**Not Complied:** PP has not constituted the MDMC committee yet.	Kindly refer **Sl. No. xiv)** of Part-I Compliance Report.

11.	A copy of the clearance letter shall be sent by the proponent to local Panchayat, Zilla /parishad /Municipal corporation, urban local body and local NGO, if any from whom suggestions/ representations were received while processing the proposal. The clearance letter shall also be put on its websites by the project proponent.	**Being Complied:** PP informed that a copy of the clearance letter has been sent to the local Panchayat, Zilla /parishad /Municipal corporation, urban local body and local NGO. PP has also put on the clearance letter on its website.	--------
12.	The project proponent should advertise within 7 Days at least in two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned informing that has been accorded environmental clearance and copies of clearance letters are available with the state Pollution Control Board /Committee and may also be seen at website of the ministry of environment and forest at http://www.envfor.nic.in	**Partially Complied:** PP informed that the he has advertised the project has been accorded Environmental Clearance in two local newspapers widely circulated in the region around the project. However not submitted the detail of the same.	Kindly refer **Sl. No. xv)** of Part-I Compliance Report.
13.	After 5 years of the commissioning of the project, a study shall be undertaken regarding impact of the project on the environment and downstream ecology. The study shall be undertaken by an independent agency, to be decided in consultation with the Ministry.	**Noted and agreed by the PP** as informed during the site visit.	--------
14.	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) including the respective Regional office of MOEF and Zonal Office CPCB and SPCB.	**Being Complied:** PP is regularly submitting the six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data.	--------
15.	Any appeal against the Environmental clearance shall lie with the National Green Tribunal, if preferred with in a period of 30 days from the date of issue as, prescribed under section 10 of the National Green Tribunal Act 2010.	**Noted and agreed by the PP** as informed during the site visit.	--------

Annexure-12

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भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
क्षेत्रीय कार्यालय, चंडीगढ़, उपकार्यालय, जम्मू / Sub-office, Jammu,
Regional Office, Chandigarh

F.No.: 07-92/2022-RO (NZ) **August, 2024**

सेवा में,

अपर निदेशक
अनुपालना निगरानी प्रभाग
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
आई ० पी० भवन, जोर बाग़
नई दिल्ली- ११००० १ **(**ईमेल : moefcc-monitoring@gov.in**)**

Sub.: Environmental Clearance granted in favor of General Manager (Civil), M/s Ratle Hydroelectric Power Corporation Limited, Room No. 08, Block No. 2, NHPC Regional Office, JDA Commercial Complex No 1, Narwal, Jammu, Jammu & Kashmir-reg.

Ref: i) F.No. J-12011/39/2010-1A1 dated 12.12.2012
ii) F.No. J-12011/39/2010-IA.1 dated 27.09 2021

Madam,

It is bring to your kind notice that the above mentioned project was visited by the undersigned on 06.05.2024. The monitoring report (Annexure I) of the said project is enclosed herewith for perusal and further appropriate action with following observations:

i. The construction work of the project has been initiated since 11.01.2022 but the work of CAT Plan has not been initiated yet **[Sp. Cond. No. (i)].**
ii. PP informed that the commitments will be fulfilled after the final approval of RR Plan **[Sp. Cond. No. (ii)].**
iii. PP informed that RR plan has been approved by the standing committee but final approval has yet to be accorded. Hence, Rehabilitation and Resettlement plan has yet to be implemented **[Sp. Cond. No. (iii)].**
iv. PP informed that Monitoring Committee for R&R will be constituted after finalization of RR plan **[Sp. Cond. No. (iv)].**
v. PP has not installed any Continuous Monitoring system for environmental flow measurement neither displayed this data nor submitted any data related to environmental flow to sub Regional office of Ministry **[Sp. Cond. No. (ix)].**
vi. PP has not installed the real time telemetry and data acquisition system including all weather hydro metrological stations for in-flow monitoring and advance flood warning. However, agree to comply before commissioning of the project **[Sp. Cond. No. (x)].**
vii. Compensatory Afforestation Programme on 277.84 ha of land with 13 plant species has not been initiated yet. However, PP informed that 179.71 lakhs have been deposited to the State forest department for undertaking the Compensatory Afforestation Programme **[Sp. Cond. No. (xi)].**
viii. Biodiversity Conservation and Wildlife Management Plans has not been initiated yet. PP has not submitted any status report for the same **[Sp. Cond. No. (xiii)].**

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GOVERNMENT OF INDIA
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Regional Office, Chandigarh

ix. PP has not initiated the Local Area Development Activities (LADA). However, informed that same will be implemented by the Deputy Commissioner, Kishtwar **[Sp. Cond. No. (xvi)].**

x. PP informed that the LADA activities will be implemented by the Deputy Commissioner, Kishtwar **[Sp. Cond. No. (xvii)].**

xi. PP has not submitted any detail of tie ups between existing city hospitals or district hospital Kishtwar for disposal of Bio-medical waste **[Sp. Cond. No. (xviii)].**

xii. PP has written a letter to the PHE Department for the permission of six bore well, but didn't submitted any clearance letter, Moreover the construction work of the project was initiated in 2022 but PP has obtained the CTE in 2024 under Consent No. PCC/digitat/ 24033871690 of 2024 **[Sp. Cond. No. (xix)].**

xiii. Water sprinkling arrangements has been made by PP to suppress the fugitive emissions. But fugitive dust emissions were observed near the dam site during the site visit **[Gen. Cond. No. (iv)].**

xiv. PP has not constituted the MDMC committee yet **[Other Cond. No. (10)].**

xv. PP informed that the information about the grant of EC has been advertised in two local newspapers widely circulated in the region around the Project site, but not submitted the copy of the advertisement to sub office, Jammu **[Other Cond. No. (12)].**

EC letters and latest compliance reports are not uploaded on the company's website.

Submitted for necessary actions, as deemed fit, pl.

Annexure: As stated.

Signed by Khursid Alam Khan
Date: 16-08-2024 14:50:57

भवदीय
हस्ता/-
डॉ0 खुर्शीद आलम खान
उप निदेशक
उप कार्यालय, जम्मू

Copy to:

1. General Manager (Civil), M/s Ratle Hydroelectric Power Corporation Limited, Room No. 08, Block No. 2, NHPC Regional Office, JDA Commercial Complex No 1, Narwal, Jammu, Jammu & Kashmir (Email : rhpcl@nhpc.nic.in).
2. Compliance Monitoring Division, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi (Email: moefcc-monitoring@gov.in).
3. Member secretary, Jammu & Kashmir Pollution Control Committee, Forest Complex, Gladni, Narwal, Jammu (Email: membersecretaryjkspcb@gmail.com) for necessary action.

Deputy Director/Scientist 'C'

Annexure-13 528

Speed Post/Online

F. No. IA-J-11014/257/2024-IA-I
Government of India
Ministry of Environment, Forest and Climate Change
(Compliance & Monitoring Division-IA Division)
*****

Indira Paryavaran Bhavan
Jor Bagh Road, Aliganj
New Delhi-110 003
Email: moefcc-monitoring@gov.in

Dated: 22nd October, 2024

Sub: Show Cause Notice under Section 5 of Environment (Protection) Act, 1986 for Non- Compliances observed with respect to the project "Ratle Hydroelectric Project (850MW) in Village Drabshala, Kishtwar District of Jammu & Kashmir by M/s Ratle Hydro Electric Project Pvt Ltd." -reg.

