No---2022

GOVERNMENT OF INDIA
CENTRAL WATER COMMISSION
PROJECT PREPARATION ORGANIZATION

NOTE FOR CONSIDERATION OF THE ADVISORY COMMITTEE OF DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUVENATION (MINISTRY OF JAL SHAKTI) ON IRRIGATION, FLOOD CONTROL & MULTIPURPOSE PROJECTS

NAME OF PROJECT

LOWER ORR DAM PROJECT
UNDER KEN BETWA-LINK PROJECT (PHASE-II)
(MADHYA PRADESH)

NEW DELHI
January, 2022

INDEX

NOTE ON LOWER ORR DAM PROJECT UNDER KEN-BETWA LINK PROJECT (PHASE-II) FOR CONSIDERATION OF THE ADVISORY COMMITTEE OF DEPARTMENT of WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUNVATION (MINISTRY OF JAL SHAKTI) ON IRRIGATION, FLOOD CONTROL AND MULTIPURPOSE PROJECTS.

Estimated Cost	Rs. 2657.04 Crore at 2017-18 price level.
Gross Command Area (GCA)	138462 ha
CCA	90000 ha
Annual Irrigation	90000 ha
Intensity of Irrigation	100%
Power Generation	19 MW Solar Power
BC Ratio	1.54

1.0 INTRODUCTION:

National Water Development Agency (NWDA) identified Ken-Betwa Link as one of the 16 links under Peninsular Component of National Perspective Plan for Water Resources Development for which feasibility report was prepared by NWDA in the year 1995. Tripartite Memorandum of Understanding was signed by Madhya Pradesh (MP), Uttar Pradesh (UP) and the Union Government on 25th August 2005 for preparation of Detailed Project Report (DPR) of Ken-Betwa Link Project (KBLP). The work of preparation of DPR was entrusted to NWDA by Erstwhile Ministry of Water Resources (MoWR) in January 2006. The DPR was completed in December 2008 and was circulated to the Governments of Madhya Pradesh and Uttar Pradesh in February, 2009. To discuss various issues raised by the Govts. of MP and UP, a Secretary level meeting was convened by Erstwhile MoWR on 03.02.2010 at New Delhi. During the meeting, it was opined that the Survey & Investigation of the alternative projects/schemes proposed by Madhya Pradesh in Upper Betwa region will take about 2 years time. In order to avoid undue delay in implementation of KBLP, it was decided to reframe the DPR in two separate parts viz., DPR of KBLP (Phase-I) comprising components of Daudhan complex and DPR of KBLP (Phase-II) comprising Lower Orr Dam Project, Bina Complex Project and Kotha Barrage Project. Subsequently, during the meeting held under the Chairmanship of Secretary (WR), Govt. of India with the representatives of Govts of M.P. and U.P. on August 4,

2010 at New Delhi, it was decided that Survey and Investigations (S&I) works of proposed projects in Betwa Basin including Lower Orr Dam Project and preparation of Detailed Project Report (DPR) of KBLP (Phase-II) will be taken up by NWDA. The survey and investigations and preparation of DPR of KBLP (Phase-II) was taken up by NWDA in January, 2011.

The DPR of KBLP (Phase II) including Lower Orr Dam Projects and other barrages as proposed by Govt. of MP was completed in January, 2014.

Thereafter, from time to time discussions were held between Govt. of MP, Govt. of UP and NWDA to finalize DPR of KBLP (Phase-II). Subsequently, as per the suggestions of Govt. of MP, the projects under KBLP (Phase-II) have been finalised as Lower Orr Dam, Kotha Barrage and Bina Complex

1.1 National Projects:

On 7th February 2008, Government of India had approved a scheme of National Projects during XI Plan with a view to expedite completion of identified National Projects for the benefit of the people. Such Projects were provided Central Assistance (CA) of 90% of the cost of irrigation & drinking water component (as per original Guideline) of the project as CA by Government of India in the form of Central Grant for their completion in a time bound manner.

The Government of India initially declared 14 projects as National Projects in February 2008. Later, Cabinet Committee on Infrastructure approved inclusion of Saryu Nahar Pariyojna (Uttar Pradesh) in the scheme of National Project on 3rd August, 2012. Polavaram Irrigation Project (Andhra Pradesh) was included under the scheme of National Projects vide Gazette notification dated 01.03.2014.

The List of 16 National Projects in tabular form is attached as **Annexure I.**

1.2 Hon'ble Supreme court direction in respect of Ken Betwa Link Project

The Hon'ble Supreme Court in the matter of Writ Petition (Civil) No.512 of 2002 "In Re: Networking of Rivers" along with Writ Petition (Civil) No.688 of 2002 delivered a judgement dated 27.2.2012. The Hon'ble Supreme Court has directed that an appropriate body should be created to plan, construct and implement the interlinking of rivers programme for the benefit of the nation as a whole. The main direction of the Hon'ble Supreme Court are covered under Para 64 of judgement. Hon'ble Supreme Court has directed the Union of India and particularly the Erstwhile MoWR, Govt of India, to constitute forthwith a committee to be called "Special Committee for Interlinking of rivers" under the Chairmanship of Hon'ble Minister (Water Resources). The Hon'ble Supreme Court in its judgement (under Para 64(viii) dated 27.2.2012) directed the committee to take up the KBLP for implementation at the first instance itself.

The Union Cabinet in its meeting dated 24th July, 2014 has decided to implement the above direction of Hon'ble Supreme Court. In compliance of the above directions of the Hon'ble Supreme Court, the Erstwhile MoWR, RD & GR has constituted the Special Committee for Interlinking of rivers vide Notification dated 23rd September, 2015. The Hon'ble Minister (Water Resources, RD&GR) is Chairman of the committee and Water Resources Ministers of various States are members of the committee. The committee is regularly monitoring the progress of the interlinking rivers.

1.3 Proposal:

KBLP mainly envisages transfer of surplus water from Ken Basin to Betwa Basin to provide water to water short areas of Upper Betwa Basin. Lower Orr Dam Project as part of KBLP (Phase-II) has been planned as a multipurpose project with irrigation as a major benefit whereas power, drinking water supply and flood moderation are other incidental benefits.

The main objective of the KBLP (Phase-II) is to make available water to water deficit areas of Upper Betwa Basin through substitution from the surplus waters of Ken Basin.

Lower Orr Dam Project as part of KBLP (Phase-II) envisages construction of 45 m high Composite Dam, in which Concrete portion is 487 m long and earthen dam is 1731 m long

with a maximum height of 36.00 m, across river Orr (a tributary of Betwa river, which is a tributary of Yamuna river in Betwa Basin). The main objective of the Lower Orr Dam Project is to provide irrigation and domestic water supply to water deficit areas of Shivpuri and Datia districts of MP. The total catchment area of Orr river upto Lower Orr Dam is 1843 sq km. The 75% dependable annual yield of the sub-basin upto the proposed dam site has been assessed as 362.53 MCM. A main canal has been proposed on the left bank of river. The FRL of the Lower Orr Dam has been kept as 380 m. The submergence area at FRL is 2723.70 ha.

The project will provide annual irrigation to 90,000 ha in Shivpuri and Datia districts of MP. Crop Water Requirement has been finalized as 389.53 MCM. Ground water use of 77.91 MCM (20% of 389.53 MCM) had also been considered in the Project. There is provision of 6 MCM of water for drinking water supply and 44.90 MCM for environmental releases.

The salient features of the Projects are at **Annexure-II**. An index map showing the proposals is at **Plate-I.**

2. TECHNO ECONOMIC APPRAISAL:

Lower Orr Dam Project as Part of KBLP (Phase-II) with estimated cost of Rs 3065.14 Cr had also been submitted. After detailed examination of estimates based on available data/records, the cost of Lower Orr Dam Project has been finalized for Rs 2657.04 Cr at Price Level (PL) 2017-18.

Corresponding to final cost estimate of the Lower Orr Dam Project amounting Rs 2657.04 Cr, the Benefit Cost (B. C.) ratio for the project has been finalized for 1.54:1 having Internal Rate of Return (IRR) as 10.10%.

3. HYDROLOGY:

3.1 WATER AVAILABILITY:

KBLP (Phase-I) envisages diversion of surplus water from proposed Daudhan dam on Ken River. Out of diverted water, after enroute utilizations, balance water will be diverted to

Betwa River upstream of existing Parichha weir. As part of KBLP (Phase-II) work, it is proposed to utilize equal quantity of balance water in Upper Betwa sub basin upstream of Rajghat Dam through construction of lower Orr Dam and other projects. The hydrological studies of the above projects have been incorporated in DPR of the KBLP (Phase-II).

One Gauge & Discharge site is existing at Basoda (CA: 7726 sq km) in the Upper Betwa Basin where long term flow data is available for the period 1976-2009. The rainfall data of 15 rain gauge stations is available in the Basin for variable time periods. The consistency of the rainfall data is carried out using the double mass curve technique and necessary corrections are made in the data. The missing rainfall data is filled up using nearby rainfall station data. Based on the refined rainfall data, the weighted areal monthly rainfall for *all the projects (including L*ower Orr Dam) and Basoda G&D site is computed for the period 1901-2009 using Thiessen polygon method.

Bhopal Lake with a catchment area of 354 Sq Km utilises water of Betwa River and contributes quite marginal quantity of spills downstream side. In view of this, the catchment area of Bhopal Lake is excluded in further water availability studies duly deducting the spills from Basoda discharge data and catchment area from relevant project's catchment areas. As per the DPR, 34 Projects (1 Major, 2 Medium and 31 Minor Projects) utilize / withdraw water upstream of Basoda G&D site. Utilizing the relevant inflow series, project operation/ working tables of major and medium projects as well as utilisations of 31 minor projects the virgin flows at Basoda are computed for the period 1976-2009.

Using the Virgin flows and the weighted areal rainfall at Basoda G & D site, rainfall-runoff relationship is established for the monsoon months (viz. June, July, August, September and October). The non-monsoon flows are estimated as 4.264% of the monsoon flows and further the flows are disaggregated into individual non-monsoon month flows in the ratio of relevant month average virgin flows and average non-monsoon virgin flows at Basoda site. Based on the estimated rainfall-runoff relationship and weighted areal monthly rainfall, the virgin flows are computed for Basoda site and all the proposed projects for the period 1901-2009.

The net water yield series at the *proposed projects* including Lower Orr Dam Project is estimated after accounting the diversion from the existing / proposed projects, net domestic and industrial demands in the sub-basins. Dependable flow, hence, derived for Lower Orr Dam Project came out to be 501.15MCM (for 50% dependability), 362.53MCM (for 75% dependability) and 263.98MCM (for 90% dependability). Details are annexed as **Annexure-III.**

3.2 DESIGN FLOOD:

The KBLP envisages diversion of surplus water of Ken basin to water deficit Betwa basin. The KBLP (Phase-II) consists of Lower Orr Dam and other projects. Lower Orr Dam qualifies for PMF studies whereas others are barrages qualify for 100 year return period as design flood and SPF as check flood. The catchment area of Lower Orr dam up to the dam site is 1843 Sq Km.

The peak for Lower Orr Dam (PMF) has been worked out as **12704 Cumec** (**Annexure-IV**).

As there is no change in the parameters of Lower Orr dam, the hydrological aspects in revised DPR remain the same. However, it was advised to carry out an analysis at an appropriate stage subsequently to assess the impact of all structures under KBLP (Phase-II) on the major regulating sections downstream on Betwa River **(Annexure-IV).** Further, NWDA submitted study that there is no adverse effect on Matatila committed withdrawals due to this project. The same has also been vetted by CWC.

3.3 SEDIMENTATION STUDIES:

The KBLP (Phase-II) consists of Lower Orr Dam and other projects. Out of these projects, Lower Orr Dam is the only Dam for which sedimentation studies are carried out and the details are as follows.

No Sediment data is available either at the proposed project or nearby sediment site on Betwa River. Rajghat dam located upstream of the confluence of Orr river with Betwa river, Matatila dam and Dhukwan dams located at the downstream of the confluence of Orr river

with the Betwa River are the nearest dams to the proposed Lower Orr Dam. As per CWC publication "Compendium on Silting of Reservoirs in India" in 2015, the silt rate at Matatila dam, Dhukwan dam, median value of the silt rate of Indo Gangetic plains are 0.483, 0.030 and 0.752 Th.cu.m/sqkm/year, respectively. Looking at the variability of sediment rate at above two projects, the median value of silt rate pertaining to Indo Gangetic plains (i.e.0.752 Th.cu.m/sqkm/year) is adopted as the design sediment rate for the project.

The Bed Level and FRL of the reservoir are 340.0 m and 380.0 m respectively.

The Trap efficiency has been calculated based on Brune's curve for every 5 years period and the sediment load is estimated for 50 and 100 years and the details are enclosed as Annexure-l. The type of the reservoir has been found to be Type-l. Sediment distribution has been studied based on Empirical Area Reduction method for 50 years and 100 years. For the proposed project the New Zero elevation after 100 years is estimated as 352.830 m and the revised area-elevation-capacity curve after 50 years is enclosed as **Annexure-V**. Further, the project authorities are suggested to establish hydro-metrological network in the catchment and start observing the data so that studies may be firmed up at later stage.

3.4 DIVERSION FLOOD STUDIES:

Lower Orr being a large dam, it is desirable that 100-year return period flood should be adopted for diversion works. Accordingly, the annual peaks of daily flow provided by Project Authority for Basoda G&D Site have been used for computing the 100- year return period flood for Lower Orr Dam. Peak flows were adjusted in proportion to the ratio of (Catchment area)$^{0.75}$. 'Log Pearson Type-III' frequency distribution has been used to compute the 100-year flood for the Dam site. The Diversion Flood for Lower Orr Dam computed and recommended is **4576 cumec**. Details are annexed in **Annexure-VI.**

4. IRRIGATION ASPECTS AND WATER REQUIREMENT:

As per the DPR of Lower Orr Dam Project under KBLP (Phase II), 45,047 ha of CCA were proposed to be irrigated. However, with same quantity of water, as per the revised DPR

(submitted with comprehensive report in 2018), the total area to be irrigated was stated as 90,000 ha (50000 ha will be irrigated under gravity and 40000 ha under lift system). The reason for increase in the command area mentioned by the project authorities has been adoption of Micro Irrigation system for the entire command of 90000 ha of Lower Orr Dam Project. The working table submitted by the Project Authorities was examined in CWC and it has been found that the same has been prepared from period 1978-79 to 2008-09 (31 years). Further, the working table prepared by the project authorities considering the inflow series approved by CWC**,** Crop Water Requirement has been finalized as 389.53 MCM. Ground water use of 77.91 MCM (20% of 389.53 MCM) had also been considered in the Project. Subject to above, the working table has been examined and success rate thus worked out as 80.65 %.

Project also has fishery component. The rate per kg of fish has been revised by the project authorities at 2017-18 price level with 3 % depreciation each year as Rs. 504.68 / kg and the same has been used for calculating the benefits of fisheries, as the rate provided by state Govt. is for year 2021-22. (Details annexed at **Annexure-VII**)

Lower Orr Dam Project also has solar power generation of 19 MW. The total cost of Power plant and electric system (Unit-III) is taken as Rs. 10070.70 lakhs and the benefits have been considered as Rs. 3665.1 lakhs and the solar power purchase rate has been considered @ Rs. 6.43/ Kwhr as per the Retail Supply Tariff Order FY 2017-18 of Madhya Pradesh Electricity Regulatory Commission.

5. PROVISION OF DRINKING WATER:

Provision of 5.49 MCM (say 6MCM) for Drinking Water requirement has been proposed, Out of which around 1.13 MCM is for Datia and 4.36 MCM for Shivpuri Districts of Madhya Pradesh.

6. INTER STATE ASPECTS:

In respect of Comprehensive Project Report of KBLP (including Lower Orr Dam Project), CWC vide letter dated 30.01.2018 (**Annexure- VIIIA**) conveyed that it may be acceptable

from inter-state angle subject to signing of Memorandum of Agreement (MoA) among the States of Madhya Pradesh, Uttar Pradesh and Union Govt. for implementation of KBLP. MoA on Comprehensive Project Report of KBLP (including Lower Orr Dam Project) has been signed on 22.03.2021 among Madhya Pradesh, Uttar Pradesh and Union Govt. for implementation of KBLP (**Annexure-XVIII).** Thereafter, CWC vide letter dated 02.07.2021 has communicated that Comprehensive Project Report of KBLP (including Lower Orr Dam Project under KBLP (Phase-II)) may be considered acceptable from inter-state aspects. Details are annexed at **Annexure-VIII B.**

7. DESIGN ASPECTS:

The design aspects of the project have been examined in CWC and found to be generally in order. As the Design Chapter and drawings of earthen dam of KBLP (Phase-II) was prepared in CWC in January 2014. The lower Orr Dam Project is a part of KBLP (Phase-II). The proposal present in revised DPR submitted to Specialized Directorate vide letter dated 05.09.2017 was at the same location for which design was done, so **Embankment Dams (NW&S) Directorate, Barrage and Canal Design Directorate (NW&S)** had no comments to offer.

Instrumentation Directorate vide letter dated 04.12.2017 suggested that for concrete, instrumentation has to be provided only in Dam not in training wall along with the installation of stress strain meter. It also suggested for the installation of numbers of temperature meters on upstream and downstream sections. In case of Earthen Dam Embankment piezometer may also be installed in impervious soil (**Annexure IX**).

8. ENVIRONMENTAL & FOREST CLEARANCE:

The Environmental clearance for Lower Orr Dam project was accorded in 93rd meeting of EAC held on 2nd May, 2016 (**Annexure-X)**. Stage-I Forest clearance was accorded by MoEF&CC vide their letter dated 12.02.2019 and stage –II Forest clearance was accorded vide MoEF&CC vide their letter dated 06.05.2021. Letters for Forest Clearances in respect to Lower Orr Dam project are attached as Annexure –XI.

9. TRIBAL AFFAIRS & R&R:

The Clearance of the Rehabilitation and Resettlement Plan for Lower Orr Dam Project under KBLP, near Didauni village in Khaniyadhana /Chanderi Tehsil of Shivpuri / Ashok Nagar, Madhya Pradesh was accorded by MoTA letter dated 03.10.2018. MoTA letter dated 03.10.2018 is annexed at **Annexure-XII.**

10. PLAN PROVISIONS:

Union Cabinet has approved proposal of Ken-Betwa Link Project (Lower Orr Dam Project as part of KBLP) on 08.12.2021 and its funding will be as per decision taken therein.

11. COST ESTIMATE:

The Cost Estimate of Comprehensive Project Report of KBLP for an amount of Rs 35111.24 Cr at PL 2017-18 had been received in CWC during October, 2018 for examination of Cost aspects. In this Report, the Cost Estimate of "Lower Orr Dam Project" as Part of KBLP (Phase-II) amounting Rs 3065.14 Cr has also been submitted by Project Authority. The discussion on the Cost Estimate of Lower Orr Major Irrigation Project was held with the Project Officials from 25th to 29th October, 2021. NWDA has submitted revised cost estimate of Rs 3013.51 Cr at 2017-18 Price Level on 20.10.2021. After detailed examination of estimates based on available data, the cost of Lower Orr Dam Project have been finalised for Rs 265703.68 lakhs (Rs 2657.04 Cr) at SoR 2017-18. The Unit wise finalized cost of the project is as under

S.No.	Items	Cost (Rs in lakhs)
1	Unit I(Head Works like Dam,Barrage etc)	104521.08
2	Unit II(Canal Works)	151011.91
3	Unit III (Power Plant and Electrical systems)	10170.70
4	**Total**	**265703.68**

The Project Cost is subjected to the correctness of the quantities as per the detailed survey carried out and rates indicated in the cost estimates at Madhya Pradesh Unified Schedule of Rates 2017-18. NWDA has also submitted a certificate regarding the correctness of quantities as per Design and Drawings proposed for preparation of Cost Estimate**.** In this regard, it is to mention that project is under execution. Expenditure up to 30 Nov, 2021 on the project is Rs. 1664.52 Cr, which includes Rs 414.92 Cr on Land acquisition and Rs 1249.60 Cr on works. The Abstract of Cost of the Project and expenditure is enclosed as **Annexure-XIV.**

12. ECONOMIC EVALUATION:

12.1 BENEFIT COST RATIO:

The cost of the project has been finalized at 2017-18 price level for Rs 2657.04 Cr. Accordingly, corresponding to final cost estimate of Rs 2657.04 Cr at 2017-18 price level, the benefit cost ratio for the project has been finalized to 1.54:1 and the Internal Rate of Return (IRR) as 10.10%.

Detailed calculation of BC Ratio as submitted by IP (S) Directorate, CWC is enclosed as **Annexure XV.**

13. WORK COMPLETION SCHEDULE:

13.1 PHYSICAL SCHEDULE:

In this regard, it is to mention that project is under execution from 2018-19. The overall Physical progress of the project up to 30 Nov, 2021 is 50%, which includes 70% of Headworks & 25% of Canal Works. Further Bar chart from next year onwards are at **Annexure-XVI.**

13.2 YEAR WISE FINANCIAL PROJECTIONS:

Year-wise phasing of finalized cost estimate for the project of Rs 2657.04 Cr @ PL 2017-18 is given in Table 14.2.