Ref: i. Ministry's EC letter no. J-12011/39/2010-IA-I dated 12.12.2012 and transfer of EC from M/s GVK Ratle Hydro Electric Project Pvt. Ltd. to M/s Ratle Hydroelectric Power Corporation Ltd. vide letter dated 27.09.2021
ii. SRO Jammu Monitoring report No. 07-92/2022 RO(NZ) dated 16.08.2024

WHEREAS, Environmental Clearance (EC) was granted to M/s GVK Ratle Hydro Electric Project Pvt. Ltd. located at Village Drabshala, Kishtwar District of Jammu & Kashmir vide letter No J-12011/39/2010-IA-I dated 12.12.2012 and transfer of EC from M/s GVK Ratle Hydro Electric Project Pvt. Ltd. to M/s Ratle Hydroelectric Power Corporation Ltd. vide letter dated 27.09.2021, subject to implementation of various conditions and environmental safeguards contained therein, and

2. WHEREAS, the project was monitored for ascertaining compliance to the conditions stipulated in the aforesaid environmental clearance by the Sub-Regional Office of the Ministry at Jammu on 06.05.2024 The report was submitted to the Ministry vide letter No. 07-92/2022-RO (NZ) dated 16.08.2024. **(Copy enclosed).**

3. WHEREAS, the inspection report dated 16.08.2024 was examined in the Ministry and following are the observed significant non-compliance with respect to EC issued by the Ministry:

i. The construction work of the project has been initiated since 11.01.2022 but the work of CAT Plan has not been initiated yet **(Specific Condition: I).**

ii. Commitments made during public hearing has not been fulfilled and only assurance has been given that the same will be fulfilled after the final approval of RR Plan **(Specific Condition: ii)**

iii. Final approval of R&R Plan has not been approved yet and Rehabilitation and Resettlement Plan has to be implemented yet **(Specific Condition: iii)**

iv. Monitoring Committee for R&R has not been constituted yet and only assurance has been provided that the same will be constituted after finalization of R&R Plan **(Specific Condition: iv)**

v. Muck has been dumped in the river at several places against the stipulated condition **(Specific condition: v)**

vi. An additional unit of 30 MW in the project, which will be running for 24 hours continuously has not been installed yet **(Specific Condition: vii)**

vii. Continuous monitoring system for environmental flow measurement has not been displaying data not submitting any data related to environmental flow to SRO **(Specific Condition: ix)**

viii. Real time telemetry and data acquisition system has not been installed for in-flow monitoring and advance flood warning **(Specific Condition: x)**

ix. Compensatory afforestation programme on 277.84 ha of land with 13 plant species has not been initiated yet **(Specific Condition: xi)**

x. Greenbelt has not been developed yet **(Specific Condition: xii)**

xi. Biodiversity Conservation and Wildlife Management Plans has not been initiated yet **(Specific Condition: xiii)**

xii. Local Area Development Activities (LADA) have not been initiated yet **(Specific Condition: xvi, Specific Condition: xvii)**

xiii. Any detail of tie ups between existing city hospitals or district hospital Kishtwar for disposal of Bio-medical waste has not been submitted yet **(Specific Condition: xviii)**.

xiv. The construction work of the project was initiated in 2022 but PP has obtained CTE in 2024 **(Specific Condition: xix)**

xv. Fugitive dust emissions were observed near the dam site during the site visit **(General Condition: iv)**

xvi. Multi-disciplinary committee for monitoring the implementation of environmental safeguards has not been constituted yet **(other conditions: 10)**

xvii. Details of EC advertised in local newspapers has not been provided yet **(other conditions: 12)**

4. WHEREAS, discrepancy is noted in the land details provided in the Environmental Clearance (EC) dated 12.12.2012 of the project and Part 1 of the inspection report submitted by the SRO Jammu.

5. In the above context, your attention is drawn to provision of Section 5 of the Environment (Protection) Act, 1986 which is as reproduced below:

"For the avoidance of doubts, it is hereby declared that the power to issue directions under this section includes power to direct-

a. The closure, prohibition or regulation of any industry, operation or process; or

b. Stoppage or regulation of the supply of electricity or water or any other service."

6. **Now, therefore, you are directed to submit your point-wise response to the aforesaid non-compliance of EIA Notification, 2006 and explain as to why this Ministry should not take action against you under the provisions of Environment (Protection) Act, 1986 for the non-compliance of the environmental conditions mentioned above. You are also advised to submit your reply within 30 (Thirty) days of the receipt of this Notice failing which the Ministry will be constrained to initiate action, as deemed fit and appropriate under the provision of Section 5 of the Environment (protection) Act, 1986 and in the circumstances of the case, with or without any further notice to the Project. In your response, it may also be clearly stated whether a hearing is required by the project proponent before a final order is passed by this Ministry. Further, this Show Cause is without prejudice to any other legal action which may be taken against you.**

This issues with the approval of the Competent Authority.

To,
General Manager (Civil),
M/s Ratle Hydroelectric Power Corporation Limited,
Room No.08, Block No. 2, NHPC Regional Office,
JDA Commercial Complex No 1, Narwal, Jammu,
Jammu & Kashmir
(Email :rhpcl@nhpc.nic.in)

(Dr. Shruti Rai Bhardwaj)
Director/Scientist 'F'

Copy to:

1. Deputy Director General of Forest (C), Regional Office-Chandigarh, Ministry of Environment, Forest and Climate Change, Bays No. 24-25, Sector 31 A, Dakshin Marg, Chandigarh – 160030
2. Deputy Inspector General of Forest (C), Sub Regional Office-Jammu, Plot no. 397 A Gandhinagar, Jammu-180004
3. Member secretary, Jammu & Kashmir Pollution Control Committee, Forest Complex, Gladni, Narwal, Jammu-180002
4. The Member Secretary, Hydro & River Valley, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi-03 *(For information and further necessary action)*
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar, Delhi-110032

(Dr. Shruti Rai Bhardwaj)
Director/Scientist 'F'

रतले हाइड्रोइलेक्ट्रिक पॉवरकॉरपोरेशन लिमिटेड

(एनएचपीसी लिमिटेड और जेकेएसपीडीसी लिमिटेड का एक संयुक्त उद्यम)

RATLE HYDROELECTRIC POWER CORPORATION LIMITED

(A Joint Venture of NHPC Limited and JKSPDC Limited)

सन्दर्भसं: / Ref. No. **RATLE/CEO/2022/GM(C-I)/330** **दिनांक / Date:** 27-09-2022

M/s Megha Engineering & Infrastructures Limited
S2, Technocrat Industrial Estate,
Balanagar, Hyderabad,
Telangana- 500 037

Kind Attention: Mr. B. Umamaheswara Reddy, VP
E-mail: umr@meilgroup.com

Sub:- Compliance of provisions pertaining to Ecological Balance- Regarding disposal of muck at designated sites only

Ref:- i) RHPCL letter No. RATLE/CEO/2022/281 dated 13-07-2022
ii) RHPCL letter No. RATLE/CEO/2022/257 dated 10-06-2022
iii) LOA No. RATLE/CEO/2022/145 dated 18-01-2022

Sir,

Please refer to our aforementioned letters on the cited subject. As per Clause 53 of GCC of Contract Agreement and also mentioned in Part A : Specific Conditions of Environment Clearance letter of Ratle HEP dated 12-12-2012 and 27-09-2021, the muck is to be disposed of only at designated muck disposal sites and further, proper consolidation and compaction of disposed muck is to be carried out avoiding any spillage of muck or debris into the river/ streams.

In this regard, District Magistrate, Kishtwar has also issued Order vide No. DM/K/22-23/1707-08 dated 24-09-2022 (copy enclosed) vide which all the executing Agencies/ Projects in Kishtwar have been restrained for dumping of muck at other than designated muck dumping sites. Further, providing and maintaining of proper crate walls/ breast walls has also been directed vide the above Order.

In view of above, it is again requested to dispose of the muck only at designated sites strictly as per directions conveyed vide aforementioned Order of DM, Kishtwar and also provided in Part A: Specific Conditions contained in Env. Clearance letter.

Thanking you.

Yours faithfully,
For and on behalf of RHPCL

27/9/22

General Manager (Civil)

Copy for information to:-

1. Chief Executive Officer, Ratle Hydroelectric Power Corporation Limited, Kishtwar, UT of J&K.
2. Sh. Narendra Reddy, M/s MEIL, Hyderabad (narendrareddy.g@meilgroup.org).
3. Sh. P. Sudhakar Reddy, M/s MEIL, Kishtwar (psudhakar@meilgroup.com).

रतले हाइड्रोइलेक्ट्रिक पॉवरकॉरपोरेशन लिमिटेड
(एनएचपीसी लिमिटेड और जेकेएसपीडीसी लिमिटेड का एक संयुक्त उद्यम)
RATLE HYDROELECTRIC POWER CORPORATION LIMITED
(A Joint Venture of NHPC Limited and JKSPDC Limited)

सन्दर्भसं: / Ref. No. RATLE/GM(C)/2022/ 66 दिनांक / Date: 07-11-2022

M/s Megha Engineering & Infrastructures Limited
S2, Technocrat Industrial Estate,
Balanagar, Hyderabad,
Telangana- 500 037

Kind Attention: Mr. B. Umamaheswara Reddy, VP
E-mail: umr@meilgroup.com

Sub:- Compliance of provisions pertaining to Ecological Balance- Regarding disposal of muck at designated sites only

Ref:- i) RHPCL letter No. RATLE/CEO/2022/GM(C-I)/330 dated 27-09-2022
ii) RHPCL letter No. RATLE/CEO/2022/281 dated 13-07-2022
iii) RHPCL letter No. RATLE/CEO/2022/257 dated 10-06-2022
iv) LOA No. RATLE/CEO/2022/145 dated 18-01-2022

Sir,

Please refer to our aforementioned letters regarding disposing of muck at designated muck disposal sites only. Despite making so much correspondence on the subject matter, not much improvement has been noticed on part of M/s MEIL. It is reiterated here that it is quite a serious matter which may otherwise have serious implications including monetary penalty and/or legal action against the defaulters.

In this regard, some complaints have also been received by the Office of Deputy Commissioner, Kishtwar that muck of Ratle HEP is being disposed of at undesignated sites and in an unscientific way without providing proper retaining structures / crate walls at disposal sites.

It is again mentioned that as per Clause 53 of GCC of Contract Agreement and Part A: Specific Conditions of EC letter of Ratle HEP, the muck is to be disposed of only at designated muck disposal sites and further, proper consolidation and compaction of disposed muck is to be carried out avoiding any spillage of muck or debris into the river/ streams.

कार्यालय: कमरा नंबर 08, ब्लॉक नंबर 02, एनएचपीसी क्षेत्रीय कार्यालय, जेडीए वाणिज्यिक परिसर नंबर 01, नरवाल, जम्मू, (जम्मू और कश्मीर) - 180006
Office : Room No. 08, Block No. 02, NHPC Regional Office, JDA Commercial Complex No. 01, Narwal, Jammu, (J&K) – 180006
Camp Office : NHPC Office Complex, Sector-33, Faridabad – 121003 (Haryana)
CIN: U40105JK2021GOI012380 E-mail id: rhpcl@nhpc.nic.in

रतले हाइड्रोइलेक्ट्रिक पॉवरकॉरपोरेशन लिमिटेड
(एनएचपीसी लिमिटेड और जेकेएसपीडीसी लिमिटेड का एक संयुक्त उद्यम)
RATLE HYDROELECTRIC POWER CORPORATION LIMITED
(A Joint Venture of NHPC Limited and JKSPDC Limited)

In this regard, District Magistrate, Kishtwar has already issued Order vide No. DM/K/22-23/1707-08 dated 24-09-2022 citing various NGT rulings and other statutory regulations, a copy of which stands duly communicated to M/s MEIL vide letter No. RATLE/CEO/2022/GM(C-I)/330 dated 27-09-2022.

It may be noted here that proper disposal of muck is sole responsibility of M/s MEIL and RHPCL shall not be liable for any sort of penalty (whether monetary or legal action), if arises in future due to non-compliance of proper Muck Disposal.

In view of above deliberations, it is once again requested to dispose of the muck only at designated sites as provided in the GCC of Contract Agreement and Part A: Specific Conditions of Env. Clearance letter. Further, muck/debris dumped, if any, at undesignated location may be immediately relocated to designated sites to avoid violation of laid down legal norms.

Thanking you,

Yours faithfully,
For and on behalf of RHPCL

7/11/22
General Manager (Civil)

Copy for information to:-

1. Chief Executive Officer, RHPCL, Kishtwar, UT J&K.
2. Chief Engineer (Civil) I/c Env Division, Ratle HEP, Kishtwar.
3. Sh. Narendra Reddy, M/s MEIL, Hyderabad (narendrareddy.g@meilgroup.org).
4. Sh. P. Sudhakar Reddy, M/s MEIL, Kishtwar (psudhakar@meilgroup.com).
5. MEIL Office, Hyderabad (ssrvk.reddy@meilgroup.com)

रतले हाइड्रोइलेक्ट्रिक पॉवर कॉरपोरेशन लिमिटेड
(एनएचपीसी लिमिटेड और जेकेएसपीडीसी लिमिटेड का एक संयुक्त उद्यम)
RATLE HYDROELECTRIC POWER CORPORATION LIMITED
(A Joint Venture of NHPC Limited and JKSPDC Limited)

सन्दर्भसं: / Ref. No. **RATLE/CEO/2024/**798 **दिनांक / Date:** 26-07-2024

M/s Megha Engineering & Infrastructures Limited
S2, Technocrat Industrial Estate,
Balanagar, Hyderabad,
Telangana- 500 037

Kind Attention: Mr. B. Umamaheswara Reddy, VP
E-mail: umr@meilgroup.com

Sub:-Strict compliance of condition pertaining to disposal of muck, only at designated sites

Ref:- LOA No. RATLE/CEO/2022/145 dated 18-01-2022

Sir,

As per **Sl. No. (v) of Specific Conditions** of Environment Clearance letter of MoEF&CC, the unused muck is to be disposed off along with its consolidation and compaction, only at three designated muck disposal sites. Further, the muck disposal is to be carried out at these sites at least 30mtr horizontally away from the edge of the river corresponding to HFL, avoiding any spillage of muck or debris into the river.