Table – 14.2

Yearly Phasing of cost of Lower Orr Project*

Year	**Requirements of fund (Rs in Cr)**
Upto Nov, 2021	1664.52
Nov, 2021 to March 2022	35.48
Apr, 2022 to March 2023	350.00
Apr, 2023 to March 2024	300.00
Apr, 2024 to March 2025	250.00
Apr, 2025 to March 2026	57.03
Total	**2657.03**

*Project started from the year 2018-19

14. RECOMMENDATIONS:

The broad technical and economical aspects of the project proposal have been scrutinized in Central Water Commission on the basis of the data, assessment and certificates presented in the report and information / clarification received as compliances to the observations. The TAC note is prepared on the assumption that the information and data furnished are accurate and have been collected reliably by the project authorities from dependable sources and / or after carrying out detailed surveys and investigations as presented in the report. The issues arising out of changes made during construction stage, designs and drawings shall be duly taken care of by the project authorities. The scrutiny of CWC does not cover the examination of detailed design & working drawings of the individual component of the work of the project in regard to their structural, hydraulic, mechanical and electrical performance and safety which are presumed to be ensured by project authorities.

In view of detailed examination of compliance and estimates, the cost of proposal of Lower Dam Project has been finalized for Rs 2657.04 Cr @ PL 2017-18. The finalized cost of the proposal is subject to correctness of quantities considered in the estimate, supporting documents provided by the project authorities as well as clearance from other concerned directorates of C.W.C.

Lower Orr Dam Project under KBLP (Phase-II) at an estimated cost of Rs 2657.04 Cr @ PL 2017-18 with BC ratio as 1.54 is found techno-economically viable and recommended for consideration and acceptance of the Advisory Committee subject to the conditions that:

i. Statutory clearances (Environment, Forest, wildlife, R&R, etc.) wherever required/pending shall be obtained by project authorities and conditions of such clearances shall be complied by them.
ii. Observations of CWC design wing shall be complied.

15. CHECK LIST

PROJECT: LOWER ORR DAM PROJECT (KBLP, PHASE-II)

Estimated Cost	Rs 2657.04 Cr (at 2017-18 price level)
CCA	90000 ha

PART-I DATA SHEET

<table>
<tr><td>1.a)</td><td>Name of Project and State</td><td>Lower Orr Project, Ken-Betwa Link Project (Phase-II) in Madhya Pradesh</td></tr>
<tr><td></td><td>Attach an Index Map</td><td>Attached at Plate I</td></tr>
<tr><td>b)</td><td>Is the Project included in the plan and what is allocation</td><td>Yes, project included in the plan</td></tr>
<tr><td>2.a)</td><td>Total Estimated cost of the project including credits/debits from concerned projects and foreign exchange component</td><td>Rs 2657.04 Cr (at 2017-18 price level)
Foreign Exchange component is Nil</td></tr>
<tr><td>b)</td><td>Yearly optimum phasing of expenditure and foreign exchange (subject to reasonable equipment, personnel and finance being available)</td><td><table><tr><td>Year</td><td>Requirements of funds (Rs in Lakhs)</td></tr><tr><td>1</td><td>28613.00</td></tr><tr><td>2</td><td>68605.00</td></tr><tr><td>3</td><td>59711.00</td></tr><tr><td>4</td><td>59710.00</td></tr><tr><td>5</td><td>49065.00</td></tr><tr><td>Total</td><td>265703.68</td></tr></table></td></tr>
<tr><td>3.</td><td>Salient feature of the work (location, length, height & type of dam, gross and live storage, length of canal, FRL, MWL whether any lift involved</td><td>Attached as Annexure-I</td></tr>
<tr><td>4.</td><td>Command Area
(GCA, CCA and GIA) in ha</td><td>CCA: 90000 ha
Gross Command Area (GCA): 138462 ha</td></tr>
<tr><td>5.</td><td>Expected Irrigation (Cropped Area in ha)
Power and other benefits</td><td>CCA: 90000 ha for Irrigation & Power Generation
NIL</td></tr>
</table>

6.	Cost per ha of Annual Irrigation	
7.	Benefit Cost Ratio	1.54
8.	Is the project unproductive? What are the special grounds for undertaking?	Project is not unproductive. The project will result in upliftment of socio-economic condition of people in general living in water scarce areas of Ashok Nagar, Shivpuri districts of MP.

PART-II DESCRIPTIVE REPORT & COMMENTS

A. Water Resources, Engineering and other Technical Aspects:

1.	Assumptions and data (give broad details of hydrology, yields, utilization etc.)	As per details mentioned in Para 4 of the main note
2.	Salient features of the physical program and its phasing.	The construction programme is for 60 months
3.	Does this project envisage interlinking with other projects now or at a future date	Yes, this project is part of overall project proposing to inter link Ken and Betwa Rivers
4.	Is the project self contained or does it envisages further stages of development? If the latter, describe their scope and relationship at the present position.	Lower Orr Dam project is part of KBLP. KBLP appraised in CWC in two phases. KBLP (Phase-II) comprises the projects, namely, Lower Orr Dam project along with Kotha Barrage Project and Bina Complex Project.
5.	Has any curtailment or enhancement of the scheme been considered for advantages of economy and whether the scheme proposed will undergo any change on that account.	No change is proposed
6.	Interstate Aspects	NIL

6.a)	Is there any interstate interest or issues involved such as upstream and down-stream utilization, involved.	As per Para 7 of main note inter-state aspects were resolved via signing of MoA between M.P. and U.P. dated 22.03.2021. Annexed as **Annexure XVIII**
6.b)	If so, has the concurrence of the other concerned States has been obtained for implementation of the scheme with regard to questions such as sharing of project, water cost benefits etc.	Sharing of project cost and benefits etc from Ken-Betwa link project will be as per MoU of 2005 between MP & UP **(Annexure VIII-C)** and also will be guided by MoA signed on 22 March 2021 by the Chief Ministers of M.P. and U.P. in the August presence of Honorable Prime Minister of India**. (Annexure-XVIII)**
7.	Are there any special features peculiar to the project in regard to planning and Design.	

B. Cost Estimate & Foreign Exchange:

1.	Attach an abstract of cost	Attached as **Annexure XIV**
2.	Does the cost include necessary provision of drainage? if so, what is the amount provided.	Already exist in command
3.	Has the specific concurrence of the State Finance Department been obtained for taking up the project	Administrative Approval has been accorded for amounting to Rs 2208.03 Cr by Govt. of MP vide letter dated 25.04.2017.(**Annexure-XIX**)

C. Water Utilization:

1.	Drainage Aspects	Already exist in command
2.	Soil conservation in the catchment and command areas	The Catchment area treatment Plan has been prepared and provisions have been made in the cost estimate.
3.	Measures against salinity & alkalinity	NIL
4.	Colonization Plans (if necessary)	

5.	Is there any ayacut development plan	
6.	Are any minor irrigation proposed in the Ayacut?	Project proposes Micro Irrigation
7.	Measures for construction of field channels and water courses.	Project proposes micro irrigation.

D. Benefits:

1.	Are the command area and annual irrigation estimates reliable	Yes
2.	What are the existing and proposed cropping patterns?	Attached at **Annexure - XVII**
3.	What is the net additional agricultural produce expected.	----
4.	Are the cropping pattern and estimates of benefit sound and reasonable? Do they have the concurrence of State Agricultural Department	yes
5.	What is the benefit cost ratio at 10% rate of interest charges? Attach calculations.	1.54 (Calculations attached as **Annexure XV)**.
6.	What is the phasing of expected Benefits	Expected benefits will be available immediately after completion of project.

E: Revenue:

1.	What are the rates of betterment levy proposed, the period for recovery, year of commencement and estimated yield.	**No**
2.	Are any charges proposed for irrigation facilities as distinct from water charges	**No**
3.	Give the scale of water rates for the various crops.	

Annexure-I

NATIONAL PROJECTS

Sl. No	Name of the Project	State (River/Basin)	1) Irrigation Potential (ha.) 2) Power (MW) 3) Storage (MCM)
1	2	3	4
1	Indira Sagar Polavaram Project	Andhra Pradesh (Godavari)	1) 4.36 lakh 2) 960 MW 3) 663.59 MCM of water to Vizag city for drinking and industrial purpose and Diversion of 2264.80 MCM to Krishna basin
2	Gosikhurd Irrigation Project	Maharashtra (Wainganga/ Godavari)	1) 2.50 lakh 2) 3 MW 3) 1147.14 MCM (Gross)
3	Shahpurkandi Dam Project	Punjab (Ravi)	1) 0.37 lakh 2) 206 MW 3) 120.71 MCM (Gross)
4	Saryu Nahar Pariyojna	Uttar Pradesh (Diversion Scheme among Rivers Ghaghara, Saryu, Rapti & Bansagar/ Ganga)	1) 14.04(NP Component:4.73) 2) – 3) Barrage
5	Teesta Barrage Project	West Bengal (Teesta)	1) 9.23 lakh (NP component :5.27 lakh) 2) 1000 MW 3) Barrage
6	Ujh Multipurpose project	J&K (Ujh / Ravi)	1) 0.32 lakh 2) 196 MW 3) 925 MCM (Gross)

7	Lakhwar Multipurpose Project	Uttarakhand (Yamuna)	1) 0.338 lakh 2) 300 MW 3) 587.84 MCM (Gross)
8	Noa-Dihing Dam Project	Arunachal Pradesh (Noa-Dihing)	1) 0.069 lakh 2) 72 MW 3) 322.00 MCM (Gross)
9	Kulsi Dam Project	Assam (Kulsi) Tributary of Brahamputra	1) 0.395 lakh 2) 55 MW 3) 525.64 MCM (Gross)
10	Renuka Dam Project	HP (Giri/Yamuna)	1) Drinking water 2) 40 MW 3) 498.33 MCM (Live)
11	Kishau Multipurpose Project	HP/ Uttarakhand	1) 0.97 lakh 2) 660 MW 3) 1824 MCM (Gross)
12	Bursar HE Project	J&K (Marusudar/ Chenab / Indus)	1) 1.74 lakh 2) 800 MW 3) 616.74 MCM (Gross)
13	Ken Betwa Link Project	Madhya Pradesh & Uttar Pradesh (Ken & Betwa/ Yamuna basin)	1) 10.62 lakh 2) 103 MW 3) 3711.55 MCM (Gross)
14	2nd Ravi Vyas Link Project	Punjab (Ravi Beas Link)	Harness water flowing across border (about 715.42 MCM in non-monsoon period)
15	Upper Siang Project	Arunachal Pradesh (Siang)	1) Indirect 2) 9750 MW 3) 1776.21 MCM (Gross) 4) Flood moderation
16	Gyspa HE Project	HP (Bhaga / Chenab / Indus)	1) 0.50 lakh ha 2) 300 MW 3) 912.78 MCM (Live)
Source: National Projects Directorate, Central Water Commission			
MCM- Million Cubic Meter			MW- Mega Watt

SALIENT FEATURES					
1	Name of the project		Lower Orr Project		
	Type of project		Multipurpose		
	Location		Ashok Nagar, Shivpuri Madhya Pradesh		
2	River Basin		Betwa		
	Name		Orr		
	Located in State(s):		Madhya Pradesh		
	i) Countries (if international river)		NIL		
	River/Tributary		Orr		
			Tributaries - Makua, Reba		
3	State(s)/ District(s)/ Taluka(s) or Tehsils in which following are located		State	District	Tehsils
		(a) Reservoir	M.P	Ashok Nagar, Shivpuri	Chanderi/ khaniadhana
		(b) Headwork	M.P	Ashok Nagar, Shivpuri	Chanderi/ khaniadhana
		(c) Command Area	M.P	Shivpuri Datia	Khaniadhana, Pichhore Kakera, Narwar Datia
		(d) Power House	No Power House		
3.1	Name of Village near the Head-Works		Village: Didauni Tehsil: Khaniadhana		
3.2	Location of Head-Works				
		(a) Longitude	78^0 05' 55"E		
		(b) Latitude	24^0 50' 50"N		
		(c) Seismic	Zone II		
3.3	Access to the Project	Name	Distance		
	Airport	Gwalior, Bhopal	195 km 240 km		
	Rail Head	Lalitpur	60 km		
	Road head (from Rajbagh)	Chanderi	22 km		
4	International/Interstate aspects of the Project : NIL				
5	Catchment area of the basin		1843 sq. km		
	Submergence due to projects	In M.P.	2723.70 ha (Whole in M.P.)		
	Proposed annual	(i) Drinking water	6.00 MCM		

	utilization by the project		
		(ii)Environmental Flow	44.90 MCM
		(iii)Evaporation Loss	21.30 MCM

	Minimum agreed/proposed flow in the river for maintaining ecology			44.90 MCM.	
6	Estimated life of the project (years)			100 yrs.	
7	Irrigation	(Ha.)			
		Area under irrigation (break up)			
		(i) Kharif		Nil	
		(ii) Rabi		90000 hectare	
		(iii) Zaid		Nil	
		District(s) benefited		Shivpuri, Datiaof M.P.	
8	Water Supply	annual		6.00 MCM Drinking	
9	Data(averageof all stations in command area)				
				Maximum	Minimum
			(a) Air temp.(^{O}C)	45	3.8
			(b) Seismic Zone	Zone– II	
			(c) Maximum probable flood	12704 Cumec(m^3/s)	
10	River flows (minimum observed)				
			(a)Water level (El-m)	339.00 m	
			(b) Discharge(m^3/s)	0.02 Cumecs (April, 1995	
			(c) Months of 'nil' flow. If any	NA May, June	
10.1	Reservoir				
10.2	Water levels (El-m)				
			(a) Maximum Water Level (MWL)	380.40 m	
			(b) Full Reservoir Level (FRL)	380.00m	
			(c)Minimum Drawdown Level	360.50m	
			(d) Dead Storage Level	360.50m	
10.3	Outlet levels				
			(a) Irrigation	360m	
			(b) Power	No Hydro Power	
10.4	Other parameters				
			(a) Free board	2.94 m	
			(b) Live storage	328.17 MCM	

			(c) Gross storage		371.80 MCM	
10.5	Sedimentation rate and levels					
			(a) Rate		0.33 mm/Year	
			(b) New zero elevation after 50yrs.		351.80m	
			(c) New zero elevation after 100yrs.		353.53m	
11	Submergence					
11.1	Land and property submerged at MWL					
		(a) Revenue villages affected (no.)			Submergence	Canal System
				(i) Fully	7	
				(ii) Partially	5	
		(b) Land affected (ha)				
				(i) Gross	2723.70	
				(ii)Culturable	853.00	
				(iii Un-Culturable	576.18	
				(iv)Forest	968.24	
				(v) Others	State Land:326.00 ha	Pvt agri land=240.2 ha State revenue land=23.52 ha, Forest land=23.52 ha
		(c)Buildings/houses(No.)				
				(i) Houses	869	
				(ii) Govt.		
				(iii)Temples		
				(iv) Mosques		
				(v)Govt/Pvt schools		
				(vi) Cattle Shed		
				(vii) Structure of cultural		
				(viii) Lift Irrigation		
		(d)Tube Wells/Bore Wells (No.)			93/257	
		(e) Road(km) under submergence				
		(f)Transmission lines (km.) under submergence			NA	
11.2	Total Population under Submergence					
					Families	
		(a) Total			944	
		(b) Scheduled Castes			Not Available	
		(c) Scheduled Tribes			Not Available	
11.3	Population effected under Main Canals and under distributaries					
12	Head works					
12.1	Dam (Non-overflow section)					
		(a) Type of dam		Composite earthen and concrete dam		

		(b) EL of top(m)		384.00m
		(c) Length of Over Flow section		247.00 m
		(d) Length at the river bed(m)		180.00m
		(e)Width at top(m)		8.00 m
12.2	Spillway(overflow section)			
		(a) Location of spillway		Provided within the body of dam
		(b) Type of Spillway		Ogee
		(e) Max height above the deepest foundation(m)		45.00 m
		(f) Crest level (EL-m)		370m
		(g) Number of gates		12
		(h) Type of gate		Radial
			(i) Size of gate	15m(W)x10m(H)
			(ii) FRL	380.00 m
			(i) MWL	380.40 m
		(j) Tail water level (EL)		
			(i) Maximum	-
			(ii) Minimum	-
		(k)Type of energy dissipation arrangement		Stilling basin
12.3	U/S Coffer Dam			
		(a) Height of U/S coffer dam		-
		(b) EL of top		-
12.4	D/S Coffer Dam			
		(a) Height of D/S coffer dam		-
		(b) EL of top		-

12.5	Head Regulator(s)	Left side	Right side
	(a) Total length	104.95	Not provided
	(b) Height above deepest	40.50m	
	(c) Length of bay(m)	5.00m	
	(d) Sill level (EL-m)	360m	
	(e) Number of	2	
	(f)Type of gates	Vertical type	
	(g) Size of gate	2.5x 4.0 m	
	(h) Type of hoisting arrangement	Rope & Drum	
13	Canal System		
	14.1 Main canal	Left bank canal	
		14.1.1Purpose of canal	Irrigation & water supply
		14.1.2 Type of canal	Carrier contour
		(a) Flow/lift	Both
		(b) Lined/unlined	Lined
		(d) Type of lining	100mm thick M15 PCC (0 to 3.1 km) 75mm thick M15 PCC (3.1 to 50.00 km)
	14.2Design data	Left Bank Canal	
	(a) Length (km)	66.67 km	
	(b) Full supply level at head	361.80 m	
	(c) Full supply depth at head	3.80 m	
	(d) Side slope(EL-m)	1.5:1	
	(e) Bottom width of canal upto spill channel	4.35 m	
	(f) Maximum discharging	NA	
	(i) At head	34.00 (0 to 3km) cumec	
	(ii) At tail	20.00 (3 to 66.67 km)cumec	

14.	Cropping Pattern	Name of crop (season- wise)	Area (ha)
	(i) Rabi Season	(a) Wheat (HYV)	39105
		(b) Wheat (ORD)	31995
		(c) Gram N2	7101
		(d) Gram N1 (Peas)	9999
		(e) Other Vegetables	1800
15.	Power	Type	Solar Power
		Installed capacity (MW)	19 MW about 36 ha over submergence Area in the reservoir
16	Total Project Cost (Rs in Crore)	2657.03	
17	BC Ratio	1.54	
	IRR	10.10	
18	Total Project Cost (Rs in Crores)		2657.04
19	BC Ratio		1.54

Annexure-III

भारत सरकार
केंद्रीय जल आयोग
जल विज्ञान (मध्य) निदेशालय
कमरा नंबर 504 (दक्षिण), सेवा भवन,
आर के पुरम, नई दिल्ली
फ़ोन अंक: 26106432

विषय: Comments on Water Availability Studies of Ken-Betwa link (Phase-II)

The Supplementary Report of Ken-Betwa link (Phase-II) which has been received on 07.10.2015 has been examined in this office. In this regard please find enclosed the comments on the Water availability studies.

(एम रघुराम)
निदेशक

निदेशक, (NP-II), केंद्रीय जल आयोग

पत्र संख्या: 1/82/2013/Hyd(C)/ 128 दिनांक: 26 :04:2016

Project Background

Ken Betwa link project - Phase I envisages diversion of 1074 MCM of water from the proposed Daudhan dam on Ken River. Out of diverted water, after en route utilisations, 659 MCM of water will be diverted to Betwa River upstream of existing Parichha weir. As part of Phase-II work it is proposed to utilise equal quantity of water in upper Betwa sub basin upstream of Raghat Dam through construction of 5 projects namelyNeemkhedaBarrage, Barari Barrage, Kesari Barrage,Kotha Barrage and Lower Orr Dam. The hydrological studies of the above five projects have been incorporated in the DPR of Phase-II.

Water Availability Studies

One Gauge &Discharge site is existing at Basoda(CA:7726sqkm) in the Upper Betwa Basin where long term flow data is available for the period 1976-2009. The rainfall data of 15 rain gauge stations is available in the Basin for variable time periods. The consistency of the rainfall data is carried out using the double mass curve technique and necessary corrections are made in the data. The missingrainfall data is filled up using nearby rainfall station data. Based on the refined rainfall data, the weighted areal monthly rainfall for all the five projects and Basoda G&D site is computed for the period 1901-2009 using Thiessen polygon method.

Bhopal Lake with a catchment area of 354 sqkm utilises water of Betwa River and contributes quite marginal quantity of spills downstream side. In view of this, the catchment area of Bhopal Lake is excluded in further water availability studies duly deducting the spills from Basoda discharge data and catchment area from relevant projects' catchment areas. As per the DPR, 34 projects (1 Major, 2 Medium and 31 Minor Projects) utilise/withdraw water upstream of BasodaG&D site.Utilising the relevant inflow series, project operation/ working tables of major and medium projects as well as utilisations of 31 minor projects the virgin flows at Basoda are computed for the period 1976-2009 using the following relationship

$$Basoda_{virgin\_flows} = Basoda_{observed\_flows} - Bhopal_{spills} + Halali_{inflow} - Halali_{spills} - Halali_{10\%\ Diversions} + Kerwan_{90\%\ utilisations} + Kalisot_{90\%\ utilisations} + Minor\ Projects_{\ monthly\_utilisations}$$

Using the Virgin flows and the weighted areal rainfall at Basoda G & D site, rainfall-runoff relationship is established for the monsoon months (viz. June, July, August, September and October). The non-monsoon flows are estimated as 4.264% of the monsoon flows and further the flows are disaggregated into individual non-monsoon month flows in the ratio of relevant month average virgin flows and average non-monsoon virgin flows at Basoda site. Based on the estimated rainfall-runoff relationship and weighted areal monthly rainfall, the virgin flows are computed for Basoda site and all the proposed projects for the period 1901-2009.