The instructions in this regard, have been conveyed to MEIL from time to time, for ensuring the strict compliance, as also stipulated in Clause 53 of GCC (Contract Agreement).

However, it has been observed at site that excavated muck and debris arising out of construction works are not being dumped properly at designated sites. This non-compliance of Environment Clearance condition is a matter of serious concern and the violation of norms may attract the penal action in terms of provisions contained in Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981, EPA, 1986 and guidelines issued by Hon'ble NGT, CPCB, JKPCC, etc. in this regard.

It is reiterated here that RHPCL shall not be liable for any sort of penal action, whether monetary penalty or legal action, if arises in future due to non-compliance of proper muck disposal and the same shall be the sole responsibility of MEIL.

रतले हाइड्रोइलेक्ट्रिक पॉवर कॉरपोरेशन लिमिटेड
(एनएचपीसी लिमिटेड और जेकेएसपीडीसी लिमिटेड का एक संयुक्त उद्यम)
RATLE HYDROELECTRIC POWER CORPORATION LIMITED
(A Joint Venture of NHPC Limited and JKSPDC Limited)

It is brought out here that Project land including three designated muck disposal sites with sufficient area, stands already handed over to MEIL. If required, M/s MEIL may explore the possibility of temporarily utilizing other areas within the handed over land, for stacking of the muck. In case of additional land requirement, the possibility may be explored by MEIL for temporary hiring of suitable land in nearby areas, at their own cost.

It is, therefore, again requested to ensure that the muck and debris arising out of construction activities of Ratle HE Project are dumped only at handed over designated Muck Disposal sites, without any spillage into the river Chenab or any other water body.

It is also requested to immediately relocate the muck/debris, if dumped at any unauthorized location, to the designated muck disposal sites of the Project.

Thanking you,

Yours faithfully,

A. K. Nauriyal
Chief Executive Officer

Copy to the:-

1. General Manager (Civil)-I/II/III, RHPCL, Kishtwar- for ensuring the necessary compliance.
2. Sh. M. S. Pai, AVP, M/s MEIL (sainathpai.m@meghaeng.com).
3. Sh. Harpal Singh, COO, MEIL (harpalsingh@meilgroup.com).
4. Sh. S. N. Jha, CGM, M/s MEIL (sachindranath.jha@meghaeng.com).
5. Sh. Mallikarjuna Reddy, M/s MEIL, Hyderabad (mallikarjuna.k@ meilgroup.in).
6. MEIL Office, Hyderabad (ssrvk.reddy@meilgroup.com).

Megha Engineering & Infrastructures Ltd.

An ISO 9001-2008 Company
S-2, Technocrat Industrial Estate, Balanagar, Hyderabad-500037, T.S., INDIA
Tel: +91 40 4460 9100, +91 40 4433 6700, Fax: +91 40 4433 6800
E-mail: info@meil.in, Visit us: www.meil.in U45202TG2006PLV050271

MEIL/RHPCL/24/07/250 Dt: 30th July, 2024

The Chief Executive Officer,
Ratle Hydro Electric Power Corporation Ltd,
Kishtwar, UT of Jammu & Kashmir.

Sub.: Strict Compliance of condition pertaining to disposal of muck measures only at designated sites.

Ref: No. Ratle/CEO/2024/798

Sir,

This is in reference to above referred communication in which direction have been conveyed by your good office citing the strict compliance of condition pertaining to the disposal of muck, only at designated site. We acknowledge the concerns in your correspondence regarding muck disposal and compliance with our contractual obligation. We also appreciate your attention in detail and like to address these concerns, emphasizing our commitment to maintaining environmental standards.

M/S MEIL has been diligently following the compliance requirements as stipulated in clause 53 of the general conditions of contract (GCC). We have established through protocols to ensure that our muck disposal processes align with contractual obligations.

Any muck that spills from the crate protection or gabion in the muck disposal area will be promptly retrieved and relocated to the designated muck disposal sites. This muck will be reused for making gabion work or for generating aggregate for construction work.

We admit that we have designated three muck disposal sites in the downstream area for muck management. Out of these, two sites have been fully developed and are currently being utilized for muck disposal, effectively minimizing environmental impact.

It is further to apprised that the designated area given for dumping is not sufficient for the muck to be generated for construction of this project. As per conditions of the environment clearance muck are to be dumped 30m away from the edge of the river. But the same was not possible, as leaving 30m from the river edge, no sufficient space was available and dumping was continued after putting crate work in the river bed along hill slope.

Additionally, the area in Kulligadh also does not provide adequate space for dumping, further exacerbating our situation.

As part of our operations, we have been actively searching for suitable land in the nearby area to accommodate the muck generated from our work. Unfortunately, we found that there is no available land nearby, that meet our requirements.

Contd...

Harpal Singh
MEIL

In light of these challenges, we kindly request that the RHPC considers assigning an alternative area that would be more suitable for our muck stacking and storage needs.

Thank you for your understanding and continued support.

Submitted for your kind information please.

Thanking you sir,

Yours Faithfully,

30/7/24

S N JHA
(C G M Project)
Authorized Signatory
For Megha Engineering & Infrastructures Limited.

c/s

Harpal Singh
MEIL

Copy to:
1. Sh. Harpal Singh, COO MEIL
2. Sh. Sainath Pai, AVP MEIL
3. Sh. Sanjay Kumar, GM MEIL
4. Sh. Krishna Reddy, MEIL Office, Hyderabad
5. Mallikarjuna Reddy, MEIL Office, Hyderabad

Annex-I

J&K POLLUTION CONTROL COMMITTEE
OFFICE OF THE REGIONAL DIRECTOR - JAMMU
Parivesh Bhawan, Forest Complex Gladni, Transport Nagar, Narwal, Jammu
regionaldirectorjkspcbjmu@gmail.com, Tel/Fax 0191-2476926
www.jkspcb.nic.in

PCC

Chief General Manager,
M/s Megha Engineering & Infrastructures Ltd.
Drabshalla, Kishtwar.

No: PCC/RDJ/GGC-20/2023/ 9026-29 Dated: 18 /12/2023

Sub: Complaint regarding Pollution being caused by Rattle Hydroelectric Project and M/s Megha Engineering & Infrastructures Limited Drabshalla, Kishtwar.

Ref: (i) Notice-I No. PCC/RDJ/GGC-20/N-I/2023/1516-18 dt: 07/10/2023
(ii) Rattle Hydroelectric Power Corporation Limited letter No. RATLE/GM(C)/2023/E-42 dt: 20/10/2023
(iii) Megha Engineering & Infrastructure Limited letter No. MEIC/D/23/11/115 dt: 20/10/2023.