The net water yield series at the proposed five projects is estimated after accounting the diversions from the existing /proposed projects, net domestic and industrial demands in the sub-basins using the following relationship.

Net flow at the proposed project

= virgin flows from free catchment area
+ spills form upstream proposed project
+ spills and 10% of diversion of medium projects in the catchmnet
– diversions for minor projects + upstream environmental flows
– withdrawal for domestic industrial demands

In general, the methodology followed is found to be in order. The estimated dependable flows for four projects viz. Neemkheda, Barari, Kesari and Lower Orr given in Table-1 and net flow series enclosed at Annexure 2.4.1, 2.4.4, 2.4.7, 2.4.10 of the supplementary report may be adopted for planning and design purpose subjected to following observations.

Table 1: Dependable Flows

Sl no	Project Name	Dependable Flow (MCM)		
		50%	75%	90%
1	Neemkheda	448.80	334.27	262.16
2	Barari	1423.08	1131.45	831.15
3	Kesari	158.79	123.03	94.20
4	Lower Orr	501.15	362.53	263.98

Observations

1. Out of five projects, Neemkheda, Barari, Kesari and Kotha are barrages and usually the water availability series for barrages is to be estimated on 10 daily bases. In the report, the same is estimated on monthly basis. The same may be updated accordingly.
2. In respect of Kotha barrage, the important levels such as MDDL and Pond Levels are drastically changed from the earlier design levels of 396.5 m and 403.10 m to 384.50m and 396.0m respectively. The Area-Capacity curve given in the supplementary report is deviating from the earlier curve. Further, the design demands of the project are revised from 3.81 MCM to 72 MCM. The correctness of above changes and reasons may be provided.
3. As per the supplementary report, 20% of the 75% dependable flows of monsoon monthsand 15% of the average monthly flows in non-monsoon months are reserved for environmental and ecological purposes and accordingly considered in simulation studies of the projects. However, environmental releases are subject to the approval by the Ministry of Environment and Forests (MoEF). Accordingly, the studies are required to be revised as per the approved environmental flows.
4. As the proposed projects are cascading in nature, the water availability studies of downstream proposed projects depend upon spills/ water demands of the upstream proposed projects. The demands considered in the report may be got vetted by the concerned Irrigation Planning Directorate of CWC and accordingly studies may be revised, if needed.
5. Integrated simulation analysis of Ken-Betwa system is carried out considering the six proposed projects (viz. one project on Ken river and five projects on Betwa river) and

four existing projects in Betwa river basin (viz. Rajghat dam, Matatila dam, Dhukwn dam and Parichha Weir) with multi reservoir simulation studies. The inflow series for the existing four projects is computed by adding the flows from the intervening catchment area, environmental flows, spills and 10% of withdrawals from the upstream projects. The flow from the intervening catchment area is estimated in catchment area proportion using virgin flows of Basoda site, which seems to be generally in order. However, the relevant simulation studies may be got vetted by the concerned Irrigation Planning directorate of CWC.

ANNEXURE-II

Revised Area Capacity curve after 50 years

Elevation in m	Area in (Ha)	Capacity in (Ha.m)	Revised Area (Ha)	Revised Capacity (Ha.m)
380	2723.70	37180.20	2723.70	30398.96
379	2589.90	34523.70	2366.70	27854.06
378	2472.10	31992.90	2199.07	25571.37
377	2349.30	29582.50	2048.58	23447.85
376	2241.30	27287.40	1924.25	21461.64
375	2118.70	25107.70	1792.57	19603.53
374	1946.30	23075.80	1616.23	17899.73
373	1821.10	21192.40	1490.94	16346.44
372	1709.40	19427.50	1382.16	14910.24
371	1641.90	17752.00	1319.96	13559.33
370	1587.90	16137.10	1273.19	12262.76
369	1533.40	14576.60	1227.51	11012.56
368	1469.30	13075.30	1173.51	9812.10
367	1399.40	11641.10	1114.77	8668.10
366	1297.40	10293.00	1024.79	7598.62
365	1203.60	9042.80	943.70	6614.68
364	1141.50	7870.40	894.84	5695.56
363	1060.00	6769.90	826.98	4834.90
362	987.70	5746.30	768.62	4037.36
361	911.10	4797.10	706.13	3300.18
360	826.40	3928.70	635.63	2629.65
359	742.00	3144.90	565.43	2029.52
358	630.20	2459.60	467.74	1513.74
357	544.70	1872.60	396.18	1082.24
356	445.60	1378.30	310.79	729.60
355	390.00	960.80	268.59	440.21
354	287.60	623.30	179.22	217.61
353	193.00	384.60	97.21	81.00
352	118.60	230.30	34.91	16.44
351	74.80	134.40	2.64	0.00
350	47.00	74.10	0.00	0.00
349	20.30	41.30	0.00	0.00
348	7.60	27.90	0.00	0.00
347	5.50	21.40	0.00	0.00
346	4.40	16.40	0.00	0.00
345	8.00	10.30	0.00	0.00
344	2.70	5.20	0.00	0.00
343	1.80	3.00	0.00	0.00
342	1.20	1.50	0.00	0.00
341	0.70	0.50	0.00	0.00
340	0.40	0.00	0.00	0.00

Government of India
Central Water Commission
Hydrology (Central) Directorate
Room no. -504 (S),
Sewa Bhawan, R.K.Puram,
New Delhi-110066
Dated: 17.06.2016

विषयः– Ken Betwa Link (Phase-II)- Flood Studies of Lower Orr Dam.
संदर्भ– Lr.No 4/9/2012/NP-II/ dated 07.10.2015

Kindly refer to above cited letter vide which the project authority has forwarded the supplementary report on Ken-Betwa link (phase-II) for examination from Hydrological angle. The observations on Yield study and Sedimentation study has already been conveyed vide this office letter of even number dated 26-04-2016 & 17-05-2016. This office has now examined the flood study of Ken-Betwa Link (Phase-II) and observation of this office area as under:

Introduction: The Ken- Betwa link project envisages diversion of surplus water of Ken basin to water deficit Betwa basin. The Ken-Betwa link (Phase-II) consists of five projects namely Neemkheda Barrage, Barari Barrage, Kesari Barrage, Kotha Barrage and Lower Orr Dam. Lower Orr dam qualifies for PMF studies whereas others are barrages qualifies for 100 year return period as design flood and SPF as check flood. The catchment area of Lower Orr dam up to the dam site is 1843sq Km.

Design Flood Study of Lower Orr dam carried out by project authority:

In absence of short interval rainfall runoff data, unit hydrograph for the Lower Orr dam has been derived synthetically using Flood Estimation report for sub zone 1 (c). IMD has carried out the PMP studies of Lower Orr dam and recommended Two day & One day PMP values as 758mm & 589mm respectively. 24 hr & 48 hr Time distribution (3-hourly) has also been given by IMD.

The loss rate has not been taken into account while calculating the effective rainfall i.e excess rainfall in the basin. The base flow has been taken from FER of sub zone-1 (c) as 0.018m^3/s/Sq. Km. The peak design flood (PMF) has been worked out as **12067m^3/s.**

Observation:

(i) In the absence of short interval rainfall-runoff data the unit hydrograph derived as per Flood Estimation Report of Sub zone 1(c) is appears to be in order. Project authorities has not smoothened and not adjusted the volume of Unit Hydrograph and also not given the ordinates at 15hr of hourly unit hydrograph. The UG needs to be smoothened before using in convolution.

(ii) Temporal distribution of storm pattern is provided by IMD in 3 hour interval. However, project authorities converted the distribution factor on

hourly basis without smoothening the curve supplied by IMD. The same may be smoothened before converted into 12 hr from 24 hour time distribution.

(iii) The two day and one day PMP as 75.8cm & 58.9 cm supplied by IMD has been considered as design storm appears to be in order.

(iv) The loss rate has not been taken into account while computing the excess rainfall. The same may be taken from concerned FER.

Recommendation:

This office has modified the flood study for the Lower Orr Dam addressing above observation. The Unit hydrograph has been smoothened and adjusted the volume of Unit Hydrograph. The time distribution of 24-hr (3 hourly) as supplied by IMD has been converted into hourly distribution with duly smoothened the curve. The 12 hr temporal distribution has been used to assess the incremental rain fall. The loss rate and base flow have been taken as 0.1cm/hr and 0.018 cumec/sq km respectively from Flood Estimation Report of subzone-1(C) for the calculation of excess rainfall. The excess rainfall has been critically arranged in the two bells per day and convoluted with the Unit Hydrograph. The Peak PMF for the Lower Dam has been worked out as **12354 m^3/s**. Details of the flood study is enclosed at Annex1/1 to 1/7.

The flood studies of other four barrages namely Neemkheda Barrage, Barari Barrage, Kesari Barrage and Kotha Barrage are under examination.

This issues with the approval of CE, HSO,CWC.

(एम॰ रघुराम)
(क्रा॰प्र॰) निदेशक
ज॰वि॰(म॰)

निदेशक, राष्ट्रीय परियोजना–2, निदेशालय, के॰ज॰आ॰ नई दिल्ली–66
पत्र संख्याः1 /82/2013/ज॰वि॰(म॰)/ 255 दिनांकः 17/06/2016

भारत सरकार
केन्द्रीय जल आयोग
जलविज्ञान (मध्य) निदेशालय

CORRIGENDUM

विषयः– Ken Betwa Link (Phase-II)- Flood Studies of Lower Orr Dam.

संदर्भ:- 1. Letter No. 4/9/2012/NP-II/ dated 07.10.2015
2. Letter No. 1/82/2013/Hyd.(C)/ 255 dated 17/06/2016

Kindly refer to above cited letter (Ref.1) vide which the project authority has forwarded the supplementary report on Ken-Betwa link (phase-II) for examination from Hydrological angle. This office had examined the Design Flood Study of Lower Orr Dam of Ken-Betwa Link (Phase-II) and observations were conveyed vide this office Letter mentioned above (Ref. 2). The Peak PMF for the Lower Orr Dam had been worked out and recommended as **12,354 m^3/s**.

However, due to some error found in the calculation of Peak PMF, this office is now revising the Peak PMF for the Lower Orr Dam to **12,704 m^3/s**. No changes have been made in the Design Parameters adopted while calculating the Peak PMF for the Lower Orr Dam. Details of the revised flood study are enclosed at Annex1/1 to 1/7.

Thus, upon correction, Peak PMF for Lower Orr Dam is now recommended as **12,704 m^3/s**.

This issues with the approval of CE, HSO, CWC.

22/7/2016.
(एस. के. सिन्हा)
निदेशक

o/c

निदेषक, राष्ट्रीय परियोजना–2, निदेषालय, के॰ज॰आ॰ नई दिल्ली–66
पत्र संख्याः1 /82/2013/ज॰वि॰(म॰)/ २९४ दिनांकः 19/07/2016

कमरा संख्या 504 (द.), सेवा भवन, आर. के. पुरम सैक्टर-1, नई दिल्ली-110066
दूरभाष: 011-26106432

भारत सरकार
केन्द्रीय जल आयोग
जलविज्ञान (मध्य) निदेशालय

विषयः— **Detailed Project Report of Lower Orr Project (Part of Ken-Betwa Link Project Phase-II) – reg.**

संदर्भः— 1. CWC U.O. No. 4/9/2012/NP-II/1359 dated 31.08.2017
2. Lr. No. 1/82/2013/ज•वि•(म•)/586 dated 21.07.2017

Kindly refer the above cited letter at sl. (1), vide which compliances to the observations of this office, in respect of Lower Orr Project, were communicated. In this regard, it is observed that, since there is no change in the parameters of Lower Orr dam from the previously submitted combined DPR of Ken-Betwa Link (Phase-II) Project, this office has no further comments to offer regarding water availability, design/ diversion flood and sedimentation studies as communicated earlier vide this office letter dated 26.04.2016, 17.05.2016, 17.06.2016, 22.07.2016 & 14.09.2016.

It is, however, advised to carry out an analysis at an appropriate stage subsequently to assess the impact of all the structures now being proposed under Ken-Betwa Link (Phase-II) on the major regulating structures in the downstream on Betwa river.

This issues with the approval of CE, HSO, CWC.

26/9/17
(एस.के.सिन्हा)
निदेशक

निदेषक, राष्ट्रीय परियोजना, निदेषालय, के•ज•आ• नई दिल्ली–66
पत्र संख्याः 1/82/2013/ज•वि•(म•)/441 दिनांकः 26.09.17

DD
3/10/2017

कमरा संख्या 504 (द.), सेवा भवन, आर. के. पुरम सैक्टर-1, नई दिल्ली-110066
दूरभाषः 011-26106432

Lower Orr

Computation of Unit Hydrograph Parameters

As per flood estimation report sub-zone 1 (C)

A	1843	Sq km
L	105.50	km
Lc	47.64	Km
S	1.63	m/km

tp = 2.195*(qp)^-0.944

11.61 **11.50** hrs

qp= 1.331*(L/S)^-0.492

0.171219 **0.171** cumec

W50 = 2.04*(qp)^-1.0265

12.48 **12.48** hrs

W75 = 1.25*(qp)^-0.864

5.74 **5.74** hrs

WR50 = 0.739*(qp)^-0.986

4.21 **4.21** hrs

WR75= 0.500*(qp)^-0.813

2.10 **2.10** hrs

TB = 3.917*(tp)^0.99

44.0 **44.0** hrs

Tm = tp+tr/2

12 **12** hrs

Qp = qp*A

315.56 **315.56** cumecs

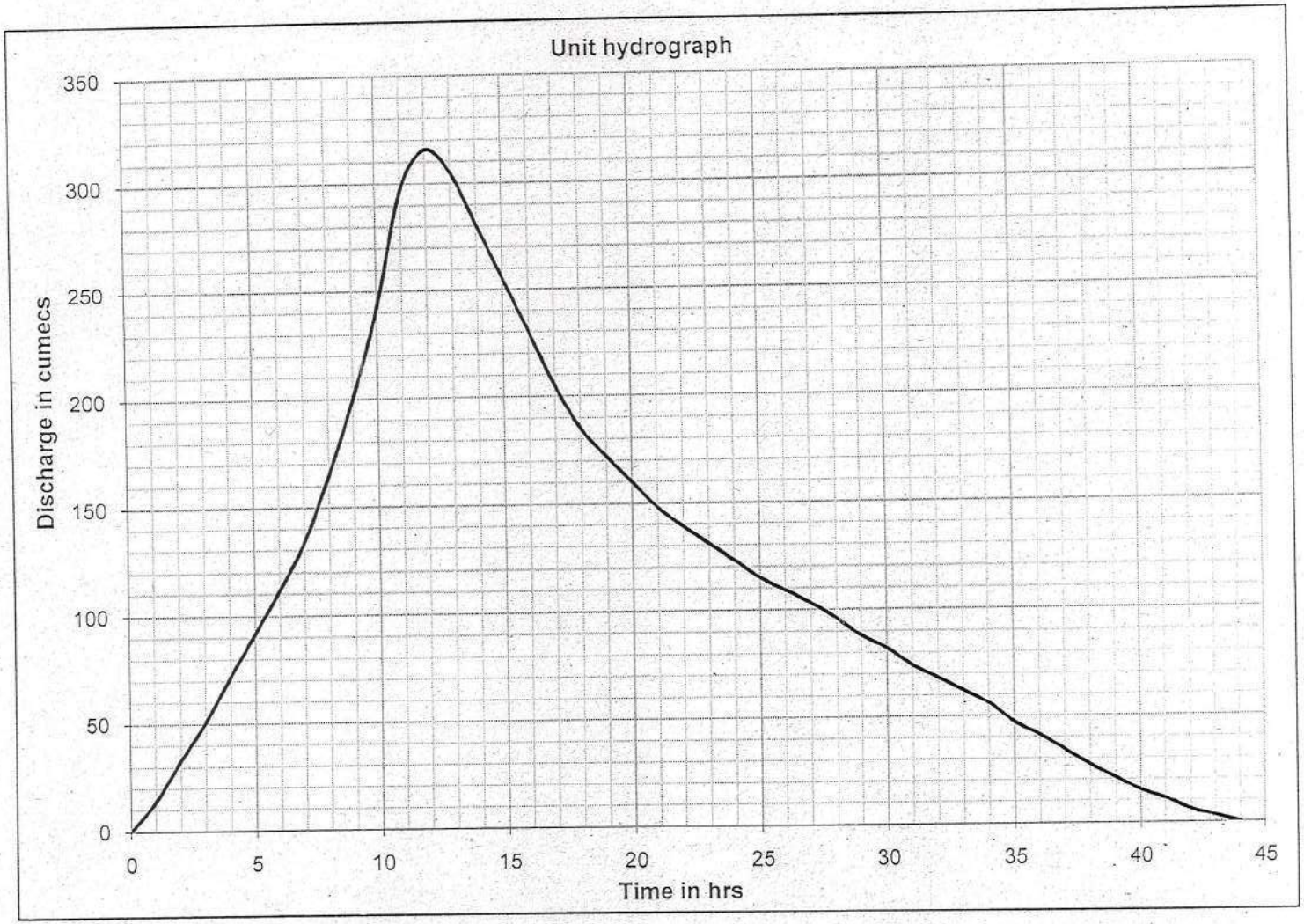
∑Qi = A*d/tr*0.36

d=1.00cm ,tr=1hrs

5119.44 **5119.4** cumecs

UNIT HYDROGRAPH FOR LOWER ORR DAM

Time	Ordinate	Time	Ordinate
0	0.0	30	82.0
1	14.0	31	74.0
2	33.0	32	68.0
3	51.0	33	62.0
4	72.0	34	56.0
5	92.0	35	47.0
6	112.0	36	41.0
7	134.0	37	34.0
8	165.0	38	27.0
9	200.0	39	21.0
10	242.0	40	15.0
11	297.0	41	11.0
12	315.6	42	6.0
13	305.0	43	3.0
14	280.0	44	0.0
15	255.0		
16	230.0		
17	205.0		
18	185.0		
19	172.0		
20	160.0		
21	148.0		
22	139.0		
23	131.0		
24	123.0		
25	115.0		
26	109.0		
27	103.0		
28	96.0		
29	88.0		



Lower Orr
Temporal Distribution of Rainfall

Temporal Distribution (24 hr) of Rainfall

Time (hrs)	Td %
1	17
2	26
3	33
4	38
5	43
6	47
7	51
8	55
9	59
10	63
11	66
12	69
13	72
14	75
15	78
16	81
17	84
18	87
19	90
20	92
21	94
22	96
23	98
24	100

Temporal Distribution (12 hr) of Rainfall

Time (hrs)	Td %
1	25
2	38
3	48
4	55
5	62
6	68
7	74
8	80
9	86
10	91
11	96
12	100

Lower Orr

Computation of Rainfall Excess (PMP)

2- day PMP value	75.8	cm
Ist day PMP value	58.90	cm
IInd day PMP value	16.90	cm

1st Day	Total 1st day rainfall	58.90	cm
	First bell (12 hour)	40.64	cm
	Second bell (12 hour)	18.26	cm
2nd Day	Total 2nd day rainfall	16.90	cm
	First bell (12 hour)	11.66	cm
	Second bell (12 hour)	5.24	cm

Time in hr	Time distribution coeff	% storm distribution	First Day							Second Day					
			I st Bell				2nd Bell			1st Bell			2nd Bell		
			Cum. Rain fall (cm)	Incremental Rainfall (cm)	Loss Rate (cm)	Rainfall Excess (cm)	Cum. Rain fall (cm)	Incremental Rainfall (cm)	Rainfall Excess (cm)	Cum. Rain fall (cm)	Incremental Rainfall (cm)	Rainfall Excess (cm)	Cum. Rain fall (cm)	Incremental Rainfall (cm)	Rainfall Excess (cm)
1	17	25	10.01	10.01	0.10	**9.91**	4.50	4.50	**4.40**	2.87	2.87	**2.77**	1.29	1.29	**1.19**
2	26	38	15.31	5.30	0.10	**5.20**	6.88	2.38	**2.28**	4.39	1.52	**1.42**	1.97	0.68	**0.58**
3	33	48	19.44	4.13	0.10	**4.03**	8.73	1.85	**1.75**	5.58	1.18	**1.08**	2.51	0.53	**0.43**
4	38	55	22.38	2.94	0.10	**2.84**	10.06	1.33	**1.23**	6.42	0.84	**0.74**	2.89	0.38	**0.28**
5	43	62	25.33	2.95	0.10	**2.85**	11.38	1.32	**1.22**	7.27	0.85	**0.75**	3.26	0.38	**0.28**
6	47	68	27.68	2.35	0.10	**2.25**	12.44	1.06	**0.96**	7.94	0.68	**0.58**	3.57	0.30	**0.20**
7	51	74	30.04	2.36	0.10	**2.26**	13.50	1.06	**0.96**	8.62	0.68	**0.58**	3.87	0.30	**0.20**
8	55	80	32.39	2.35	0.10	**2.25**	14.55	1.05	**0.95**	9.29	0.68	**0.58**	4.18	0.30	**0.20**
9	59	86	34.75	2.36	0.10	**2.26**	15.61	1.06	**0.96**	9.97	0.68	**0.58**	4.48	0.30	**0.20**
10	63	91	37.11	2.36	0.10	**2.26**	16.67	1.06	**0.96**	10.65	0.68	**0.58**	4.78	0.30	**0.20**
11	66	96	38.87	1.76	0.10	**1.66**	17.46	0.79	**0.69**	11.15	0.51	**0.41**	5.01	0.23	**0.13**
12	69	100	40.64	1.77	0.10	**1.67**	18.26	0.80	**0.70**	11.66	0.51	**0.41**	5.24	0.23	**0.13**

Lower Orr
Temporal Distribution of Rainfall

Temporal Distribution (24 hr) of Rainfall

Time (hrs)	Td %
1	17
2	26
3	33
4	38
5	43
6	47
7	51
8	55
9	59
10	63
11	66
12	69
13	72
14	75
15	78
16	81
17	84
18	87
19	90
20	92
21	94
22	96
23	98
24	100

Temporal Distribution (12 hr) of Rainfall

Time (hrs)	Td %
1	25
2	38
3	48
4	55
5	62
6	68
7	74
8	80
9	86
10	91
11	96
12	100

Lower Orr

Computation of Rainfall Excess (PMP)

2- day PMP value	75.8	cm
Ist day PMP value	58.90	cm
IInd day PMP value	16.90	cm

1st Day	Total 1st day rainfall	58.90	cm
	First bell (12 hour)	40.64	cm
	Second bell (12 hour)	18.26	cm
2nd Day	Total 2nd day rainfall	16.90	cm
	First bell (12 hour)	11.66	cm
	Second bell (12 hour)	5.24	cm

Time in hr	Time distribution coeff	% storm distribution	First Day							Second Day					
			1st Bell				2nd Bell			1st Bell			2nd Bell		
			Cum. Rain fall (cm)	Increm ental Rainfall (cm)	Loss Rate (cm)	Rainfall Excess (cm)	Cum. Rain fall (cm)	Increm ental Rainfall (cm)	Rainfall Excess (cm)	Cum. Rain fall (cm)	Increm ental Rainfall (cm)	Rainfall Excess (cm)	Cum. Rain fall (cm)	Increm ental Rainfall (cm)	Rainfall Excess (cm)
1	17	25	10.01	10.01	0.10	**9.91**	4.50	4.50	**4.40**	2.87	2.87	**2.77**	1.29	1.29	**1.19**
2	26	38	15.31	5.30	0.10	**5.20**	6.88	2.38	**2.28**	4.39	1.52	**1.42**	1.97	0.68	**0.58**
3	33	48	19.44	4.13	0.10	**4.03**	8.73	1.85	**1.75**	5.58	1.18	**1.08**	2.51	0.53	**0.43**
4	38	55	22.38	2.94	0.10	**2.84**	10.06	1.33	**1.23**	6.42	0.84	**0.74**	2.89	0.38	**0.28**
5	43	62	25.33	2.95	0.10	**2.85**	11.38	1.32	**1.22**	7.27	0.85	**0.75**	3.26	0.38	**0.28**
6	47	68	27.68	2.35	0.10	**2.25**	12.44	1.06	**0.96**	7.94	0.68	**0.58**	3.57	0.30	**0.20**
7	51	74	30.04	2.36	0.10	**2.26**	13.50	1.06	**0.96**	8.62	0.68	**0.58**	3.87	0.30	**0.20**
8	55	80	32.39	2.35	0.10	**2.25**	14.55	1.05	**0.95**	9.29	0.68	**0.58**	4.18	0.30	**0.20**
9	59	86	34.75	2.36	0.10	**2.26**	15.61	1.06	**0.96**	9.97	0.68	**0.58**	4.48	0.30	**0.20**
10	63	91	37.11	2.36	0.10	**2.26**	16.67	1.06	**0.96**	10.65	0.68	**0.58**	4.78	0.30	**0.20**
11	66	96	38.87	1.76	0.10	**1.66**	17.46	0.79	**0.69**	11.15	0.51	**0.41**	5.01	0.23	**0.13**
12	69	100	40.64	1.77	0.10	**1.67**	18.26	0.80	**0.70**	11.66	0.51	**0.41**	5.24	0.23	**0.13**

Orr

Critical Sequencing of rainfall excess

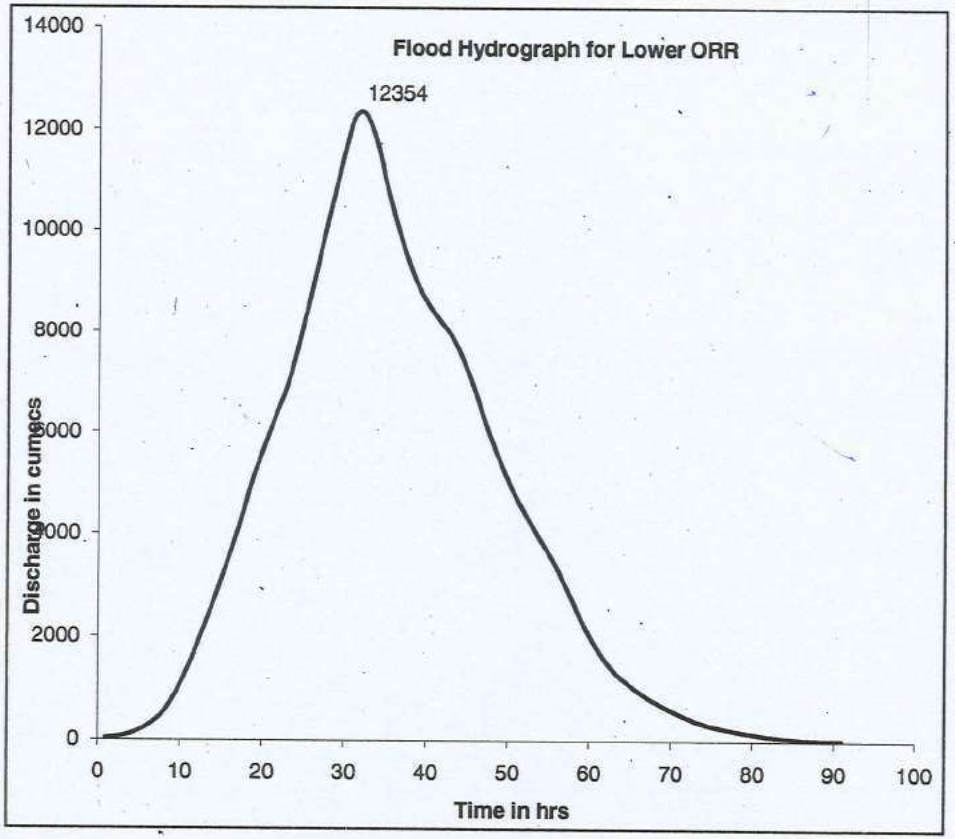
Unit : cm

Time (hrs)	UG ORD (cumecs)	Critical Sequencing				Reverse Order			
		1st Bell	IInd Bell	IIIrd Bell	IVth Bell	1st Bell	IInd Bell	IIIrd Bell	IVth Bell
0	0.0					1.67	0.70	0.41	0.13
1	14.0					2.25	0.96	0.58	0.20
2	33.0					2.26	0.96	0.58	0.20
3	51.0					2.26	0.96	0.58	0.20
4	72.0					2.84	1.22	0.75	0.28
5	92.0					2.85	1.23	0.74	0.28
6	112.0					5.20	2.28	1.42	0.58
7	134.0					9.91	4.40	2.77	1.19
8	165.0	1.66	0.69	0.41	0.13	4.03	1.75	1.08	0.43
9	200.0	2.25	0.96	0.58	0.20	2.26	0.96	0.58	0.20
10	242.0	2.26	0.96	0.58	0.20	2.25	0.96	0.58	0.20
11	297.0	4.03	1.75	1.08	0.43	1.66	0.69	0.41	0.13
12	**315.6**	9.91	4.40	2.77	1.19				
13	305.0	5.20	2.28	1.42	0.58				
14	280.0	2.85	1.23	0.74	0.28				
15	255.0	2.84	1.22	0.75	0.28				
16	230.0	2.26	0.96	0.58	0.20				
17	205.0	2.26	0.96	0.58	0.20				
18	185.0	2.25	0.96	0.58	0.20				
19	172.0	1.67	0.70	0.41	0.13				
20	160.0								
21	148.0								
22	139.0								
23	131.0								
24	123.0								
25	115.0								
26	109.0								
27	103.0								
28	96.0								
29	88.0								
30	82.0								
31	74.0								
32	68.0								
33	62.0								
34	56.0								
35	47.0								
36	41.0								
37	34.0								
38	27.0								
39	21.0								
40	15.0								
41	11.0								
42	6.0								
43	3.0								
44	0.0								

Lower Orr
Flood hydrograph

Unit : cumec

Time in Hours	Total Flood	Time in Hours	Total Flood
0	33	46	6332
1	43	47	5880
2	70	48	5472
3	114	49	5092
4	178	50	4753
5	264	51	4460
6	375	52	4185
7	527	53	3913
8	761	54	3662
9	1055	55	3368
10	1391	56	3044
11	1786	57	2707
12	2206	58	2366
13	2638	59	2063
14	3092	60	1792
15	3572	61	1560
16	4071	62	1366
17	4611	63	1217
18	5164	64	1089
19	5610	65	971
20	6052	66	869
21	6491	67	775
22	6916	68	687
23	7502	69	606
24	8175	70	531
25	8863	71	463
26	9554	72	401
27	10250	73	347
28	10921	74	301
29	11590	75	265
30	12179	76	233
31	12354	77	202
32	12161	78	175
33	11686	79	150
34	10974	80	126
35	10343	81	105
36	9793	82	87
37	9320	83	71
38	8926	84	58
39	8624	85	47
40	8373	86	40
41	8156	87	36
42	7943	88	35
43	7634	89	34
44	7258	90	33
45	6825		



भारत सरकार
केंद्रीय जल आयोग
जल विज्ञान (मध्य) निदेशालय

कमरा नंबर 504 (दक्षिण), सेवा भवन,
आर के पुरम, नई दिल्ली
फोन अंक: 26106432

विषय: Comments on Sedimentation Studies of Ken-Betwa link (Phase-II)

The Supplementary Report of Ken-Betwa link (Phase-II) which has been received on 07.10.2015 has been examined in this office. In this regard please find enclosed the comments on the Sedimentation studies.

(एम रघुराम)
निदेशक

निदेशक, (NP-II), केंद्रीय जल आयोग

पत्र संख्या: 1/82/2013/Hyd(C)/ 420

दिनांक: 17:05:2016

Sedimentation Analysis of Ken Betwa Link (Phase-II)

The Ken BetwaLink (Phase-II) consists of five projects, Neemkheda Barrage, Barari Barrage, Kesari Barrage, Kotha Barrage and Lower Orr Dam. Out of the five projects Lower Orr is the only Dam for which sedimentation studies are carried out and the details are as follows:

No Sediment data is available either at the proposed project or nearby sediment site on Betwa river. Rajghat dam located upstream of the confluence of Orr river with Betwa river, Matatila dam and Dhukwan dams located at the downstream of the confluence of Orr river with the Betwa River are the nearest dams to the proposed Lower Orr Dam. As per CWC publication "Compendium on Silting of Reservoirs in India -2015" the silt rate at Matatila dam, Dhukwan dam, medium value of the silt rate of Indo Gangetic plains are 0.483, 0.030 and 0.752 Th.cu.m/sqkm/year respectively. Looking at the variability of sediment rate at above two projects, the medium value of silt rate pertaining to Indo Gangetic plains (i.e.0.752 Th.cu.m/sqkm/year) is adopted as the design sediment rate for the project.

The Bed Level and FRL of the reservoir are 340.0m and 380.0 m respectively.

The Trap efficiency has been calculated based on Brune's curve for every 5 years period and the sediment load is estimated for 50 and 100 years and the details are enclosed as Annexure-I. The type of the reservoir found to be Type-I. Sediment distribution has been studied based on Empirical Area Reduction method for 50 years and 100 years. For the proposed project the New Zero elevation after 100 years is estimated as 352.830 m and the revised area-elevation-capacity curve after 50 years is enclosed as Annexure-II.

Further, the project authorities are suggested to establish hydro-metrological network in the catchment start observing the data so that studies may be firmed up at later stage. It is also suggested that, all corrections carried out in the computations and changes mentioned in the compliance should be incorporated in the DPR.

ANNEXURE-I

SEDIMENT LOAD FOR LOWER ORR PROJECT

FRL = 380 m

Gross storage at FRL (given) C = 371.802 Mm^3 Average Annual Inflow I = 519.11 Mm^3

51911 Ha.m

CA= 1843 sq km

Rate= 0.0752 Ham/sq.km/year 0.752 mm/yr

Average annual sediment load = 138.5936 Ham / yr

1.385936 MCM /yr

LOWER ORR

COMPUTATION OF TOTAL SEDIMENT

ANNUAL SEDIMENT (HAM/YEAR) 138.5936

Period	Sed Inflow Ha.m	Initial Capacity Ha.m	Trap Efficiency	Annual trapped Volume Ha.m	5 Year Trapped Volume Ha.m	Cumulative Trapped volume Ha.m	Final Capacity Ha.m	C/I Ratio
Start							37180.2	0.7162
1-5	138.59	37180.20	98.03%	135.86	679.31	679.31	36500.89	0.7031
6-10	138.59	36500.89	97.99%	135.81	679.07	1358.37	35821.83	0.6901
11-15	138.59	35821.83	97.96%	135.76	678.82	2037.20	35143.00	0.6770
16-20	138.59	35143.00	97.92%	135.71	678.57	2715.77	34464.43	0.6639
21-25	138.59	34464.43	97.88%	135.66	678.30	3394.07	33786.13	0.6508
25-30	138.59	33786.13	97.84%	135.61	678.03	4072.10	33108.10	0.6378
31-35	138.59	33108.10	97.80%	135.55	677.74	4749.85	32430.35	0.6247
36-40	138.59	32430.35	97.76%	135.49	677.45	5427.29	31752.91	0.6117
41-45	138.59	31752.91	97.72%	135.43	677.14	6104.43	31075.77	0.5986
46-50	138.59	31075.77	97.67%	135.36	676.82	6781.25	30398.95	0.5856
51-55	138.59	30398.95	97.62%	135.30	676.48	7457.73	29722.47	0.5726
56-60	138.59	29722.47	97.57%	135.23	676.13	8133.87	29046.33	0.5595
61-65	138.59	29046.33	97.52%	135.15	675.77	8809.64	28370.56	0.5465
66-70	138.59	28370.56	97.46%	135.08	675.39	9485.02	27695.18	0.5335
71-75	138.59	27695.18	97.41%	135.00	674.99	10160.01	27020.19	0.5205
76-80	138.59	27020.19	97.34%	134.91	674.57	10834.58	26345.62	0.5075
81-85	138.59	26345.62	97.28%	134.83	674.13	11508.71	25671.49	0.4945
86-90	138.59	25671.49	97.21%	134.73	673.67	12182.37	24997.83	0.4816
91-95	138.59	24997.83	97.15%	134.64	673.18	12855.56	24324.64	0.4686
96-100	138.59	24324.64	97.07%	0.00	0.00	12855.56	24324.64	0.4686

भारत सरकार
केन्द्रीय जल आयोग
जलविज्ञान (मध्य) निदेशालय

विषयः– **Ken Betwa Link (Phase-II)- Flood Studies of Neemkheda, Barari, Kesari, Kotha Barrages and Diversion Flood Studies of Lower Orr Dam.**
संदर्भः– Lr. No. 4/9/2012/NP-II/ dated 07.10.2015

Kindly refer to above cited letter vide which the project authority has forwarded the supplementary report on Ken-Betwa Link (phase-II) for examination from Hydrological angle. The observations on Yield study and Sedimentation study had been conveyed vide this office letter of even number dated 26-04-2016 & 17-05-2016. The observations on the design flood study of Lower Orr Dam, Ken-Betwa Link (Phase-II) were also conveyed vide Letter dated 17.06.2016 and subsequently vide Letter dated 22.07.2016. This office has now examined the Flood Studies (including Diversion Flood) of the remaining four Barrages viz. Neemkheda, Barari, Kesari and Kotha Barrages; and Diversion Flood Studies of the Lower Orr Dam for which observations of this office are as under:

Introduction: The Ken- Betwa link project envisages diversion of surplus water of Ken basin to the water deficit Betwa basin. The Ken-Betwa Link (Phase-II) consists of five projects namely Neemkheda Barrage, Barari Barrage, Kesari Barrage, Kotha Barrage and Lower Orr Dam. Lower Orr dam qualifies for PMF studies whereas the four Barrages qualify for 100 year return period as design flood and SPF as check flood. Catchment area of the barrages up to the barrage site is computed using GIS Analysis and found to be as:

Table 1:- Catchment Areas (Sq.Km.) for the Project Sites

S.No.	Project Name	Computed using GIS Analysis (Sq. Km.)
1	Neemkheda Barrage	1965.00
2	Barari Barrage	5387.92
3	Kesari Barrage	518.00
4	Kotha Barrage	9262.51

Design Flood Study of Neemkheda, Barari, Kesari and Kotha Barrages carried out by project authority:

In absence of short interval rainfall runoff data, unit hydrograph for the Neemkheda, Barari, Kesari and Kotha Barrages has been derived synthetically using Flood

Estimation report for sub zone 1 (c). IMD has carried out the SPS studies of Neemkheda, Barari and Kesari Barrages and recommended Two day & One day SPS values as:

Table 2:- SPS Values (mm) recommended by IMD

S.No.	Project Name	SPS Values (mm)	
		1-day	2-day
1	Neemkheda Barrage	355	593
2	Barari Barrage	306	567
3	Kesari Barrage	431	-

The 24 hr & 48 hr Time distribution (3-hourly) has also been given by IMD.

Loss rate of 2.3 mm/hr has been taken into account from FER of sub zone- 1 (c) while calculating the effective rainfall i.e. excess rainfall in the basin. The base flow has been taken from FER of sub zone- 1 (c) as 0.018 m^3/s/Sq. Km. Further, for Barari and Kotha Barrages the flood hydrograph from upper basins have been routed to the outlet using Muskingum- Cunge routing technique and the downstream flood hydrographs are added to the routed hydrograph in order to derive the SPF at the respective project sites. The peak design flood (SPF) has been worked out as:

Table 3:- SPF (cumec) Computed by Project Authority

S.No.	Project Name	SPF (cumec)
1	Neemkheda Barrage	6654.60
2	Barari Barrage	16449
3	Kesari Barrage	2690.14
4	Kotha Barrage	22486

Analysis:

(i) Project Authorities have submitted the Design Flood studies considering 10 Project Sites. However, the Project Authorities subsequently reduced the Project Sites to 5 in number consisting of Lower Orr Dam and four barrages namely Neemkheda, Barari, Kesari and Kotha. This office has now carried out the flood studies considering the above mentioned four barrages and is issuing its recommendations.

(ii) In the absence of short interval rainfall-runoff data the unit hydrographs derived as per Flood Estimation Report of Sub zone 1(c) appears to be in order. Project authorities have not smoothened the Unit Hydrographs. The UG_s needs to be smoothened before using in convolution.

(iii) Temporal distribution of storm pattern is provided by IMD in 3 hour interval. However, project authorities converted the distribution factor on hourly basis

without smoothening the curve supplied by IMD. The same has been smoothened before converting into 12 hr from 24 hour time distribution.

(iv) 1 in 100 Year Return Period Storm has been considered for computing the Design Flood for all the barrages. Isopluvial map of 24- hr 100 Year return period storm as provided by IMD has been used and the following values of point rainfall depth are obtained and used in further analysis:

Table 4:- 24- hr Point Rainfall Depth (mm) Obtained from 100-yr Isopluvial Map

S.No.	Project Name	24- hr Point Rainfall (mm)
1	Neemkheda Barrage	400
2	Barari Barrage	380
3	Kesari Barrage	360
4	Kotha Barrage	380

To convert the point rainfall obtained from isopluvial map into areal rainfall following Area Reduction Factors (ARF); as per FER-1(C) are applied:

Table 5:- Areal Rainfall (mm) after applying ARF

S.No.	Project Name	Point Rainfall (mm)	ARF	Areal Rainfall (mm)
1	Neemkheda Barrage	400	0.7707	308.3
2	Barari Barrage	380	0.76	288.8
3	Kesari Barrage	360	0.858	308.9
4	Kotha Barrage	380	0.76	288.8

(v) The two day and one day SPS values supplied by IMD for the project areas and as mentioned in the DPR have been considered for computing the Check Flood for all the barrages. The SPS value for Kotha Barrage has been taken same as that of Barari Barrage as mentioned in the DPR.

(vi) The loss rate of 2.3 mm/hr has been taken into account while computing the excess rainfall in case of design flood and 1.0 mm /hr has been adopted for check flood. These values have been taken from concerned FER of sub zone- 1 (c).

Recommendation:

This office has modified the flood study for the Neemkheda, Barari, Kesari and Kotha Barrages addressing above observation. The Unit hydrograph has been smoothened and adjusted for the volume of Unit Hydrograph. The time distribution of 24-hr (3 hourly) as supplied by IMD has been converted into hourly distribution with duly smoothening the curve. The 12 hr temporal distribution has been used to assess the incremental rain fall. The loss rate as mentioned in the observations (v) and base flow of 0.018 cumec/sq km have been taken from Flood Estimation Report of subzone-1(C) for the calculation of excess rainfall. The excess rainfall has been critically arranged in the two bells per day and convoluted with the Unit Hydrographs.