The reply submitted by you in response to the legal Notice served vide above reference has been examined in light of inputs obtained from field functionaries and documents/photographs, following observation have been noticed which are required to be rectified and complied with in light of Environmental laws and EC conditions:

1. Only 02 Nos of water tankers have been deployed on ground for water sprinkling to arrest dust emission, some additional water tankers are required to ensure pollution is under control.
2. The project authorities to ensure that Air monitoring stations are established at construction site/Dam site Power house area. You may opt for CAAQM (Continuous Ambient Air Quality Monitoring) for maintaining the vital parameters.
3. The dumped muck near water body has not been removed as yet despite directions from this end. The muck thrown into the river hinder the water flow and affects the aquatic flora and fauna.
4. Quarterly Self-Monitoring Reports (SMRs) of Air Quality, Water Quality and Noise Pollution are required to be submitted to this office to know the quality of Air, Water and Noise Levels.

In view of the above, you are, as such directed to comply with the directions and submit compliance report to this office by 15/01/2024 failing which action warranted under rules will be initiated in the matter.

18/12/2023

(Sat Paul), IFS
Regional Director

Copy to:
1. The Member Secretary, J&K PCC for information.
2. Chief Executive Officer, Rattle Hydro electric Project, Shalimar, Kishtwar for information and necessary action. This has reference to your letter under reference (ii)
3. Divisional Officer, PCC Kishtwar for information and necessary action.

Jammu and Kashmir Pollution Control Committee

Parivesh Bhawan, Forest Complex Transport Nagar, Jammu, 180 006
regionaldirectorjkspcbjmu@gmail.com
0191-2476926

Chief General Manager,
M/s Megha Engineering & Infrastructures Ltd.,
Drabshalla, Kishtwar.

Notice-I

No: PCC/RDJ/GGC-20/2024/1104-1109 Dated: 26 /09/2024

Legal Notice

Whereas, no activity can be operated/run/carried out, having the potential to create pollution, without the consent of the J&K Pollution Control Committee as envisaged under section 25/26 and section 21 of the Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981, respectively.

Whereas, every such activity is also under statutory obligation to take necessary measures to avoid any such activity which may be detrimental to the Environment.

Whereas, Divisional Officer, PCC, Kishtwar has reported that muck dumping near TRT on the right bank (downstream) is going into the River Chenab in violation of environmental laws.

Whereas, this is flagrant violation of the prescribed Laws/Acts and is also punishable, thereunder and that whosoever fails to comply with or contravenes any of the provisions, shall be punishable with imprisonment with fine or both under relevant Environmental Laws.

Whereas, the J&K Pollution Control Committee accordingly proposes to initiate legal action against you for:

1) Carrying out the activity in violation of Environmental Laws/Acts.
2) Causing environmental pollution of air/water in the area especially affecting the ecology of river Chenab.

This notice is therefore, issued and served upon you to show cause within 10 days from its issuance as to why legal action is not taken against you for the violation of various environmental laws.

Regional Director
PCC, Jammu

Copy to:

1. The Chaiman, J&K PCC, Jammu for kind information.
2. The Member Secretary, J&K PCC, Jammu for kind information.
3. The Deputy Commissioner, Kishtwar for information.
4. Divisional Officer, PCC, Kishtwar for information and necessary action. He will submit status report of the unit after expiry of Notice period. This is in reference to his office letter no. **PCC/DO/K/24/84 dt:06/09/2024**.
5. Chief Executive Officer, Rattle Hydro Electric Project, Shalimar, Kishtwar.

Annexure-20

Details of Muck Generated/Utilized in Ratle HE Project till 31-10-2024.

1. Total Quantity of Excavated Muck = 12.80 lakh cum

2. a. Quantity utilized/Crushed for construction of project component = 4.0 lakh cum

   b. Quantity utilized for the construction of coffer Dykes and lying in construction area = 4.04 lakh cum

   c. Quantity utilized on Left Bank for approach road = 2.5 lakh cum

   d. Quantity dumped in Left Bank = 0.50 lakh cum

   e. Quantity dumped in Right Bank = 1.26 lakh cum

   f. Stacked near Joshana Colony = 0.50 lakh

GM(C) RHPCL

13.11.24

S.N Jha
CGM
MEIL, Drabshalla

Annexure-21

Annexure-21

========== Forwarded message ==========
From: Narender Sharma <narendersharma.cpcb@gov.in>
To: "Khursid Alam"<khursid.alam@gov.in>,
"membersecretaryjkspcb"<membersecretaryjkspcb@gmail.com>
Cc: "dckishtwar-jk"<dckishtwar-jk@nic.in>
Date: Mon, 18 Nov 2024 18:43:56 +0530
Subject: Fwd: Re: Fwd: Details pertaining to 850MW Ratle HE Project
========== Forwarded message ==========

========== Forwarded message ==========
From: Environment RHPCL <env-rhpcl@nhpc.nic.in>
To: "narendersharma cpcb"<narendersharma.cpcb@gov.in>, "rdchandigarh cpcb"<rdchandigarh.cpcb@gov.in>
Date: Mon, 18 Nov 2024 17:30:27 +0530
Subject: Re: Fwd: Details pertaining to 850MW Ratle HE Project
========== Forwarded message ==========

Respected Sir,

Kindly refer to your email dated 17-11-2024 vide which some information pertaining to Ratle HE Project has been sought by your Office from RHPCL. In this regard, the desired information is given below for your kind information and consideration:-

1. **Capacity of the alternative site** : The alternative site(s) near Joshana village which fall within the acquired Project land (acquired in 2012) and situated far away from the river (approx. 8km), can accommodate more than 18.0 Lakh CuM of muck approx.

2. Approval of the above site from the concerned Authority: In order to avoid any spillage of muck, the dumping of muck on right bank of river has been stopped since July 2024 under intimation to the District Administration/GoJK. Subsequently, an alternative site has been provided to MEIL near Joshana village, within the acquired Project land (acquired in 2012). The said alternative site is far away from river (approx. 8 Kms).

This alternative site (acquired land of Project) has been provided to MEIL as a measure for temporary stacking/storage of muck and its further utilization/ processing for use in the Project construction activities later on. The providing of aforementioned alternative site has also been intimated to MoEF&CC and J&K Pollution Control Committee in October 2024 for kind information.

3. Quantity of muck dumped on the above site as on date: As submitted by M/s MEIL, approx. 65000 CuM of muck has been relocated/stacked at this alternative site.

4. Water testing facilities: A Quality Control Laboratory has been established at Project site for sampling and testing of water as well other various materials which also includes the testing of water samples from river Chenab for aspects like silt analysis, which is carried out on regular basis.

For sampling and monitoring of river water quality, the testing of river water is being carried out on regular basis (quarterly) through Labs authorized by Ministry of Environment, Forests and Climate Change (MoEF&CC).