The Peak Design Flood and Peak Check Flood for the Neemkheda, Barari, Kesari and Kotha Barrages have been worked out as follows:

Table 6:- Peak Design Flood and Peak Check Flood

S.No.	Project Name	Peak Design Flood (cumec)	Peak Check Flood (cumec)
1	Neemkheda Barrage	**5298**	8345
2	Barari Barrage	**11983**	16439
3	Kesari Barrage	**1856**	2866
4	Kotha Barrage	**18698**	26673

Flood frequency analysis has also been performed as a check to the derived Design Flood values. Results obtained from the 'Log Pearson Type-III' Frequency Distribution of Basoda G&D Site have been used to compute the various return period floods for all the four Projects in the proportion to the ratio of (Catchment area) $^{0.75}$ and the same are tabulated below:

Table 7:- Return Period Floods from Flood Frequency Analysis

S.No.	Project Name	Return Period Flood transferred from Basoda G&D Site	
		100- Years	500- Years
1	Neemkheda Barrage	4801.36	6578.46
2	Barari Barrage	10230.76	14017.42
3	Kesari Barrage	1766.40	2420.19
4	Kotha Barrage	15359.90	21045

The Values of the Peak Design Flood computed are found to be in order with the values obtained from Flood Frequency analysis. Hence, the values of Peak Design Flood and Peak Check Flood tabulated in Table 6 are recommended for planning and design purpose.

Diversion Flood:

a) For Neemkheda, Barari, Kesari and Kotha Barrages

Diversion flood for all the four barrages has been evaluated as the maximum of the following two criteria: a) Maximum non-monsoon flow observed at the barrage site OR; b) 25-year return period flow, calculated on the basis of non-monsoon yearly peaks. The peak of daily flow for non-monsoon months, available for 35 years at Basoda G&D Site was provided by Project Authority and used in our analysis. The 25-year return period flow was calculated using the 'Pearson Type-III' frequency distribution. The diversion flood obtained and recommended are as follows:

Table 8:- Recommended Diversion Flood for all the Barrages

Project Site	Flow (cumec)			
	Max. Observed		25-year return period	Recommended

	(non-monsoon)	(non-monsoon)	Diversion Flood
Neemkheda Barrage	300.84	172.22	301
Barari Barrage	641.02	366.98	641
Kesari Barrage	110.68	63.36	111
Kotha Barrage	962.39	550.96	963

b) For Lower Orr Dam

Lower Orr being a large dam, it is desirable that 100-year return period flood should be adopted for diversion works. Accordingly, the annual peaks of daily flow provided by Project Authority for Basoda G&D Site have been used for computing the 100-year return period flood for Lower Orr Dam. Peak flows were adjusted in proportion to the ratio of (Catchment area)$^{0.75}$. 'Log Pearson Type-III' frequency distribution has been used to compute the 100-year flood for the Dam site. The Diversion Flood for Lower Orr Dam computed and recommended is **4576 cumec**.

Details of the flood study are enclosed at Annex 1 to 119.

This issues with the approval of CE, HSO, CWC.

14/9/2016

(एस.के.सिन्हा)
निदेशक
ज•वि•(म•)

O/C

निदेषक, राष्ट्रीय परियोजना–2, निदेषालय, के•ज•आ• नई दिल्ली–66
पत्र संख्या:1 /82/2013/ज•वि•(म•)/311 दिनांक: 14/09/2016

कमरा संख्या 504 (द.), सेवा भवन, आर. के. पुरम सैक्टर-1, नई दिल्ली-110066
दूरभाष: 011-26106432

Annexure-VII

भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
केन्द्रीय जल आयोग
सिंचाई आयोजन (दक्षिण(निदेशालय

सत्यमेव जयते

Government of India
Ministry of Jal Shakti
Deptt. of Water Resources, RD&GR
Central Water Commission
Irrigation Planning (South) Directorate

विषय: Lower Orr dam project- Part of Comprehensive Report of Ken-Betwa Link project-reg.

संदर्भ: (i) File No.T-26030/2/2020-IP(S) DTE I/75508/2021 dated 08.11.2021.
(ii) Email from Project Authorities dated 12.11.2021.
(iii) Email from Project Authorities dated 15.11.2021.
(iv) Email from NP Dte. dated 18.11.2021

May please refer to the email received under reference (iv) above vide which NP Dte. of CWC has forwarded the copy of minutes of the meeting held on 02.11.2021 under the chairmanship of Member, WP&P,CWC. Based on the above, the BC ratio of the project has been revised and reworked out. Further, vide email under reference (ii) above the Project Authorities has submitted the revised BC ratio computation for examination. The same has been examined and the observations thereon are as under:

Observations:

1. The project authorities have now submitted the documents for ground water availability of 94.08 MCM in the command of the project duly authenticated by the Superintending Geohydrologist, Ground Water Survey Circle, Bhopal.
2. The project authorities have now provide the certificate in respect of benefits of fisheries duly authenticated by Assistant Director, State Fisheries Department, MP and now the production rate (in kg/ha) and rate per kg of fish has been considered @ Rs. 600 kg/ha and @ Rs. 570/ kg (as per 2021 price level) respectively. The rate per kg of fish has been revised by the project authorities at 2017-18 price level with 3 % depreciation each year as Rs. 504.68 / kg and the same has been used for calculating the benefits of fisheries. However, on examination of the documents, the benefits of fisheries have been applicable to Kotha Barrage project only. In this regard, the project authorities vide their letter dated 15.11.2021 have clarified that the yield and rates of fisheries for Kotha Barrage is applicable to Lower Orr also. Based on this, the benefits of fisheries have been considered in the BC Ratio computation.
3. Based on the meeting held on 02.11.2021 under the chairmanship of Member, WP&P,CWC, it was decided to consider the crop rates for Lower Orr project for the year 2017 by arriving at from that of year 2021 after taking into account inflation. Accordingly, the rates and cost of cultivation (viz. seeds, manure, labour etc.) of crops in pre-project and post project scenario has been revised.

Subject to the above and based on veracity of the documents submitted by the

project authorities, the BC ratio computation has been reworked out as 1.54.

This issues with approval of CE (IMO), CWC, New Delhi.

Signed by Vineet Gupta
Date: 29-11-2021 13:26:02
Reason: Approved

विनीत गुप्ता

निदेशक - सिंचाई आयोजन (दक्षिण)

To.

i. Director, NP Dte., CWC, Sewa Bhawan, R.K Puram, New Delhi.
ii. Director, PA (C) Dte., CWC, Sewa Bhawan, R.K Puram, New Delhi.

Copy for kind information to :

(i) CE, PAO, CWC, Sewa Bhawan, R.K Puram, New Delhi.
(ii) CE, PPO, CWC, Sewa Bhawan, R.K Puram, New Delhi.

भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
केन्द्रीय जल आयोग
सिंचाई आयोजन (दक्षिण) निदेशालय

सत्यमेव जयते

Government of India
Ministry of Jal Shakti
Deptt. of Water Resources, RD&GR
Central Water Commission
Irrigation Planning (South) Directorate

विषय**:** Comprehensive Report of Ken-Betwa Link project - reg.
Ref: (i) No. 4/11/2019/NP-II/Vol-I/3055 dated 19.08.2019
(ii) No. 4/11/2019/NP-II/Vol-I/3040-51 dated 03.09.2019

May please refer to the letter under reference (i) above vide which Comprehensive Report of Ken-Betwa Link project has been forwarded for examination which consists of Dhaudhan dam, Lower Orr dam, Bina complex multipurpose project, Kotha Barrage, the additional CCA, repair / strengthening of Bariyarpur Pickup weir, Paricha Weir and Barwa Sagar dam. Further, under reference (ii) above, NP Directorate of CWC, informed that some changes are likely to be expected in the Comprehensive Report of Ken-Betwa Link project after resolving of water sharing issues related to non-monsoon season between MP & UP state. However, no revised Comprehensive Report of Ken-Betwa Link project has been received till now.

Further, NWDA vide their letter dated 09.07.2019 provided the comparative statement including changes between the proposed components as envisaged in the Comprehensive Report of Ken-Betwa Link Project viz a viz earlier submitted DPR of Phase-I & Phase-II. The details are as under.

	Provisions in DPRs of Ken Betwa Link project, Phase-I & Phase-II	**Provisions in Comprehensive Report, October 2018**	**Changes [column (2) –(1)]**
	(1)	**(2)**	**(3)**
a.	**Daudhan Dam**		
(i)	Command area in MP-287837 ha	Command area in MP-447368 ha	***Increase in command area by 1,59,531 ha***
(ii)	Command area in UP-227373 ha	Command area in UP-251064 ha	***Increase in command area by 23,691 ha***
(iii)	Annual utilisation in MP - 1788 MCM and 591 MCM by substitution	Annual utilisation in MP-2349.87 MCM	***Change in Annual water utilisation***
(iv)	Annual utilisation in UP - 1700 MCM	Annual utilisation in UP-1700.08 MCM	***No change***

b.	**Lower Orr dam**		
(i)	Command area in MP-45047 ha	Command area in MP-90000 ha	***Increase in command area by 44,953 ha***
(ii)	Annual utilisation in MP-329.67 MCM	Annual utilisation in MP-291.77 MCM	***Decrease in Annual water utilisation by 37.90 MCM***
c.	**Kotha Barrage**		
(i)	Command area in MP-20000 ha	Command area in MP-20000 ha	***No change***
(ii)	Annual utilisation in MP-88.19 MCM	Annual utilisation in MP-88.19 MCM	
d.	**Bina Complex**		
(i)	Command area in MP-96000 ha	Command area in MP-96000 ha	***No change***
(ii)	Annual utilisation in MP-413.35 MCM	Annual utilisation in MP-413.35 MCM	

From the above table, it may be seen that no change in irrigation planning parameters i.e. command area and water utilisation has been proposed for Kotha Barrage and Bina complex Multipurpose project respectively. **Therefore, the observations in respect of Kotha Barrage submitted to CE, PPO, CWC vide this office letter dated 27.08.2018 (copy enclosed) and the observations in respect of Bina complex Multipurpose project submitted to CE, PAO, CWC vide this office letter dated 10.09.2018 (copy enclosed) stands valid. The project authorities are requested to submit the compliance of the observations in respect of these two projects at earliest to this office.**

The Comprehensive Report of Ken-Betwa Link project has been examined and comments / observations are as under.

A. **Ken-Betwa Link Canal Command**

At page no. 133 of the Comprehensive Report of Ken-Betwa Link project, Vol-I, the details of command area of MP under Ken-Betwa Link project has been provided, which is as under.

S. No.	Canal System	CCA as per Comprehensive Project report in MP	CCA as per Comprehensive Project report in UP
1.	K-B Link Main Canal	96751 ha	58585 ha
2.	High Level command through K-B link through pumping of water	85774 ha	0
3.	Bariyarpur PUW through Dam		

	i. Chhatarpur ii. Panna	34894 ha	192479
4.	Ken left bank canal	139848 ha	0
5.	Lift from Daudhan dam	90101 ha	0
	Total	447368 ha	251064 ha

From the above, it has been seen that the Ken-Betwa Link Canal Command is lying in MP and UP with 447368 ha and 251064 ha of CCA respectively. **At page no. 141 of the Comprehensive Report of Ken-Betwa Link project, Vol-I, it has been stated that no details have been submitted by the Government of UP for computation of crop water requirement. It is, therefore, requested that the details may be furnished so that the crop water requirement may be finalized for UP portion.**

The other observations are given as under.

i. The net hydrological yield series/flow series is considered for the period from 1981-82 to 2003-04 and the same has been developed by NIH, Roorkee. Therefore, it is suggested that net hydrological yield series/flow series may be got approved from the concerned Hydrology Directorate of CWC to establish the water availability for the project and the same may be furnished.

ii. The proposed cropping pattern has been given on Page no. 139 & 140 of Vol-I. It is suggested that the proposed cropping pattern may be got approved by the Director, State Agriculture Department (UP & MP) and a copy of the same may be furnished.

iii. At page no. 141 of the Comprehensive Report of Ken-Betwa Link project, Vol-I, the crop water requirement has been worked out as 2238.76 MCM (441.64 MCM for Kharif season & 1797.12 MCM for Rabi season). However, on page 147 of the same report, the water requirement has been mentioned as 2349.87 MCM. The discrepancy may be rectified.

iv. The following observations may please be clarified/ complied for better appraisal of the crop water requirement.

a. **Reference station for computation of Eto & effective rainfall has not been given.** The details of the station may be provided so as Eto and effective rainfall value may be considered suitably.

b. Percolation losses for paddy crop have been considered as 2 mm per day by the project authorities. **It is suggested that the same may be used in the range of 3-6 mm per day depending upon the type of the soil in the command**.

c. **The details in respect of field application and conveyance efficiency have not been mentioned separately in the report.** It is suggested that irrigation efficiencies may be considered as per CWC guidelines of “Piped irrigation network (PIN) planning” which is available on CWC website.

v. **Considering the comments under paras (i) to (iv) above, the irrigation demand table may be worked out and furnished**.

vi. **The working tables/simulation study using the net yield series at dam site duly approved by the concerned Hydrology Directorate of CWC and**

the revised irrigation demand table may be prepared and furnished to assess the success rate of the project.

vii. For irrigation planning aspects, reference material "A guide to prepare chapter on irrigation planning aspects of detailed project report" may also be referred which is available on CWC website.

B. Betwa Basin Command

Lower Orr dam project:

As per the Comprehensive Report of Ken-Betwa Link project, the project envisages construction of Lower Orr dam (on Orr River about 9 km u/s of confluence with river Betwa) and a 91.26 km long left main canal. The gross and live storage capacity of dam has been considered as 372 MCM and 328.17 MCM respectively. The 75% dependable yield at dam site has been assessed as 362.53 MCM. The culturable command area (CCA) of the project is 90,000 ha lying in Shivpuri and Datia district of MP. The proposed cropping pattern in the command is wheat, gram and vegetables. The total cost of the project has been estimated as Rs.3065.14 crore @ price level 2017-18.

Comments:

1. **Irrigation Planning aspects:**

i. The net hydrological yield series/flow series for Lower Orr dam is considered for the period from 1954-55 to 2008-09 and the same has been developed by NIH, Roorkee. Therefore, it is suggested that net hydrological yield series/flow series may be got approved from the concerned Hydrology Directorate of CWC to establish the water availability for the project and the same may be furnished.

ii. The proposed cropping pattern has been given on Page no. 159 of Vol-I and the same has been vetted by the Assistant Director, Sate Agriculture Department. It is suggested that the proposed cropping pattern may be got approved by the Director, State Agriculture Department and a copy of the same may be furnished.

iii. The crop water requirement had been computed for Rabi period (October-February) and the crop considered for 90,000 CCA are Wheat, Gram and Vegetables/others (table 6.17). In computation of crop water requirement, there are certain deficiencies that should be cleared for better appraisal of the crop water requirement.

a. **Reference station for computation of Eto & effective rainfall has not been given**. However, after considering Guna station (approx. 100 km from Shivpuri District), it has been observed that there is huge difference in the value of ETo and effective rainfall as considered in the computation of crop water requirement (Annex 6.14). The details of the station may be provided so as Eto and effective rainfall value may be considered accordingly.

b. Earlier, as per the DPR of Lower Orr Project under Ken Betwa Link project Phase II, 329.67 MCM of water was required to irrigate 45,047 ha of CCA. However, with the same quantity of water, the project authorities have now proposed to irrigate 90,000 ha of CCA. It has been observed (page 162 of Vol-I) that the field application efficiency has been considered as 85%. However, in the crop water computation, the overall efficiency has also been considered as 85%. The details in respect of conveyance efficiency have not been mentioned in the report, which may be provided.

   It may be noted that as per CWC guidelines "A guide to prepare chapter on irrigation planning aspects of detailed project report", conveyance efficiency for canal based conveyance system (fully lined) may be considered as 70% to 75%. As per CWC guidelines on "Piped Irrigation Network (PIN) planning", conveyance efficiency for pipe based conveyance system may be considered as 95%. The field application efficiency for DRIP irrigation can be assumed upto 90% as per CWC guideline "Piped irrigation network (PIN) planning".

c. CCA of Lower Orr Dam is 90,000 ha with following two components.

- One component involves first water transport though carrier canal for a length of 50 km (refer page xii of executive summary) and afterwards water is lifted from carrier canal to provide irrigation to 40,000 ha (as per table 6.15, page 159) through pipeline by gravity flow. In this scenario, first crop water requirement has to be calculated at the terminal point of carrier canal. After that, water demand at Headwork may be calculated by multiplying crop water requirement (calculated at the terminal point of carrier canal) by the conveyance efficiency of carrier canal. In case of lined carrier canal, the conveyance efficiency may be considered in the range of 70 to 75% and in case of unlined carrier canal, the conveyance efficiency may be considered in the range of 55 to 60% as per CWC guidelines "A guide to prepare chapter on irrigation planning aspects of detailed project report". The project authorities may clarify whether carrier canal is lined or unlined and the conveyance efficiency may be considered accordingly. The field application efficiency for DRIP irrigation has been assumed as 85% by the Project Authorities (vide Page No 162 of Vol -1).
- Second component involves irrigation to 50,000 ha (as per table 6.15, page 159) only through pipeline. In this scenario, as per CWC guideline "Piped irrigation network (PIN) planning", water demand at Headwork may be calculated taking pipe based conveyance efficiency (using Drip) as 95%, while field application efficiency has already been assumed by Project Authorities as 85%.

iv. Considering the comments under para (i) to (iii) above, the irrigation demand table may be worked out and furnished.

v. The working tables/simulation study using the net yield series at dam site duly approved by the concerned Hydrology Directorate of CWC and the revised irrigation demand table (as per Para 1. (iv) above) may be prepared and furnished to assess the success rate of the project.

vi. For irrigation planning aspects, reference material "A guide to prepare chapter

on irrigation planning aspects of detailed project report" may also be referred which is available on CWC website.

2. **B C Ratio**

The B.C. ratio has been worked out as 1.58 by the project authorities. The project authority may provide the compliance/clarifications to the following observations.

i. The BC Ratio computation has not been done as per the CWC guideline. It is suggested that the same may be worked out using the proforma attached in the "Guidelines for preparation of Detailed Project Reports of Irrigation & Multipurpose projects" of the Ministry published in 2010.
ii. The cost of the project may also be got approved by the Cost Appraisal (I) Dte. of CWC. The price level for the cost of the project and benefits from agricultural produces may be considered at same price-level while carrying out the B.C. Ratio computation.
iii. The interest @ 10% on the estimated cost of the project including the cost of land development may be considered for carrying out the B.C. ratio computation. The cost of land development @ Rs.20,000 per ha of CCA may be considered for the purpose.
iv. The yield, rates and cost of cultivation (viz. seeds, manure, labour etc.) of crops in pre-project and post project scenario may be got approved by the Director, State Agriculture Department in the format given in the "Guidelines for Submission, Appraisal and Acceptance of Irrigation and Multipurpose Projects, 2017" of CWC *(Appendix F (1) and F(2))* for the purpose of estimating the agricultural benefits.
v. Since, repair / strengthening of Bariyarpur Pickup weir, Paricca Weir and Barwa Sagar dam is part of K-B link project, project authorities may confirm whether there is any increase in discharge through regulators of these weirs due to repair / strengthening works. If so, then details of the corresponding increase in irrigation potential and consequent additional benefits may be furnished.

This issues with the approval of Chief Engineer, IMO, CWC, New Delhi.

Signature Not Verified
Digitally signed by BHUPESH KUMAR
Date: 2020.11.05 12:07:40 IST

भूपेश कुमार
(निदेशक)

To.

i. Director, NP Dte., CWC, Sewa Bhawan, R.K Puram, New Delhi.
ii. Director, PA (C) Dte., CWC, Sewa Bhawan, R.K Puram, New Delhi.

Copy for kind information to :

i. CE, PAO, CWC, Sewa Bhawan, R.K Puram, New Delhi.
ii. CE, PPO, CWC, Sewa Bhawan, R.K Puram, New Delhi.

भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग
केन्द्रीय जल आयोग
सिंचाई आयोजन)दक्षिण (निदेशालय

Government of India
Ministry of Jal Shakti
Deptt. of Water Resources, RD&GR
Central Water Commission
Irrigation Planning (South) Directorate

विषय: Lower Orr dam project- Part of Comprehensive Report of Ken-Betwa Link project-reg.

संदर्भ: (i) Email from Project Authorities dated 03.11.2021.
(ii) Email from NP Dte. dated 03.11.2021
(iii) Email from NP Dte. dated 05.11.2021
(iv)Email from Project Authorities dated 05.11.2021.

May please refer to the email received under reference (iii) above vide which NP Dte. of CWC has forwarded the revised finalized cost of the Lower Orr dam project. Further, vide email under reference (ii) above the Project Authorities, Govt. of M.P. has submitted the revised working table and BC ratio computation for examination. The same has been examined and the observations thereon are as under:

Observations:

1. The working table submitted by the project authorities has been examined and it has been found that the same has been prepared from period 1978-79 to 2008-09 (31 years). Further, the working table has been prepared by the project authorities considering the inflow series approved by Hydrology (C) Dte. letter dated 26.04.2016. It has been found that the project authorities have considered the ground water use as 77.91 MCM (20% of 389.53 MCM). This office has earlier vide letter dated 18.10.2021 has asked the project authorities to furnish the letter for the quantum of ground water availability in the command authenticated by the CGWB/State Ground water board. However, no such documents have been furnished to this office yet. It is therefore once again suggested that the project authorities may submit the documents for ground water availability of 77.91 MCM in the command of the project duly authenticated by the CGWB/State Ground water board to this office for reference and record.

   Subject to above, the working table has been examined and success rate thus worked out as 80.65 %. However, if there is any change in points mentioned in para 1 above, the working tables will also need a review to assess the success rate of the project.

2. The cost of the project has now been finalised by the Cost Appraisal (I) Dte. of CWC as Rs. 265703.68 lakhs (at Price level 2017-18) and the same has been forwarded by NP Dte. of CWC vide under reference (iv) above. Based on this, the BC Ratio computation has been worked out by the project authorities as 1.81. The same has

been examined and following observations have been made.

a. The project authorities have considered the benefits of fisheries as Rs. 10500.815 lakhs. The production rate (in kg/ha) and rate per kg of fish has been considered @ Rs. 2000 kg/ha and @ Rs. 300/ kg respectively. However, no supporting documents in respect of production rate (in kg/ha) and rate per kg of fish has been furnished by the project authorities. The project authorities may substantiate these components of cost and benefits by their experience in similar sized reservoirs in MP State. It is suggested that the supporting documents in respect of the benefits related to fisheries may be got approved from the State Fishery Department, MP and a copy of the same may be submitted to this Directorate for reference and record.
b. The benefits from solar power generation of 19 MW has been considered as Rs. 3665.1 lakhs and the solar power purchase rate has been considered @ Rs. 6.43/ Kwhr as per the Retail Supply Tariff Order FY 2017-18 of Madhya Pradesh Electricity Regulatory Commission. However, it is suggested that the solar power purchase rate considered above may also be got vetted by the Central Electricity Authority, New Delhi. PAO may also clarify that the cost of the Power component includes the cost of transmission and distribution also, as the benefit is considered at the retail consumer level.
c. The quantum of power requirement for lift have been assessed as Rs. 4410 per ha by the project authorities. The energy charges have been considered as Rs. 5 per unit as per the Retail Supply Tariff Order FY 2017-18 of Madhya Pradesh Electricity Regulatory Commission. However, it is suggested that the energy charges considered above may also be got vetted by the Central Electricity Authority, New Delhi.
d. The project authorities under reference (iv) above have submitted the certificate of computation of cost towards tubewells as Rs. 1097 lakhs and and the same has been used in the BC Ratio computation.
e. The yield, rates and cost of cultivation (viz. seeds, manure, labour etc.) of crops in pre-project and post project scenario has been forwarded by the NP Dte. of CWC vide reference (iii) above. On examination, it is found that the same has been got approved by the Deputy Director, State Agriculture Department in the format given in the "Guidelines for Submission, Appraisal and Acceptance of Irrigation and Multipurpose Projects, 2017" of CWC *(Appendix F (1) and F(2))* for the purpose of estimating the agricultural benefits. However, as per 2017 guideline of PAO, CWC, the same has to be signed from the Director, State Agriculture Department. PAO, CWC may take a view on this.

Subject to the above and based on veracity of the documents submitted by the project authorities, the BC ratio computation has been checked and found to be 1.81.

This issues with approval of CE (IMO), CWC, New Delhi.

I/75508/2021

Signed by Vineet Gupta
Date: 08-11-2021 10:17:00
Reason: Approved
विनीत गुप्ता
निदेशक - सिंचाई आयोजन (दक्षिण)

To.

i. Director, NP Dte., CWC, Sewa Bhawan, R.K Puram, New Delhi.

(ii) Director, PA (C) Dte., CWC, Sewa Bhawan, R.K Puram, New Delhi.

Copy for kind information to :

(i) CE, PAO, CWC, Sewa Bhawan, R.K Puram, New Delhi.

(ii) CE, PPO, CWC, Sewa Bhawan, R.K Puram, New Delhi.

Government of India
भारत सरकार
Central Water Commission
केन्द्रीय जल आयोग
Inter State Matters-2 Dte.
अंतरराज्यीय मामले निदेशालय

204(S), SewaBhawan
204 (द.), सेवा भवन
R.K.Puram, New Delhi-66
रामा कृष्ण पुरम, नई दिल्ली -६६
Telephone No: 011-29583207
Email: ism2dte@gmail.com

Sub: Completion of Techno-economic appraisal of Kotha Barrage Project and Lower Orr Project under Ken-Betwa Link Project (Phase II) – Reg

DPRs of Kotha Barrage Project, Lower Orr Project, Bina Complex Project proposed under phase II of Ken Betwa Link Projects as received from NWDA are under currently under examination from inter-State angle.

In respect of examination of DPR of Kotha Barrage Project, this office had asked the Project Authority vide letter no 2/1/ISM-2/2017/93 dated 17/7/2017 to provide details of approved water utilisation from existing, ongoing and proposed schemes in the entire Betwa sub-basin and/or a copy of updated master plan duly authenticated by Govt. of Madhya Pradesh, to enable this Directorate maintain an account of utilisation of Betwa river waters. Betwa River upstream of Rajghat dam vide their Memo no 372 dated 18/12/2017. In the revised abstract of water use of Betwa River upstream of Rajghat dam, total water utilisation from existing, proposed and ongoing projects in Betwa basin U/S of Rajghat dam including Kotha Barrage and Bina Complex projects has been shown as 52.721 TMC, wherein, inter basin transfer of 1.95 TMC from Dhasan river for Bina complex project has been envisaged. Accordingly the total utilisation as proposed by Govt. of Madhya Pradesh is well within the agreed share of 53 TMC for Madhya Pradesh for new projects U/S of Rajghat dam as per Inter-state agreement dated 1/08/1972 between state of Uttar Pradesh and Madhya Pradesh. However, water utilisation under Kotha Barrage Project as informed by NWDA officials during discussion on 14.11.2017 would be on substitution basis in lieu of transfer of water through Ken-Betwa Link Project (Phase I).

In view of different stand taken by NWDA and Govt. of Madhya Pradesh, this Directorate asked NWDA and Govt. of Madhya Pradesh vide letter no 2/1/ISM-2/2017/16-18 dated 10/1/2018 to reconcile their positions on water utilisation under Kotha Barrage Project. However, the same has not been complied so far.

In respect of Bina Complex Project and Lower Orr dam Projects, this Directorate has asked NWDA vide letter no 2/1/ISM-2/2017/276-78 dated 16/11/2017 to conduct integrated operation study based on 25-30 year inflow series and had requested both the States to confirm/vett the present allocation of water to various canal systems offtaking from Rajghat Dam and downstream structures upto Parichha PUW as submitted by NWDA and also furnish requisite data to NWDA for conducting integrated operation study. Further, Irrigation & WRD, Govt. of Uttar Pradesh was requested to furnish its views/comments on Lower Orr and Bina Complex Project proposals, if any, at the earliest.

However, no comments from either from Madhya Pradesh or Uttar Pradesh have been received so far.

Further, Memorandum of Understanding (MoU) to be signed amongst States of Madhya Pradesh, Uttar Pradesh and Union Government for implementation of Ken-Betwa Link Project is also under discussion/ finalisation. In this regard, CWC has recently furnished its views on modified draft Memorandum of Understanding (MoU) vide letter no 2/1/ISM-2/2017/37 dated 19/1/2018 as asked by NWDA Lr no. NWDA/Tech-II/153/27/2017/23 dated 09.01.2018.

It is also learnt that in order to sort out Inter - state issues, Hon'ble Union Minister of WR, RD & GR has been regularly reviewing the project and also has held meetings with the political leadership of both the States as well as the State govt. officials.. Therefore, it is expected that all outstanding inter-State aspects of Lower Orr project and Bina Complex projects will be brought to a logical conclusion before the further action on the project is initiated by the concerned authorities.

As mentioned above, MoU is also expected to be signed among the States of Madhya Pradesh, Uttar Pradesh and Union Government for implementation of Ken-Betwa Link Project. Therefore, subject to signing of requisite MoU, Kotha Barrage, Lower Orr and Bina Complex Projects may be considered acceptable from inter-State angle.

This issues with approval of Member (WP&P) please.

(Rajesh Kumar)
Director

To:-

1. Chief Engineer (PAO), Central Water Commission, Sewa Bhawan, New Delhi.
2. Chief Engineer (PPO), Central Water Commission, Sewa Bhawan, New Delhi.
3. Director, National Projects Directorate, Central Water Commission, Sewa Bhawan, New Delhi
4. Director, PA © Directorate, Central Water Commission, Sewa Bhawan, New Delhi

CWC U.O. No.2/1/ISM-2/2017/ 40-43 dated 30.1.2018

30.01.18

Dir (ND)

30.01.18

DD S. Kumar 31.1.18

AD-II (NP) Sh. Zia ul Haque

File No.T-85013(11)/1/2019-ISM-2 DTE

Annex-(VIII-B)

भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन नदी विकास एवं गंगा संरक्षण विभाग
केंद्रीय जल आयोग
अंतरराज्यीय मामले निदेशालय-2

सत्यमेव जयते

Government of India
Ministry of Jal Shakti
Dept. of Water Resources, RD&GR
Central Water Commission
ISM-2 Directorate

Sub: Examination of Comprehensive Project Report of Ken-Betwa Link Project - Reg.

May kindly refer to Memorandum of Agreement (MoA) amongst the states of Madhya Pradesh, Uttar Pradesh and the Union Government on the implementation of Ken-Betwa link project (KBLP) signed on 22nd March, 2021.

Earlier, this office vide letter dated 20.04.2020 (copy attached) considered Comprehensive Project Report of KBLP acceptable from inter-state angle subject to signing of MoU among the States of Madhya Pradesh, Uttar Pradesh and Union Govt. for implementation of Ken-Betwa Link Project.

Since, MoA on Comprehensive Project Report of Ken-Betwa Link Project has been signed on 22.03. 2021 between Madhya Pradesh, Uttar Pradesh and Union Govt. for implementation of Ken-Betwa Link Project, the project proposal may be considered acceptable from inter-state aspects.

This issues with the approval of Chief Engineer (IMO), CWC.

Encl.: As Above.

(Rajesh Kumar)
Director (ISM-2)

Chief Engineer, PAO, CWC, Sewa Bhawan(S), R.K. Puram, New Delhi
File No. 2/ 1/ ISM-2/ 2017/ 152 Date: 02 .07.2021

Signature Not Verified

Digitally signed by RAJESH KUMAR
Date: 2021.07.02 16:26:14 IST

5वां तल, सेवा भवन (द.),
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दूरभाष: 011-29583268,
ई मेल: [illegible]2dte-cwc@nic.in
ism2d[illegible]mail.com

5th Floor(South), SewaBhawan,
R.K. Puram, New Delhi-110066
Tel: 011-29583268,
E-mail: ism-2dte-cwc@nic.in
ism2dte@gmail.com

NO.2/56/2003-BM / 795-800
GOVERNMENT OF INDIA
MINISTRY OF WATER RESOURCES
(BM DIVISION)

New Delhi, dated the 7th June, 2006

OFFICE ORDER

Subject:- Steering Committee on Ken-Betwa Link.

A Memorandum of Understanding(MoU) was signed between Union Minister of Water Resources, Chief Ministers of Government of Madhya Pradesh and Uttar Pradesh on 25th August, 2005 in the presence of Dr. Manmohan Singh, Hon'ble Prime Minister of India for preparation of Detailed Project Report(DPR) of Ken-Betwa Link by Central Government. The Ministry of Water Resources, subsequently decided that the DPR of Ken-Betwa Link under National Perspective Plan(NPP) shall be prepared by Natinal Water Development Agency(NWDA). It also decided that a Committee headed by Chairman, Central Water Commission will monitor and supervise the overall work of preparation of DPR of Ken-Betwa link. Accordingly, a Committee to monitor and supervise the overall work of preparation of DPR of Ken-Betwa link was constituted on 16.2.2006. With a view to review the progress of preparation of DPR works of Ken-Betwa Link, a Steering Committee with the following composition is hereby constituted.

i)	Secretary(WR), MoWR	-	Chairman
ii)	Chairman, CWC	-	Member
iii)	Addl.Secretary(WR), MoWR	-	Member
iv)	Director General, NWDA	-	Member
v)	JS & FA, MoWR	-	Member
vi)	Commissioner(Pr.)	-	Member

The Committee shall review the progress of preparation of DPR of Ken-Betwa link on quarterly basis.

(K. VOHRA)
SR.JONIT COMMISSIONER(BM)
☎ 2371 4129

Copy to

Chairman and All Members

MEMORANDUM OF UNDERSTANDING AMONG THE STATE OF MADHYA PRADESH, THE STATE OF UTTAR PRADESH AND THE UNION GOVERNMENT ON KEN-BETWA LINK PROJECT

Name & Address of Parties

1. State of Madhya Pradesh, Water Resources Department, Vallabh Bhawan, Bhopal.
2. State of Uttar Pradesh, Irrigation Department, Secretariat, Lucknow.
3. Union Government, Ministry of Water Resources, Shram Shakti Bhawan, Rafi Marg, New Delhi.

(A) Whereas the Union Government considers the programme for interlinking of rivers as of national importance and work out ways and means for project funding mechanism including share of the States etc., so as to be able to complete the project within the stipulated time frame.

(B) And whereas the Union Government, in consultation with the States, create appropriate institutional arrangements involving States/Union Government for operation and control of waters in accordance with Agreements reached.

(C) And whereas the States full cooperation towards this task of linking of rivers in the overall interest of the Nation are required:

NOW, THEREFORE, IT IS HEREBY ENTERED INTO UNDERSTANDING BY THE PARTIES AS FOLLOWS:

1. Union Government shall identify and decide the organizational framework necessary for completion of the 'Detailed Project Report' (DPR) and 'Implementation of the Link Projects'

2. Specific MOUs as required will be entered into amongst the States of Uttar Pradesh, Madhya Pradesh and Union Government based on the DPR and Agreements reached on scope of the link, sharing of costs and benefits and arrangements for management and control of water etc.

3. Both the State Governments will gain multipurpose benefits through the Ken-Betwa Link Project as per the Feasibility Studies completed by National

Water Development Agency. In pursuance of the said objective, broad consensus and 'in principle' understanding was arrived at through consensus building efforts of the Union Government and the States as reflected in the Chief Engineer (HQ), NWDA letter No. NWDA/TECH-III/122/17/2004 (Vol. V) dated 5.1.2005 in order to ensure optimum and integrated planning, successful implementation and effective monitoring and operation of Ken-Betwa interlinking project under National Perspective Plan. The apprehensions on water sharing, control mechanism and compensation of power loss etc. raised by States will be addressed at DPR stage.

4. Both the States shall enter into and abide by Agreements with the Union Government and amongst themselves in the larger interest of combating natural calamities of floods and droughts in different regions of the country.

5. Any review/amendment of the MOU shall be done if agreeable to by all the parties.

6. This is being concluded amongst the State of M.P., State of U.P. and Union Government for proceeding ahead on the Ken-Betwa Link Project and taking up the project for preparation of DPR.

Signed at New Delhi on this day of 25th August, 2005.

(BABULAL GAUR)
Chief Minister of Madhya Pradesh
FOR STATE OF M.P.

(MULAYAM SINGH YADAV)
Chief Minister of Uttar Pradesh
FOR STATE OF U.P.

(PRIYA RANJAN DASMUNSI)
Minister of Water Resources
FOR UNION GOVERNMENT

Annexure-IX

भारत सरकार
केन्द्रीय जल आयोग
बैराज एवं नहर अभिकल्प (उ. प. एवं द.) निदेशालय

तल-6, सेवा भवन
आर० के० पुरम, नई दिल्ली-66

Subject: Detailed Project Report of Lower Orr Project (Part of Ken Betwa Link Project Phase II) - regd.

Ref: CWC U.O. 4/9/2012/NP-II/1444 dated 25th September 2017

With reference to the letter cited above the DPR of Lower Orr Project has been received for technical examination.

It is observed that the current DPR is part of combined DPRs of Ken-Betwa Link Project Phase-II. The Design chapter of Ken-Betwa Link Project Phase-II was prepared by CWC. The design chapter and drawings had been issued to NWDA vide letter no. 5/23/2013-BCD(NW&S)/201-202. Various components like total length of canal, side slope, bed slope etc. are same.

In view of above, there are no comments on current DPR and the project may be considered technically cleared from this directorate.

This issues with the approval of CE Designs (NW&S).

(अनिल जैन)
निदेशक
बी.पी.एल. स. - 3489

Director, National Projects (NP) Dte., CWC, Sewa Bhawan, R.K.Puram, New Delhi
No. 5/49/2017/BCD(NW&S)/ 681 Dated: 09.10.2017

S. Kumar 20.10.17 AD(NP)

भारत सरकार
Government of India
जलसंसाधन, नदीविकासऔरगंगासंरक्षणमंत्रालय
Ministry of Water Resources, River Development & Ganga Rejuvenation
तटबन्ध (उत्तर-पश्चिम एवं दक्षिण) निदेशालय, केन्द्रीय जल आयोग
Embankment Dams (NW&S) Directorate, Central Water Commission

जल बचत - जल संचय

Sub.: Detailed Project Report of **Lower ORR Project** (Part of Ken-Betwa Link Project Phase-II) –reg

Reference is invited to the CWC U.O. No. 4/9/2012/NP-II/1368-70 dated 05-09 -2017 on the above cited subject. The Detailed Project Report of **Lower ORR Project** (Part of Ken-Betwa Link Project Phase-II) is received for appraisal.

Design Chapter and drawings of earthen dam for Ken-Betwa Link Project Phase-II was prepared in CWC in January 2014. The **Lower ORR Project** is part of Ken-Betwa Link Project Phase-II. The proposal present in the submitted DPR is at the same location for which design chapter was prepared. In view of the above this directorate has no comments on earthen dam part of DPR.

14/9/17

Anil Jain
Director, Emb.(NW&S)

o/c

Director, National Projects Dte., CWC, 2B, 8th Floor(N), Sewa Bhawan ,
CWC U. O. No. 2 / 5 / 2017/ Emb. (NW&S) /960 Dated: 14 /09 /2017

Lower ORR Balance failed

सेवाभवन (दक्षिण), छठवींमंजिल, आर०के०पुरमसेक्टर-१, नईदिल्ली-११००६६
फ़ोन: 011-29583494, Fax.-011-26102420, ई-मेल:embnwsdte@nic.in

भारत सरकार
केंद्रीय जल आयोग
यंत्रीकरण निदेशालय

सातवाँ तल (द॰) सेवा भवन,
आर॰ के॰ पुरम नई दिल्ली

विषय: मध्य प्रदेश की लोअर ओर परियोजना (केन – बेतवा लिंक परियोजना फेज –II) के अनुपालन रिपोर्ट की जांच। Lower Orr Project (Ken - Betwa Link Project Phase - II) Madhya Pradesh Examination of Compliance report.

संदर्भ: No. 4 / 9 / 2012 / NP – II / 1710 दिनांक 29.11. 2017

Reference is invited to the letter cited above vide which compliance report of **Lower Orr Project** (Ken - Betwa Link Project Phase- II) Madhya Pradesh, on this office letter no. CWC/Inst./1-198/2017/355 dated 16.11.2017 has been forwarded for examination.

Compliance report has been examined in this directorate and found, generally, in order. However some observations are as below:

Concrete dam:

1. Instrumentation will be provided only in dam portion not in training wall. Stress meter and No stress-strain meter will be install along with strain meters (Group of five) and vertical distance of temperature meter will be about 15 meters as shown in Max. non-overflow section.
2. Plumb lines have been shown in the drawing of upstream elevation section but not shown in Max. Overflow and Max. non-overflow section which may be done.
3. On the upstream and down stream faces, four number temperature meters will be install at the distance of 15 cm, 1 m,2 m, and 3 m from the face.

Earthen dam:

1. Embankment Piezometer may also be installed in impervious soil.

A mechanism for monitoring the observations, data analysis and its availability may also be insured.

Subject to incorporating the above suggestions / observations in the DPR, Lower Orr Project (Ken - Betwa Link Project Phase - II) Madhya Pradesh, stand cleared with respect to instrumentation aspects.

This issues with the approval of Chief Engineer (DSO), CWC.

4/12/2017

(निरंजन घर)
निदेशक

निदेशक, राष्ट्रीय परियोजना निदेशालय, केंद्रीय जल आयोग, नई दिल्ली।

यू॰ओ॰ संख्या यंत्री॰ /1-198/2017/376 दिनांक 04/12/2017

DD
4/12/2017

भारत सरकार
केन्द्रीय जल आयोग
निर्माण मशीनरी सलाहकारी निदेशालय
छठवॉ तल (द•), सेवा भवन, आर. के. पुरम, नई दिल्ली-110066, दूरभाष- 011-29583214, ईमेल: cmcdte@nic.in

Sub: Detailed Project Report of Lower Orr Project (Part of Ken Betwa Phase-II)-reg.
Ref: CWC U.O. No. 4/9/2012/NP-II/1352-53 Dated 29 August, 2017

Reference is invited to the letter cited above vide which DPR of the subject project was sent to this office for examination from plant planning aspects. The DPR has been examined and it is found to be general in order from plant planning aspects.