Thanks and regards,

Office of Chief Executive Officer
Ratle Hydroelectric Power Corporation
Kishtwar (J&K)

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Factual Report of the Joint Committee, in the matter of OA No. 955 of 2024; President Municipal Committee Thathri Versus Union Territory of J&K, in compliance to the orders of Hon'ble NGT dated 12/09/2024

1. Background:

The matter in Original Application No. 955 of 2024; President Municipal Committee Thathri Versus Union Territory of J&K has been registered suo moto based on a letter petition of President Municipal Committee Thathri, District Doda, Jammu & Kashmir, Union Territory. The complaint in the letter petition has been made regarding dumping of debris/muck in River Chimab, by M/s Megga Engineering and Infrastructure Ltd, the executing agency of under construction Rattle Hydro Electric Power Project Drabshalla District Kishtwar, Jammu & Kashmir, Union Territory. It is alleged by the petitioner that ***"the working agency is dumping debris/muck in river Chinab instead of storing and dumping the same at the location allotted by Revenue Department of Kishtwar. On account of unauthorized and illegal dumping of debris in river Chinab during rainy season heavy losses were suffered by the residents of Thathri due to flood situation caused in river Chinab. Thathri town is situated almost on the bank of river Chinab at zero distance".***

2. Orders of Hon'ble National Green Tribunal:

Hon'ble NGT has observed in the order dated 12/9/2024 that:

Para 03: *"Dumping of muck/debris of under construction project in river water is a serious environmental violation and the averments made in the application in our view do give rise to a substantial question relating to environment arising out of the implementation of Enactments mentioned in Schedule I of NGT Act, 2010"*

The following directions were issued by Hon'ble National Green Tribunal vide order dated 12/09/2024 (**Annexure-1**):

Para 06: *"Further, we find it appropriate to obtain a factual report for which we constitute a joint Committee comprising District Magistrate, Kishtwar; Member Secretary, J&K Pollution Control Committee; Integrated Regional Officer, Ministry of Environment, Forest and Climate Change, Jammu; and a representative Central Pollution Control Board (hereinafter referred to as CPCB) shall not be below rank of Director.*

Para 07: *The CPCB shall be nodal authority for coordination and compliance.*

Para 08 *"The said Committee shall visit the site, collect relevant information and submit a factual report within one month".*

A progress report was filed by the Joint Committee, seeking more time to file the factual report, which was considered by Hon'ble NGT on 23/10/2024. While granting time to the

Joint Committee for filing the factual report, it was also observed by the Hon'ble NGT in its order dated 23/10/2024 (**Annexure -2**) that

Para 08: ***"A reply on behalf of respondent 5- M/s Megga Engineering and Infrastructure Ltd has been filed but it nowhere shows that muck is being disposed in compliance of Construction and Demolition Waste Rules, 2016. Further, photographs appended to reply shows clearly that the muck is being discharged in river directly and this is a gross violation of environmental laws. Hence, prima facie we are satisfied that here is a case where gross violation of environmental laws is virtually evident from own reply of respondent 5 and further execution of project should be stopped. However, before taking such a stringent action, we find it appropriate, and as also requested by learned counsel appearing for respondent 5, to have an additional reply placing its stand in respect of compliance to statutory rules in regard to disposal of muck."***

3. Compliance of the orders of Hon'ble NGT:

3.1. Constitution of the Joint Committee:

In compliance to the directions of the Hon'ble NGT, a joint committee comprising of the following members, was constituted:

i. Shri Rajesh Kumar Shavan, JKAS, Deputy Commissioner, Kishtwar, J&K
ii. Sh. Ghansham Singh, JKAS, Member Secretary, J&K Pollution Control Committee (J&KPCC)
iii. Dr. Khursheed Alam Khan, Scientist 'C', Sub-Office Jammu (formerly Integrated Regional Office, Jammu) now under Regional Office Chandigarh, Ministry of Environment, Forest and Climate Change (MoEF&CC)
iv. Dr. Narender Sharma, Scientist 'F'/Director, Central Pollution Control Board (CPCB), Regional Directorate, Chandigarh

3.2. Site visit and collection of relevant Information:

The Joint Committee carried out a site visit on 14/10/2024 in compliance to this order of Hon'ble NGT Tribunal to address the points raised in the letter petition. The Divisional Officer from Kishtwar, J&KPCC, and the Tehsildar of Kishtwar, J&K, were also present for assistance of the committee. The committee discussed the issue and perused all the relevant record.

It also inspected all three designated muck dumping sites outlined in the Environmental Management/Muck Management Plan..

The Joint Committee also sought details from M/s Rattle Hydroelectric Power Corporation Limited (RHPCL), M/s Megha Engineering and Infrastructure Ltd (MEIL), on the following points:

i. Muck Management Plan of the Rattle Hydroelectric Power Project.
ii. Copy of Environmental Management Plan submitted by the project proponent for obtaining Environmental Clearance
iii. Copy of half-yearly compliance report submitted by the project proponent to MoEF&CC regarding compliance of the conditions of Environmental Clearance.
iv. Copy of report of verification conducted by MoEF&CC regarding the compliance of the conditions of Environmental Clearance
v. Copy of Consent to Establish (CTE) granted by J&K PCC and violation reported in the past by the Division Office, Kishtwar, J&K PCC along with action taken report.
vi. Details of land allotted by Revenue Department, Kishtwar to project proponent for muck dumping, as mentioned in the letter petition.
vii. Status of muck generation and disposal as of October 14, 2024

The required information from the MoEF&CC was received on October 22, 2024. The information pertaining to Divisional Officer, Kishtwar, J&KPCC, M/s Rattle Hydroelectric Power Corporation Limited, M/s Megha Engineering and Infrastructure Ltd (MEIL) and the Tehsildar, Kishtwar, J&K, was received on November 14, 2024.

3.3.Discussion and Observations of the Committee :

During site inspection the M/s Megha Engineering and Infrastructure Limited (the executing agency for the Rattle Hydro Electric Power Project in Drabshalla, District Kishtwar, Jammu & Kashmir) were asked to justify the dumping of Muck as pointed out.

The project executing agency, M/s Megha Engineering and Infrastructure Limited, asserted that all the muck has been disposed of in accordance with the Environmental Clearance issued by MoEF&CC and the approved muck management plan for the same.

Explanation, the Joint Committee reviewed and considered the following documents to analyse the facts and draw the conclusion for preparing the a factual report, as directed by Hon'ble National Green Tribunal

i. Environmental Clearance granted for Ratle HEP (850MW) Project in Kishtwar District of Jammu & Kashmir to M/s GVK Ratle Hydro Electric Project Pvt. Ltd. by MoEF&CC vide No. J-12011/39/2010-IA-1 dated 12/12/2012 (**Annexure-4**).

ii. The above environmental clearance was later on transferred in the name of M/s Ratle Hydro Electric Power Corporation by MoEF&CC vide No. J-12011/39/2010-IA.1dated 27/09/2021. (**Annexure-5**).

iii. Muck Management/Disposal Plan (**EMP**), submitted by the Project Proponent for obtaining Environmental Clearance (EC) from MoEF&CC (**Annexure-6**).

iv. Environment Management Plan (EMP) submitted by the Project Proponent for obtaining Environmental Clearance (EC) from MoEF&CC (**Annexure-7**).

v. Half yearly reports of compliance of the conditions of Environmental Clearance (EC) submitted by the Project Proponent for the period October 2022 to March 2023 (**Annexure-8**), April 2023 to September 2023 (**Annexure-9**), October 2023 to March 2024 (**Annexure-10**) and October 2024 (**Annexure-11**).

vi. MoEF&CC compliance verification report dated 16/08/2024 w.r.t conditions of Environmental Clearance granted to the Project Proponent (**Annexure-12**).

vii. Show Cause Notice issued by MoEF&CC to the Project Proponent vide No. IA-J-11014/257/2024/IA-1/ dated 22/10/2024 for the non-compliances observed during compliance verification inspection (**Annexure-13**).

viii. Letter No. RATLE/CEO/2022/GM (C-I)/330/ dated 27/09/2022 issued to M/s Megha Engineering and Infrastructure Limited by M/s Ratle Hydroelectric Power Corporation Limited regarding compliance of provisions pertaining to ecological balance-regarding disposal of muck at only designated sites (**Annexure-14**).

ix. Letter No. RATLE/GM(C)/2022/66 dated 07/11/2022 issued to M/s Megha Engineering and Infrastructure Limited by M/s Ratle Hydroelectric Power Corporation Limited regarding compliance of provisions pertaining to ecological balance-regarding disposal of muck at only designated sites (**Annexure-15**).

x. Letter No. RATLE/CEO/2024/798/ dated 26/07/2024 issued to M/s Megha Engineering and Infrastructure Limited by M/s Ratle Hydroelectric Power Corporation Limited regarding strict compliance of the condition pertaining to disposal of muck only at designated sites (**Annexure-16**).

xi. Directions issued by J&K PCC to M/s Megha Engineering and Infrastructure Limited vide No. PCC//RDJ/GGC-20/2023/3026-29 dated 18/12/2023 in view of various

observations including dumping of muck near water body and the company's failure to remove the muck despite directions J&K PCC (**Annexure-17**).

xii. Legal notice issued by J&K Pollution Control Committee (J&KPCC) to M/s Megha Engineering and Infrastructure Limited vide No. PCC/RDJ/GGC-20/2024/1104-1109 dated 26/09/2024 for muck dumping near TRT on the right bank (downstream) going into the River Chenab in violation of Environmental Laws (**Annexure-18**).

xiii. Details of the muck generated/utilized in Ratle HE Project till 31/10/2024 (**Annexure-19**)

3.4. Analysis of the Documents / Facts:

From the above documents and the filed visit , following could be analysed.

1. The environmental clearance was granted with the condition that *"Consolidation and compilation of muck shall be carried out only in the designated muck dumping sites as submitted in the EIAIEMP report, As per the proposed muck disposal plan, out of 24.4 lakh m^3 of muck to be generated due to excavation, about 50% (i.e.12.2 lakh m^3 will be utilized for construction purpose and the remaining 12.2 lakh m^3 will be dumped at the 3 designated areas in an allocated area of 30.59 ha.* ***The identified muck dumping sites shall be at-least 30m horizontally away from the edge of the river corresponding to high flood level (HFL)".***

2. According to the Muck Management Plan submitted by the Project Proponent for obtaining Environmental Clearance from MoEF&CC, *"The following three sites were identified for use as dumping sites :*

   Zone I*: on the right bank of river Chenab u/s of village Thathri and d/s of the proposed Dam in an approximate length of 1350 m.*

   Zone II*: on the left of river Chenab d/s of the proposed Dam and at a lower level then the existing NH 1B in a length of 1400 m.*

   Zone III*: on the right bank of Kuligad nalla above NH 1B in a length of 450 m."*

3. It is also stated in the Muck Management Plan that *"The following points were considered and followed as guideline for finalization of the above 3 zones to be used as dumping sites:*

i) *The dumping sites were selected as close as possible to the project area to avoid long distance transport of muck.*

ii) *Standard distance between each dumping site and river bed is maintained as per MoEF&CC guidelines.*

iii) *The sites were free from active landslides or creep and care were taken that the sites should not have a possibility of toe erosion and slope instability.*

iv) *The dumping sites are either at higher level than the flood level or are away from the river course so that the possibility of muck falling into the river is avoided.*

v) *There is no active channel or stream flowing through the dumping sites.*

vi) *The sites were far away from human settlement areas.*

4. According to the Muck Management Plan"*In Ratle Hydro Electric Project, a very scientific approach and methodology was followed for identification of the dumping sites. All possible alternate sites were inspected and examined before rejecting or selecting any site. All the three finalised sites are:*

i) *With minimum possible forest cover: The area is mostly barren and rocky and covered with predominantly bushes. The total number of trees, poles and saplings is 872 out of which only 174 are trees while the rest all are poles and saplings.*

ii) *The populated /settlement areas are far away from the identified dump zones and therefore will be least impact on human life.*

iii) *Away from the river (30 m away from the HFL as per guidelines): The dumping sites are either at higher level than the flood level or are 30 m away from the river course to provide protection from high flood.*

iv) *The identified muck sites close to the project area to avoid hazards related to transport of muck to long distances.*

v) *With Retaining structures in the entire dumping area: Retaining wall have been suitably designed and proposed to be constructed all along the river bank which will prevent muck from falling into the river.*

vi) *With appropriate Restoration & Rehabilitation plan: all the three identified sites are proposed to be restored and re-habilitated in a very scientific manner and once completed will not only present an aesthetic view but will help the environment since the area which is rock and barren will be converted into forest cover because of the proposed plantation.*

5. As per Muck Management Plan submitted by the Project Proponent for obtaining Environmental Clearance from the MoEF&CC, the following Monitoring and Compliance schedule were submitted:

"MONITORING & COMPLIANCES:

i. *Muck shall be dumped from bottom in layers of 500- 700mm depending on size of boulders.*
ii. *Each layer shall be rolled compacted.*
iii. *A layer of soil shall be spread on top of it to make it suitable for plantation.*
iv. *Water testing facilities shall be set up for checking quality parameter of water.*
v. *Soil samples shall be regularly collected and tested for checking the level of contamination.*
vi. *Prescribed norms and approvals will be sought from PCB wherever necessary.*
vii. *All norms of Forest department, PCB and MoEF and their acts related to muck disposal shall be complied with.*
viii. *Design consultant shall be engaged for designing of retaining structures.*
ix. *Plantation shall be done on the reclaimed land and native variety of plants and trees shall be planted."*

6. It is mentioned in the Muck Management Plant that *"**The capacity/volume of the muck dumping sites is more than the volume of the muck to be disposed. It may appear that the area requirement is in excess but the same is required for temporary storage of usable muck, traffic movement of dumpers and lifters**. The spoil from various construction sites would be disposed of at designated sites in a controlled and orderly manner. All measures would be adopted to ensure that the dumping of muck does not cause injury or inconvenience to the people or the property around the area. The general topography of the disposal area is mild sloped. The spillage of muck into the river at any site would be prevented by making concrete retaining walls to retain the muck pile. **It shall be ensured that dumping is carried out at a minimum distance of 30 m away from the active river bank."***

7. It is mentioned in the Muck Management Plan that *"The total length of retaining wall proposed to be constructed along the river would be about 3200 meters."* It is further

mentioned that ***"These retaining walls are proposed to be located at about 30.0m distance from the highest flood level."*** A typical sketch is also given in the plan.