As far as provision under 'Q-Special T & P' sub head of the cost estimate is concerned, it is observed that a total provision of equipment worth Rs. 5391.08 Lakh (Rs. 3132.75 Lakh for Unit-I and Rs. 2258.33 Lakh for Unit-II) has been made by the Project Authorities which includes major construction equipment of worth Rs. 4969.23 Lakh (Rs. 2796.45 Lakh for Unit-I and Rs. 2172.78 Lakh for Unit-II) and general purpose construction equipment & transport/inspection vehicles worth Rs. 421.85 Lakh (Rs. 336.30 Lakh for Unit-I and Rs. 85.55 Lakh for Unit-II).

It is pertinent to mention here that now-a-days, major construction works are being executed through award of contract by contracting agencies. It is to say that the ownership cost of all the construction equipment for any major contractual work is borne by the contractor and that cost of the machineries is built in the item rate of works. As the major components are proposed to be executed through contract in the project, the provision should be limited only to general purpose equipment & inspection vehicles equipment for departmental ownership. Accordingly, the list of proposed equipment has been reviewed & revised and prices corrected, wherever required. Hence, total provision for equipments under Q-special T&P works out to **Rs. 174.50 Lakh (Rs. 69.00 Lakh for Unit-I and Rs. 105.50 Lakh for Unit-II)** & list is given at Annexure-I.

In view of the above, the project is considered acceptable from plant planning aspects with equipment worth of Rs 174.50 Lakh under Q-Spl. T&P sub head of the cost estimate of the project.

This issues with the approval of CE (CMO), CWC.

Encl: As above

28/11/2017
(Sureshwar Singh Bonal)
Director

Director, National Project Directorate, CWC, Sewa Bhawan, R K Puram, New Delhi
CWC U.O. No. 21/MP/24/2017/437 Dated: 28/11/2017

Annexure-I

Lower Orr Project				
Q-Special T&P sub-head				
Sr. No.	Name of Equipments	Nos.	Unit rate (Rs. in lacs)	As accepted by CMC Dte. (Rs. in Lacs)
For Unit-I				
1	Ambulance	1	10.00	10.00
2	Bus	1	16.00	16.00
3	Car	2	6.50	13.00
4	Jeep	5	6.00	30.00
			Total for Unit-I	**69.00**
For Unit-II				
1	Ambulance	1	10.00	10.00
2	Bus	1	16.00	16.00
3	Car	3	6.50	19.50
4	Jeep	10	6.00	60.00
			Total for Unit-II	**105.50**

Total Cost	**174.50**

Minutes of the 93rd Meeting of the Expert Appraisal Committee (EAC) for River Valley and Hydroelectric Projects held on 2nd May, 2016 at Indus Meeting Hall, Ground Floor, Jal Wing, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi – 110003.

The 93rd Meeting of the EAC for River Valley and Hydroelectric Projects (RV &HEPs) was held on 2nd May, 2016 at Indus Meeting Hall, Ground Floor, Jal Wing, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi – 110003. The meeting was chaired by Shri Alok Perti, Chairman, RV &HEPs. The list of EAC members and officials/consultants associated with various projects and who attended the meeting is at Appendix.

The following Agenda items were taken-up in that order for discussions:

Agenda Item No.1: Welcome by Chairman and confirmation of Minutes of the 92nd Meeting of EAC held on 28th -29th March, 2016. Thereafter, following agenda items were taken-up:

Agenda Item No 2.1: Nandprayag-Langasu HEP (100 MW) on Alaknanda River in Dist. Chamoli, Uttarakhand by M/s UJVN Limited- for consideration of Environmental Clearance.

1. The Nandprayag-Langasu HEP (100 MW) is proposed in the middle reach of the Alaknanda Basin to meet the requirement of power shortage in the Northern region in general and in the country as whole. The project has been conceptualized as a Run-of-the-River (RoR) scheme with 162 m wide gated barrage comprising of one under sluice (11.6 m wide) and 7 barrage bays of 18m width each with 10.3m height above the river bed and utilising a design discharge of 268.46 cumecs of Alaknanda river for power generation. The Project Site is located on NH-58 (New Delhi-Badrinath) almost midway between Karanprayag and Nandprayag in district Chamoli of Uttarakhand State and is about 190 Kms from the nearest railhead Rishikesh. The nearest airfield Jolly Grant is about 210 km from the barrage site. The barrage site is approachable from NH-58 (Delhi-Badrinath Road) upto Nandprayag and thereafter by Nandprayag – Devikhal – Gopeshwar district road.

2. During the presentation, Project Proponent (PP) informed that Hon'ble Supreme Court vide orders dated 12-08-2014 and dated 12.10.2015 clarified that ban imposed on Hydroelectric Power Projects (HEPs) was applicable to 24 HEPs mentioned in the report of Wildlife Institute of India, Dehradun (WII). Further as Nand Prayag Langasu HEP is not listed in the said 24 project, this project may be considered for Environment Clearance.
3. It was informed that Terms of Reference (ToR) for the project was issued in October 2010 for 2 years. Repeated communications were made with MoEF & CC for extension of TOR from October 2012 onwards upto December 2016 by the Project Proponent, but no communication was received from MoEF & CC. Therefore, in

- NMCG has further informed that the ban on environmental clearance to Hydro Power Projects in Uttarakhand was applicable only to the projects in Bhagirathi and Alaknanda River Basins. Whereas, the Pancheshwar Multipurpose Project is located in Sarada River Basin. As such the ban is not pertaining to it.

- EAC recommended that an Integrated EIA study covering Indian and Nepal portion be presented for obtaining Environmental Clearance.

After the detailed deliberations, the EAC noted that under the present dispensation there is no provision for giving TORs for part of any project. Since this is a special case where a project is proposed to be implemented by a joint establishment agreed to by India and Nepal the matter needs a special consideration. In order to ensure that studies on preparation of EIA/EMP are not delayed the EAC recommends that TOR for the portion of project falling in India subject to the following conditions:

i. A joint mechanism be set-up for considering the assessment of environmental impact of the full project. While considering the full project by the proposed joint mechanism a need arises to modify the TORs the same may be consider by the EAC for modification of TORs. The EIA/EMP prepared for the full project by the Project Proponent should be placed before the entity established through the joint mechanism mentioned earlier for examination and for recommendation to be given to the Ministries of Environment in both countries for acceptance.
ii. The EIA/EMP studies as depicted in the model ToR of MoEF&CC effective from April 2015 shall be carried out.
iii. Skill mapping of project affected families shall be carried out and suitable provisions shall be made in R&R plan.
iv. Minimum e-flow discharge of 20%, 25% and 30% should be planned for Lean season, Non-lean season and monsoon.

Agenda Point 2.6: Lower Orr Dam under Ken-Betwa Link Project-Phase-II, Water Resources Department, Govt. Of Madhya Pradesh and M/s National Water Development Agency for reconsideration of EC.

The project proponent made a detailed presentation on the project and informed the Expert Appraisal Committee for River Valley and Hydroelectric Projects that project was appraised in 91st meeting held on 8-9 February, 2016. It was clarified that the Lower Orr is an independent project of Govt. of M.P and is not related to Ken-Betwa link project, however, as and when Ken-Betwa link project materializes, the Lower Orr project shall become an integral part of Ken-Betwa Link Project Phase-II.

2. It was noted that the project is proposed across Orr River which is a tributary to Betwa River near the village Didauni on the border of Shivpuri & Ashok Nagar Districts in Madhya Pradesh. The main objective of the Lower Orr project is to provide irrigation and domestic water supply to water deficit areas of Shivpuri and Datia Districts of Madhya Pradesh. The proposed dam site is located at a distance of about 6 km

from Chanderi - Pichhore Road. The total catchment area of Orr river upto Lower Orr dam is 1843 Sq. km. The 75% & 50% dependable annual yield of the sub-basin upto the proposed dam site has been assessed as 362.53 MCM and 501.15 MCM respectively.

3. The project envisages construction of a composite dam. In the proposed composite dam, the concrete dam portion is 487 m long with 247 m long spillway & 240 m long Non Overflow blocks. The earthen portion of dam is 1731 m long with a maximum height of 45 m. A 91.260 Km long main canal has been proposed on the left bank of river. The FRL of the Lower Orr project is kept as 380 m. The total submergence area is about 2723.70 ha. It is proposed to provide irrigation facility to 67,570 ha in Shivpuri and Datia Districts with 150% irrigation intensity utilizing 329.67 MCM. Beside 6 MCM water will be provided for drinking water supply to the enroute villages and towns in the vicinity of the canal. About 1.65 lakh people will get drinking water facility.

3. The total land requirement for proposed project is 3730 ha. The total land coming under submergence area and canal network is 2723.70 ha and 1006 ha respectively.

4. The flows for various dependable years like 50%, 75 % and 90% are 501.15 MCM, 361.965 MCM and 263.98 MCM respectively. A provision of 6 MCM of water has been kept for providing drinking water to enroute villages and towns of Lower Orr canal off taking from proposed Lower Orr dam.

5. The project proponent made a detailed presentation in response to issues raised during the 91st EAC meeting. The key issues raised covered were:

- A detailed Livelihood Plan has been prepared as a part of SIA Report and is outlined as Chapter-6 of Volume-II covering Social impact Assessment Report. As a part of the plan, training to one member from each PAF is envisaged
- Skill mapping shall be done during the implementation of Livelihood Plan
- It was confirmed that as a part of SIA report, R&R plan has been prepared as per Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. The approval for R&R plan shall be taken at the time of implementation from the State Government, who are also the implementing agency.
- Fisheries reported from the study area are mainly carps, cat fishes, murrels and trace fishes, which belongs to 12 families, 16 genera and 22 species. The fish communities occurring in the area are broadly categorized in to four groups. Among them murrels are the dominant group which constitute 52% followed by carps (28%), cat fishes (7 %) and miscellaneous /trash fishes (13%).
- As a part of the study, the recommended Environmental Flows for Lower Orr Project are given below:

Month	Average Monthly discharge for 75% Dependable Year (Mm^3)
June	6.422
July	24.180
August	9.633
September	1.157
October	1.179
November	0.956
December	0.449
January	0.635
February	0.260
March	0.026
April	0.001
May	0.000
Total	44.898

- An amount of Rs. 8.09 crores earmarked for Environmental Management Plan includes:

  a) Rs. 2.50 crores for fish hatcheries;

  b) Rs. 2.20 crores for fishing boats, fish nets, training, etc.

  c) Rs. 2.75 crores for fish transport and post harvest facilities; and

  d) Rs. 64 lakhs for other aspects

  Thus, it was clarified that a detailed Fisheries Management Plan covering fish hatcheries, fishing boats, fish nets, training, fish transport and post harvest facilities has been prepared.

- The Lower Orr dam is an independent project of state government of Madhya Pradesh proposed on a tributary of Betwa and decided to include under Ken-Betwa link project, Phase-II. There will not be any adverse impact of this project on Ken-Betwa link project and vice-versa. The recommendation of EIA study for Ken Betwa Link Project pertaining to Lower Orr Project shall be adhere to.

- It is requested that the Environmental Clearance (EC) for the project may kindly be accorded as per the approved TOR for which final EIA & EMP report has already been submitted and appraised in the 91st EAC meeting held on 8-9 February, 2016. For additional command area considering the pressurized irrigation, the case will be processed separately.

- EIA Report has been prepared as per the approved ToR and EIA report for additional command area shall be prepared separately and then public hearing through SPCB shall be conducted.

After detailed deliberations, the EAC recommended the project for grant of Environmental Clearance as per the ToR approved for Lower Orr Project.

F. No. 8-08/2016-FC
Government of India
Ministry of Environment, Forest and Climate Change
(Forest Conservation Division)
****

Indira Paryavaran Bhawan
Jorbagh Road, Aliganj
New Delhi – 110 003
Dated: 12th February, 2019

To,

The Principal Secretary (Forests)
Forest Department
Government of Madhya Pradesh
Bhopal.

Sub: Diversion of 968.24 hectares of forest land in favour of National Water Development Agency, Ashoknagar and Shivpuri District for construction of Lower Orr Major Irrigation Project (Ken- Betwa link project), Madhya Pradesh State (Online Proposal No. FP/MP/IRRIG/7403/2014) regarding.

Sir,

I am directed to refer to the Addl. Principal Chief conservator of Forests (Land Management) and Nodal Officer, Forest (Conservation) Act, 1980, State Government of Madhya Pradesh's letter No. F-3/50/2014/10-11/15/886 dated 25.04.2016 on the above cited subject, seeking prior approval of Central Government under Section-2 of the Forest (Conservation) Act, 1980, and to say that the said proposal has been examined by the Forest Advisory Committee constituted by the Central Government under Section-3 of the aforesaid Act.

2. After careful consideration of the proposal of the State Government of Madhya Pradesh and on the basis of the recommendations of the Forest Advisory Committee, the Central Government hereby agrees ***to accord stage-I / In-principle*** approval under Section 2 of the Forest (Conservation) Act, 1980 for the diversion of 968.24 hectares of forest land in favour of National Water Development Agency, Ashoknagar and Shivpuri District for construction of Lower Orr Major Irrigation Project (Ken- Betwa link project), Madhya Pradesh State, subject to the following conditions:-

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) The Compensatory Afforestation shall be done over equal non-forest land (NFL) to the forest area proposed to be diverted within a period of three years with effect from the date of issue of Stage-II clearance and maintained thereafter in accordance with the approved Plan in consultation with the State Forest Department at the cost of the user agency. At least 1000 saplings per hectares shall be planted over 968.24 ha. (968240 plants). If this is not possible to plant these many seedlings in the identified NFL, the balance seedlings will be planted in degraded forest land as per the prescriptions of the Working Plan at the cost of the User agency. In such case CA cost will be revised and duly approved by competent authority and deposited online in the CAF managed by CAMPA;

(iii) The user agency shall submit the revised cost benefit analysis, after considering the ecological cost of being diverted forest area;

(iv) The State Government and the user agency shall ensure that the water flow downstream shall be regulated in line with the natural flow regime

and, in the lean period, 100% of the existing flow regime should be maintained while in the non-lean period, the prescribed minimum flow of water by hydrology and aquatic biodiversity experts should be ensured. The minimum flow of water in the Ken River will be maintained till it joins the Yamuna to save wildlife including crocodiles and other aquatic animals. The user agency shall also construct a number of concrete dykes across smaller streams going off from the main reservoir which during FRL shall be over flown but which during lean season shall dam up small isolated water bodies for the benefit of the wildlife;

(v) The State Government and the user agency shall ensure that the canal should be realigned to minimize the use of forest land for construction of canal;

(vi) Along the canal alignment, structural interventions, shall be carried out at wildlife cross over points, which are duly camouflaged and mimic nature, at cost to the user agency, so that dispersal is not hindered;

(vii) The land identified for the purpose of CA shall be clearly depicted on a Survey of India toposheet of 1:50,000 scale;

(viii) The identified non-forest land to be transferred and mutated in favour of the State Forest Department for raising Compensatory Afforestation shall be notified as reserved Forest under Section-4 or Protected Forest under Section-29 of the Indian Forest Act, 1927 or under the relevant Section(s) of the local Forest Act. The Nodal officer must report compliance within a period of 6 month from the date of grant of final approval and send a copy of the notification declaring the non-forest land under Section 4 or Section 29 of the Indian Forest Act, 1927, or under the relevant section of the local Forest Act as the case may be, to this Ministry for information and record;

(ix) The User Agency shall transfer the cost of raising and maintaining the compensatory afforestation at the current wage rate in consultation with State Forest Department in the account of Ad-hoc CAMPA of the concerned State through online portal. The scheme may include appropriate provision for anticipated cost increase for works scheduled for subsequent years;

(x) The User Agency shall provide additionally 25% of the CA cost towards Soil and Moisture Conservation measures in the proposed CA area as per site requirement and the said amount may be deposited in the account of Ad-hoc CAMPA of the concerned State through online e-portal only;

(xi) The User Agency shall transfer online, the Net Present Value (NPV) of the forest land being diverted under this proposal, as per the orders of the Hon'ble Supreme Court of India dated 28.03.2008, 24.04.2008 and 09.05.2008 in Writ Petition (Civil) No. 202/1995 and the guidelines issued by this Ministry vide its letter No. 5-3/2007-FC dated 05.02.2009. The requisite funds shall be transferred through online portal into Ad-hoc CAMPA account of the State Concerned;

(xii) Any fund received from the user agency under the project and deposited in the State Forest Department account, except the funds realized for regeneration/ demarcation of safety zone, shall be transferred through online portal into Ad-hoc CAMPA account of the State Concerned;

(xiii) The user agency should ensure that the compensatory levies (CA cost, NPV etc.) are deposited through challan generated online on web portal and

deposited in appropriate bank online only. Amount deposited through other mode will not be accepted as compliance of the Stage –I clearance;

(xiv) At the time of payment on the Net Present Value (NPV) at the then prevailing rate, the User Agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;

(xv) The approved Catchment Area Treatment (CAT) Plan shall be implemented at the cost of user agency. The commensurate cost of CAT plan will be deposited in Compensatory Afforestation Fund of the State;

(xvi) The State Govt. shall submit a certificate, that site for CA is suitable and free from all encroachments and other encumbrances, under the signature not below the rank of Nodal Officer (FCA) in the State Government;

(xvii) User agency shall obtain the Environment Clearance as per the provisions of the Environment (Protection) Act, 1986, if required;

(xviii) The State Government shall ensure that the forest land located between FRL and the FRL-4 meters may be afforested by planting appropriate indigenous tree species;

(xix) The User Agency shall undertake afforestation along the periphery of the reservoir;

(xx) User agency shall provide free water for the forestry related projects;

(xxi) Layout plan of the proposal shall not be changed without the prior approval of the Central Government;

(xxii) No labour camp/huts shall be established on the forest land;

(xxiii) The forest land shall not be used for any purpose other than that specified in the proposal and under no circumstances be transferred to any other agency, department or person;

(xxiv) Felling of trees, if unavoidable on the forest land being diverted shall be reduced to the bare minimum and trees should be felled under strict supervision of the State Forest Department. Moreover it shall be ensure that wherever possible maximum marked trees for felling should be translocated in the consultation of the State Forest Department;

(xxv) The State Government ensure that the user agency shall implement the R&R Plan as per the R&R Policy of State Government in consonance with National R&R Policy, Government of India before the commencement of the project work. The said R&R Plan will be monitored by the State Government / Regional Office of MoEF&CC along with indicators for monitoring and expected observable milestones;

(xxvi) To prevent illegal occupation /encroachment of the forest land by the families to be displaced from the project site, the user agency shall ensure that each family being displaced from the project site actually acquires and settles on non-forest land. Apart from taking other measures to achieve the said objective, as a measure to discourage the project affected families from encroachment on the forest land, payment of annuity for a period of atleast five years at the rate of the minimum wages payable to the unskilled person for 200 person –days per annum to each adult member of the project affected families, on receipt of a certificate signed by a forest officer not below the rank of a Range Officer having jurisdiction over the area where such person has settled after displacement from the project site,

should be incorporated in the R & R plan. Payment of the said annuity should be an additionality and not in replacement of any of the benefits to be accrued to the project affected persons, as per the approved R&R plan;

(xxvii) The User Agency shall track location of each displaced family and ensure none of them encroach/occupy forest land. In support of compliance to the said condition at least for five years from the date of taking possession of the forest land, the user agency shall submit an annual certificate to the PCCF, Madhya Pradesh that none of the persons displaced from the project land has encroached / settled on the forest land during the year;

(xxviii) The Forest Department shall prepare a plan of Action to utilize the water potential available nearby for the benefit of forest crop and also to the Wild animals at the cost of user agency;

(xxix) A plan for conservation of Wildlife will be made by the user agency in consultation with the PCCF (Wildlife) to be implemented at the cost of user agency;

(xxx) User agency in consultation with the State Forest Department shall create and maintain alternate habitat/home for the avifauna, whose nesting tress are to be cleared in this project. Bird nests artificially made out of eco-friendly materials shall be used in the area, including forest area and human settlements, adjoining the forest area being diverted for the project;

(xxxi) State Government shall complete settlement of rights, in terms of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, if any, on the forest land to be diverted and submit the documentary evidence as prescribed by this Ministry in its letter No. 11-9/1998-FC (pt.) dated 03.08.2009 read with 05.07.2013 in support thereof;

(xxxii) The user agency shall provide alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;

(xxxiii) Boundary of the forest land proposed to be diverted shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing, distance from pillar to pillar and GPS co-ordinates;

(xxxiv) The State Government shall maintain the character of the projects as an irrigation project and to ensure continued benefit to the farmers in the command area, no more diversion of water from the project for industrial projects will be permitted in future;

(xxxv) Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife with the approval of the competent authority;

(xxxvi) The user agency shall submit the annual self-compliance report in respect of the above conditions to the State Government, concerned Regional Office and this Ministry by the end of March of every year regularly; and

(xxxvii) The user agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations, Guidelines, relevant Hon'ble Court Order (s) and National Green Tribunal (NGT) Order(s), if any,

pertaining to this project for the time being in force, as applicable to the project

3. After receipt of the report on compliance to the conditions stipulated in the paragraph-2 above, from the State Government of Madhya Pradesh, final / stage-II approval for diversion of the said forest under Section-2 of the Forest (Conservation) Act, 1980 will be issued by this Ministry. Transfer of the said forest land to the user agency shall not be effected by the State Government of Madhya Pradesh till final/stage-II approval for its diversion is issued by this Ministry.