8. It is mentioned in the Muck Management Plan that ***"The muck will be spread in layers of 500 700 mm thick layers."***

9. As per details of muck generated/disposed of till 31/10/2024 provided by the Project Proponent, the total muck generated so far is 12.80 lac cum. Out of this, 0.50 lac cum is dumped on the left bank and 1.26 Lac cum is dumped at right bank of the river. Remaining quantity has been utilized.

10. The total estimated cost of Muck disposal and rejuvenation of muck disposal sites would be Rs. 7500 lacs as per Muck Management Plan.

Regulatory Mechanism adopted for environment compliances

A. Half yearly reports of compliance of the conditions of the Environmental Clearance submitted by Project proponent in October, 2024 mentions that " The contactor has confirmed that temporarily stacked muck/muck dumped near the river will be suitably retrieved and relocated for use in the Project construction works. It is also mentioned that dumping of muck on the right bank of River Chenab has been stopped since July 2024 under intimation to the District Administration/GOJK and that an alternative location within the acquired project land is now being utilized by the contractor for temporary storage/stacking of muck.

B. According to verification of the compliance of the conditions of Environmental Clearance, conducted by Sub Office of MoEF&CC, Jammu on 16/08/2024, the observation with regard to non-compliance has been made on 14 points, which also include that ***"Project Proponent has dumped the muck in the River at several places. Moreover, the designated site is less than 30 meters horizontally away from the edge of the river."***

C. MoEF&CC has also issued show cause notice to M/s Ratle Hydro Electric Power Corporation Limited vide No. IA-J-11014/257/2024/IA-I/ dated 22/10/2024, for violation of various conditions of Environmental Clearance including muck dumping in the river at several places against the stipulated condition.

D. The Project Proponent namely M/s Ratle Hydro Electric Power Corporation Limited has asked the project executing agency namely M/s Megha Engineering and Infrastructure Ltd (MEIL) vide letters dated 27/09/2022, 07/11/2022 and 26/07/2024, ***for not dumping the muck and debris properly at designated sites,*** stating that ***"this non-compliance of environmental clearance condition is a matter of serious concern and the violation of norms and may attract the penal action in terms of provisions contained in Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981, EPA, 1986 and the guidelines issued by Hon'ble NGT, CPCB, JKPCC etc. in this regard."***

E. J&K Pollution Control Committee has also issued Directions and legal notice vide No. dated 18/12/2023 and 26/09/2024, for i) ***dumping of muck near water body and the company's failure to remove the muck despite directions*** and ii)***muck dumping near TRT on the right bank (downstream) going into the River Chenab in violation of Environmental Laws, respectively.***

3.5. Finding of the Committee and the recommendations.

1. There are following 03 muck disposal sites in District Kishtwar, designated as per Environmental Management Plan/Muck Management Plan and also mentioned in the Environmental Clearance granted to the Project Proponent for proper disposal of muck arising out of the construction activities of Ratle Hydro Electric Project (RHPC). The details of the above 03 sites, as shared with the Joint Committee are reproduced below:

   Site 1: Right bank of River Chenab downstream of proposed Dam with approx. length 1350 m (designated site is part of forest land diverted for use vide Govt. of Jammu and Kashmir order No. 234-FST of 2012 dated 27.04.2012 and subsequently, forest clearance transferred in favour of RHPCL vide MoEF&CC communication No. 15-01/2021-Jammu dated 08.03.2022) ;

   Site 2: Left bank of River Chenab downstream of proposed Dam with approx. length 1400 m (Khasra No. 2879/265/185 Min. and 293/232 Min. in village Dugga of Tehsil Drabshalla; land stands acquired in 2012 by JKPDC, one of the Promoters of RHPC)

Site 3: Right bank of Kuligad nalla with approx. length 450 m (Khasra No. 171 Min and 172 Min. in village Khori of Tehsil Drabshalla; land stands acquired in 2012 by JKPDC, one of the Promoters of RHPC) .

2. It has been found that Site 1 and Site 2 are being used, ***while the , Site 3 has not yet been used for muck disposal.***

3. It was also found that M/s Ratle Hydro Electric Power Corporation Limited has also provided an alternative site to the executing agency namely M/s Megha Engineering and Infrastructure Ltd (MEIL) near Joshana village, within the acquired Project land for temporary stacking of muck (Khasra No. 317/308/209 Min) and M/s MEIL has started stacking muck at the aforementioned alternative site. They are now dumping the Muck at this location. It has enough space for meeting out the dumping. This has settled the issue to great extent.

4. As per Environmental Clearance granted for the above project, ***"The identified muck dumping sites shall be at-least 30m horizontally away from the edge of the river corresponding to high flood level (HFL)"***, Further, as per Muck Management Plan of the Project ***"It shall be ensured that dumping is carried out at a minimum distance of 30 m away from the active river bank."***. However, the committee has observed that, since the gradient of the hillock is steep the dumping of Mulba at Site no 02 could not resist the load / pressure and as a result , the muck has slightly slided down towards the river. On the opposite site on site no. 2, i.e left bank the dumping has been carried out by raising retaining walls at certain locations to manage the muck on scientific line.

5. Additionally, J&K Pollution Control Committee has also issued directions and legal notice 18/12/2023 and 26/09/2024, for i) *dumping of muck near water body and the company's failure to remove the muck despite directions* and ii) *muck dumping near TRT on the right bank (downstream) going into the River Chenab in violation of Environmental Laws, respectively.* The M/s Megha Engineering and Infrastructure Ltd (MEIL) has started removing the muck dumped at site no 2, from the river and District Magistrate has asked the Tehsildar to monitor their progress on weekly basis. This will ensure the compliance.

6. Since the project proponent is required to implement the ***Monitoring and Compliance conditions*** mentioned in its Muck Management plan, which was

submitted for obtaining the Environmental Clerance from MoEF&CC namely ***Muck shall be dumped from bottom in layers of 500- 700mm depending on size of boulders; Each layer shall be rolled compacted; Water testing facilities shall be set up for checking quality parameter of water; Prescribed norms and approvals will be sought from PCB wherever necessary; All norms of Forest department, PCB and MoEF and their acts related to muck disposal shall be complied with the same was found under execution. So far the check of quality of water in the vicinity , it was demonstrated that 04 samples quarterly are being tested. For noise Pollution various checks are being made; Three tankers of water sprinkling were found en-route on the site for sprinkling of water for containing the dust pollution.***

7. The project proponent has raised certain retaining walls also to contain the spill as per the conditions and these wall are from the HFL.

Recommended measures

The District Magistrate has sought weekly compliances regarding removal of debris, sprinkling of water and water quality checks and its monitoring on weekly basis through Tehsildar. The forest Division has also been asked to get implemented all conditions for plantation, checks dams, steep plantation etc and start the work for tehse activities immediately.

Dr. Khursheed Alam Khan
Scientist 'C', Sub Office, MoEF&CC, Jammu

Dr. Narender Sharma
Scientist 'F'/Director
CPCB, Regional Directorate, Chandigarh

Ghansham Singh, JKAS
Member Secretary, J&K PCC, J&K

Rajesh Kumar Shavan, JKAS,
Deputy Commissioner, Kishtwar, J&K

Dated: November _____