Yours faithfully,

13/10/2009

(Shrawan **Kumar Verma**)
Dy. Inspector General of Forests

Copy to:-

1. The Principal Chief Conservator of Forests, Government of Madhya Pradesh, Bhopal.
2. The Addl Principal Chief Conservator of Forests (Central), Regional Office (Western Zone), Bhopal.
3. The Nodal Officer, under the forest (Conservation) Act, 1980, Forest Department, Government of Madhya Pradesh, Bhopal.
4. User Agency.
5. Monitoring Cell, FC Division, MoEF & CC, New Delhi, for uploading
6. Guard File.

13/10/2009

(Shrawan **Kumar Verma**
Dy. Inspector General of Forests

Government of India
Ministry of Environment, Forest and Climate Change
(Forest Conservation Division)
****

Indira Paryavaran Bhawan,
Jor Bagh Road, Aliganj,
New Delhi – 110003.
Dated: 06th May, 2021

To,
The Principal Secretary (Forests),
Department of Forests and Environment,
Government of Madhya Pradesh,
Bhopal.

Sub: Diversion of 968.24 hectares of forest land in favour of National Water Development Agency, Ashoknagar and Shivpuri District for construction of Lower Orr Major Irrigation Project (Ken- Betwa link project), Madhya Pradesh State (Online Proposal No. FP/MP/IRRIG/7403/2014) - regarding.

Sir,

I am directed to refer to the Addl. Principal Chief conservator of Forests (Land Management) and Nodal Officer, Madhya Pradesh's letter No. F-3/50/2014/10-11/15/886 dated 25.04.2016 on the above cited subject, seeking prior approval of Central Government under Section2 (ii) of the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee (FAC) constituted by the Central Government under Section-3 of the said Act, ***'In-principle /Stage –I'*** approval to the proposal was accorded vide this Ministry's letter dated 12.02.2019 subject to fulfillment of certain conditions prescribed therein.

2. In this connection, on the basis of the compliance report furnished by the Addl. Principal Chief Conservator of Forests (Land Management) and Nodal Officer, Madhya Pradesh vide letter No. F-3/50/2014/10-11/15/3284 dated 30.09.2020, letter No. F-3/50/2014/10-11/15/3757 dated 07.11.2020, letter No. F-3/50/2014/10-11/15/259 dated 15.01.2021, letter No. F-3/50/2014/10-11/15/1015 dated 16.03.2021, letter No. F-3/50/2014/10-11/15/1129 dated 24.03.2021 and letter No. F-3/50/2014/10-11/15/1357 dated 15.04.2021 ***'Stage-II/Final approval'*** of the Central Government is hereby accorded under Section-2(ii) of the Forest (Conservation) Act, 1980 for diversion of 968.24 hectares of forest land in favour of National Water Development Agency (NDWA), Ashoknagar and Shivpuri District for construction of Lower Orr Major Irrigation Project (Ken- Betwa link project), in Madhya Pradesh State, subject to fulfillment of the following conditions:

A: Conditions which need to be complied prior to handing over of forest land to user agency by the State Govt.:

i. The State Government shall ensure that the user agency shall implement the R&R Plan as per the R&R Policy of State Government in consonance with National R&R Policy, Government of India before the commencement of the project work. The said R&R Plan will be monitored by the State Government / Regional Office of MoEF&CC along with indicators for monitoring and expected observable milestones;

06/05/2021

ii. The State Government shall ensure that compliance of Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 has been completed in accordance with the relevant Rules and Guidelines issued by the MoEF&CC in this regard, before handing over of forest land to the user agency;

iii. The State Government shall ensure that proposed forest land i.e. 968.24 ha shall be handed over to the user agency only when the user agency has acquired the required non-forest land, if any, for the project;

iv. The User Agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required;

v. The State Government shall upload the KML files of the area under diversion and the accepted area for raising compensatory afforestation in the E-Green Watch portal of FSI, before handing over forest land to the user agency;

B: Conditions which need to be complied after handing over of forest land to the user agency by the State Govt.:

i. Legal status of the forest land shall remain unchanged;

ii. The identified non-forest land transferred and mutated in favour of the State Forest Department for raising Compensatory Afforestation shall be notified as reserved Forest under Section-4 or Protected Forest under Section-29 of the Indian Forest Act, 1927 or under the relevant Section(s) of the local Forest Act. The Nodal officer must report compliance within a period of 6 month from the date of grant of final approval and send a copy of the notification declaring the non-forest land under Section 4 or Section 29 of the Indian Forest Act, 1927, or under the relevant section of the local Forest Act as the case may be, to this Ministry for information and record;

iii. The State Government and the user agency shall ensure that the water flow downstream shall be regulated in line with the natural flow regime and, in the lean period, 100% of the existing flow regime should be maintained while in the non-lean period, the prescribed minimum flow of water by hydrology and aquatic biodiversity experts should be ensured. The minimum flow of water in the Ken River will be maintained till it joins the Yamuna to save wildlife including crocodiles and other aquatic animals. The user agency shall also construct a number of concrete dykes across smaller streams going off from the main reservoir which during FRL shall be over flown but which during lean season shall dam up small isolated water bodies for the benefit of the wildlife;

iv. Along the canal alignment, structural interventions, shall be carried out at wildlife cross over points, which are duly camouflaged and mimic nature, at cost to the user agency, so that dispersal is not hindered;

v. The State Government shall ensure approved Catchment Area Treatment (CAT) Plan shall be implemented at the cost of user agency;

vi. The State Government shall ensure that the forest land located between FRL and the FRL-4 meters shall be afforested by planting appropriate indigenous tree species;

vii. The User Agency shall undertake afforestation along the periphery of the reservoir;

viii. User agency shall provide free water for the forestry related projects;

06/05/2021

ix. Layout plan of the proposal shall not be changed without the prior approval of the Central Government;

x. No labour camp/huts shall be established on the forest land;

xi. The forest land shall not be used for any purpose other than that specified in the proposal and under no circumstances be transferred to any other agency, department or person;

xii. Boundary of the forest land proposed to be diverted shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing, distance from pillar to pillar and GPS co-ordinates;

xiii. Felling of trees, if unavoidable on the forest land being diverted shall be reduced to the bare minimum and trees should be felled under strict supervision of the State Forest Department. Moreover it shall be ensure that wherever possible maximum marked trees for felling should be translocated in the consultation of the State Forest Department;

xiv. To prevent illegal occupation/encroachment of the forest land by the families to be displaced from the project site, the user agency shall ensure that each family being displaced from the project site actually acquires and settles on non-forest land. Apart from taking other measures to achieve the said objective, as a measure to discourage the project affected families from encroachment on the forest land, payment of annuity for a period of at-least five years at the rate of the minimum wages payable to the unskilled person for 200 person -days per annum to each adult member of the project affected families, on receipt of a certificate signed by a forest officer not below the rank of a Range Officer having jurisdiction over the area where such person has settled after displacement from the project site, should be incorporated in the R&R plan. Payment of the said annuity should be an addition and not in replacement of any of the benefits to be accrued to the project affected persons, as per the approved R&R plan;

xv. The User Agency shall track location of each displaced family and ensure none of them encroach/occupy forest land. In support of compliance to the said condition at least for five years from the date of taking possession of the forest land, the user agency shall submit an annual certificate to the PCCF, Madhya Pradesh that none of the persons displaced from the project land has encroached/settled on the forest land during the year;

xvi. The User Agency in consultation with the State Forest Department shall create and maintain alternate habitat/home for the avifauna, whose nesting tress are to be cleared in this project. Bird nests artificially made out of eco friendly materials shall be used in the area, including forest area and human settlements, adjoining the forest area being diverted for the project;

xvii. The User Agency shall provide alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;

xviii. The State Government shall maintain the character of the projects as an irrigation project and to ensure continued benefit to the farmers in the command area, no more diversion of water from the project for industrial projects will be permitted in future;

xix. The User Agency shall pay the additional amount of NPV, if so determined, as per

06/05/2021

the final decision of the Hon'ble Supreme Court of India;

xx. The layout plan of the proposal shall not be changed without prior approval of Central Government;

xxi. No additional or new path will be constructed inside the forest area for transportation of construction materials for execution of the project work;

xxii. The period of diversion under this approval shall be co-terminus with the period of lease to be granted in favour of the user agency or the project life, whichever is less;

xxiii. No damage to the flora and fauna of the area shall be caused;

xxiv. The Violation of any of these conditions will amount to violation of Forest (Conservation) Act, 1980 and action would be taken as per the para 1.21 of comprehensive guidelines issued vide this Ministry F. No.5-2/2017-FC dated 28th March, 2019;

xxv. Any other condition that the Ministry of Environment, Forests & Climate Change may stipulate from time to time in the interest of conservation, protection and development of forests & wildlife shall be carried out by the State Government and User Agency; and

xxvi. The State Government and User Agency shall ensure compliance of all conditions stipulated in the Stage-I approval letter dated 10.07.2019 for which undertakings have been obtained from the user agency and also the provisions of the all Acts, Rules, Regulations and Guidelines, relevant Hon'ble Court Order (S) and NGT Order (S), if any, pertaining to this project for the time being in force, as applicable to the project;

Yours sincerely,

06/05/2021

(Shrawan Kumar Verma)
Dy. Inspector General of Forests

Copy to: -

1. The Principal Chief Conservator of Forests & HoFF, Department of Forest, Government of Madhya Pradesh, Bhopal;
2. The Regional Officer, Integrated Regional Office, MoEF&CC, Bhopal;
3. The Nodal Officer (FCA), Department of Forest, Government of Madhya Pradesh, Bhopal;
4. The User Agency;
5. The Monitoring Cell, FC Division, MoEF & CC, New Delhi, for uploading on PARIVSEH portal.

No. 17014/04/2018-FRA
Government of India
Ministry of Tribal Affairs

Room No. F280,
August Kranti Bhawan
New Delhi-110066
Dated: 3rd October, 2018

To

The Executive Engineer & Authority,
National Water Development Agency,
(Ministry of Water Resources, River Development and Ganga Rejuvenation),
A-3 Saqhyog Parisar, E-8, Shahpura, Main Road,
Bhopal.

Subject:- Clearance of the Rehabilitation and Resettlement Plan for Lower Orr Project under Ken-Betwa Link Project, near Didauni village in Khaniyadhana/Chanderi Tehsil of Shivpuri/Ashoknagar, Madhya Pradesh- regarding.

Sir,

I am directed to refer to letter No. NWDA/ID/BPL/T-40/1892 dated 01.12.2017 on the subject mentioned above and to say that while the proposed R & R plan complies with the general requirements of RFCTLARR Act, 2013 and Forest Rights Act, 2006, this Ministry feels that it is necessary to take care of interests of the Project Affected Families (PAFs) so that actual benefits of the Project can reach them and any negative consequences can be prevented and/or mitigated at the very initial stage.

2. In order to effectively monitor the implementation of the project, a Monitoring Committee through the Commissioner Rehabilitation and Resettlement (R&R) may be set up to oversee and monitor implementation of the R&R package including additional measures suggested by this Ministry. This Ministry may also please be provided feedback at half-yearly intervals. Further, the R&R Plan may be disclosed not only to the Project Affected Families (PAFs), but also to the residents of the project affected area. The R&R Plan may be uploaded on the website of the Project Authority and a copy of the same may please be sent to this Ministry through e-mail for putting it up on the web-site of this Ministry as well.

3. Subject to the condition that the proposed R&R Plan will be followed in totality as well as implementation of additional measures (copy enclosed) are ensured by State Government/Project Authority, this Ministry conveys its approval to the proposal.

4. This issues with the approval of the competent authority.

Encl: As Above

Yours faithfully,

(Shyla Titus)
Deputy Secretary to the Government of India
Tel. no. 011 26182428

Copy to:-

(i) Director General, National Water Development Agency, Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India, 205, Palika Bhavan, R.K. Puram, New Delhi.

(ii) Director (NIC) with request to upload the said letter on the website of Ministry of Tribal Affairs

Lower Orr Project under Ken-Betwa Link Project, near Didauni village in Khaniyadhana/Chanderi Tehsil of Shivpuri/Ashoknagar, Madhya Pradesh.

Measures in addition to R&R Plan

1. Small contracts up to Rs. 30 lakhs should be reserved for PAFs. Registration as contractor may not be insisted upon.
2. Vehicle hiring rates to be at least 25% higher than those fixed by the DC for the area.
3. All PAFs should be allowed free of cost lifting of spare utilizable debris and other material.
4. Scrap disposal from HEP- In the construction phase as also in the operation phase, allow/reserve the auction only for PAFs.
5. Foreshore Cultivation should be allowed to PAFs exclusively without any charge, provided it is safe for them.
6. Preventive measures as well as remedial measures must be taken at project cost for water charging induced slope destabilization- i.e. land sinking, slope failure around reservoir. All such contracts to be assigned to PAFs.
7. Preferential allotment of Shops/ commercial plots in the project colony should be made only to PAFs. Same arrangement should be done for R&R colony, if any.
8. Present and future need of drinking water for the PAFs to be met even if tapping is required from the proposed reservoir. It must be treated as a matter of their right.
9. Following arrangements should be made to ensure health facilities to PAFs-
   (i) Periodic free of cost health check- up for PAFs.
   (ii) Project staff and labour to undergo periodic health check- up to prevent spread of any possible communicable diseases.
   (iii) Arrangements for running mobile health facilities with qualified personnel and necessary equipment should be made, until health infrastructure improves. Frequency and places (with timings) must be decided in consultation with PAFs or their Gram Sabha and displayed prominently at appropriate places.
10. Training in life saving skills- Since reservoir would be a new geomorphological feature in the local habitat, most of the villagers and children need to learn swimming, lessons for which may be arranged by the project. Further, it will help in boating and recreation related activities, besides in fishing (new proposed occupation/ supplement to livelihood). Assistance in acquiring boats with Life guards/ buoy should be provided.
11. Introduce scholarship scheme to address low literacy /education levels.
12. R&R Cells can be staffed before starting work with a mix of experienced and young staff from social science educational qualification in which local youth may also be engaged.
13. If revenue from the project is to be shared with people in PAAs/PAFs, all the BPL families (PAFs) may be given 20% more than other PAFs.

14. Access to project communication facilities may be extended to PAFs in emergency and in the case of dire need.
15. PAFs must be part of disaster preparedness and requisite training must be given to them in this regard.
16. Prior to releasing water from dam/ barrage, adequate and effective warning system has to be put in place so that local communities and visitors may be made aware to avert Larji HEP type (June 2014, Kullu HP) tragedies.
17. Mandatory disclosure- The R&R plan along with relevant Chapter of EIA (Socio-economic profile) is to be disclosed not only to PAFs but also to the residents of Project Affected Area besides putting it (on permanent basis) on the website of the Project. Similarly, the monthly /periodic implementation progress report of R&R plan has to be disclosed regularly.
18. Project may like to assist digital outreach in the Project Affected Areas.
19. The Swachchh Bharat Mission requirements be also weaved in the R&R Plan.

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Summary Record of Discussions during Public Investment Board (PIB) meeting on Ken-Betwa Link Project held on 01.10.2021.

Meeting of Public Investment Board (PIB) for appraisal of Ken-Betwa Link Project (KBLP)was held on 01.10.2021 in the Ministry of Finance, North Block, New Delhi under the Chairmanship of Finance Secretary & Secretary(Expenditure), Ministry of Finance, Govt. of India. List of the participants is enclosed at Appendix-I.

At the outset, Chairman of the Board welcomed all the members present. Thereafter, Secretary (WR, RD&GR), Ministry of Jal Shakti gave a brief overview of the project and emphasized the importance and need of this project for the drought prone Bundelkhand region. Chairman, PIB further sought to know whether KBLP is really justified techno-economically. This was clarified by Additional Secretary, Ministry of Jal Shakti. DG, NWDA subsequently made a presentation on KBLP briefly covering the need for the project and its features, status of various clearances, cost estimates, implementation mechanism, approvals sought etc. Detailed deliberations were held on various aspects of the project, as under:

1. DG, NWDA explained that that the Bundelkhand region faces frequent drought conditions and KBLP would provide enormous benefits to the water starved Buldelkhand region in Madhya Pradesh and Uttar Pradesh States. The project will provide annual irrigation to an area of 10.62 lakh ha (8.11 lakh ha in MP and 2.51 lakh ha in UP) in the Chhattarpur, Tikamgarh, Panna, Sagar, Damoh and Datia districts of Madhya Pradesh and Banda, Mahoba, Jhansi and Lalitpur districts of Uttar Pradesh in Bundelkhand region as well as to the Vidisha, Shivpuri and Raisen districts of Madhya Pradesh. The project will also provide 194 million cubic metre (MCM) of water for drinking water supply in the region to a population of about 62 lakh (41 lakh in MP and 21 lakh in UP). The project will also generate 103 MW of hydropower on 27 MW of solar power.
2. DG, NWDA further informed the Board that Ken-Betwa Link Project was declared as a National Project in the year 2008 and was included in the Prime Minister's Bundelkhand package. The total cost of the project as per the

comprehensive DPR works out to Rs. 37,611 crore (Rs. 35,111 cr + 2,500 cr for two new barrages and rennovations of tanks) at 2017-18 price level. The updated cost at 2020-21 price levels of KBLP is assessed as Rs. 44,605 crore.

3. DG, NWDA also informed the Board that Ken-Betwa Link Project is the first project under NPP which is ready for implementation as a joint project of centre and States. A tripartite Memorandum of Agreement (MoA) for the implementation of the project jointly has been signed by the Hon'ble Union Minister for Jal Shakti and Hon'ble Chief Ministers of Madhya Pradesh and Uttar Pradesh on 22nd March, 2021 in the august presence of Hon'ble Prime Minister. He also intimated that funding pattern has been proposed as 90:10 (90 Centre, 10 State) in the MoA signed on 22.03.2021.
4. Representative from Ministry of Land Resources mentioned about gestation period and requested to avoid cost and time overruns in this project.
5. Representative from Ministry of Tribal Affairs stressed on making liberal R&R plan for tribal people and its proper implementation in a time bound manner. He also stressed the need for participation of local people, particularly tribals, during the planning and implementation phases and even afterwards.
6. Representative from MoSPI informed that their Ministry is engaged in monitoring large infrastructure projects. She requested that as and when KBLP is taken up for implementation, its mile stones should be uploaded on their portal.
7. Senior Advisor NITI Ayog raised the issue of increasing cost of project from Rs. 18,057 crore to Rs. 44,605 crore and mentioned that it even now does not include future cost escalations. The cost escalation during construction phase should also be estimated. He was concerned about timely completion of project and requested that the process of getting clearances from various departments should be expedited. He recommended that funds may be released first for the land acquisition and preparatory works. Major works should be taken up only after acquisition of substantial land.
8. The Joint Secretary, MoEF&CC expressed his concerns about views of Central Empowered Committee (CEC) of Hon'ble Supreme Court on the issues related to Wildlife and Environmental clearances. It was clarified that CEC recommendations have been suitably replied to by NWDA after deliberating in the meeting of Special Committee-ILR. DG NWDA also

explained about Landscape Management Plan (LMP) being prepared by Wildlife Institute of India (WII), Dehradun for mitigating wildlife issues in a holistic manner.

9. Advisor (Cost), Ministry of Finance mentioned that cost of KBLP was about Rs. 18,000 crore in 2016 and now increased to Rs. 44,605 crore. It was explained by DG NWDA that initially DPR was prepared for Ken-Betwa link Phase-I covering Daudhan Dam and Ken-Betwa link. Later, based on the suggestions of both the States, the components viz. Lower Orr Project, Bina Complex Project, Kotha Barrage, Panna&Hatta Lift Project in M.P. and the repairing, strengthening of Bariyarpur PUW, Parichha Weir, Barwasagar Dam, two new barrages and renovation of existing tanks in Mahoba district in UP were also included in the project and a comprehensive DPR incorporating all the components was prepared during 2018. The revised cost was assessed as Rs. 37,611 crore (2017). At the time of preparation of PIB (2021) the cost has been updated to 2020-21 price level (Rs. 44,605 crore).
10. Advisor (Cost), MoF also pointed to the significant increase in yearly irrigation benefits as assessed in year 2021 as compared to year 2017 figures. The post project benefits taken are significantly higher as compared to pre project benefits. In this regard, DG, NWDA informed that increase is mainly due to revised benefits considering latest support price and prevailing market price of crops proposed and increased irrigation benefits due to micro irrigation and canal lining in Ken LBC. He informed that all the estimates of cost and benefits have been prepared as per standard guidelines for the preparation of DPR of Irrigation and Multipurpose Projects, 2010 of MoJS. The requisite details and references of the assessment made shall be shared with MoF. (A comprehensive note explaining all the issues raised during the meeting is enclosed herewith).

After detailed deliberations by the participants on the Ken-Betwa Link Project proposal and considering the challenges involved in the implementation of such mega projects having inter-state ramifications, the Chairman of the PIB concluded as under:

1. Assuming that the estimated cost and benefits of project as given in the PIB memorandum are correct, PIB recommends the central funding of Ken-Betwa Link Project on the following conditions:

i. 90% : 10% (C : S) funding pattern shall be applicable for Daudhan Dam and Ken-Betwa link canal proposed to be implemented by Ken-Betwa link authority (KBLPA), excluding the power component.
ii. Other State specific components as being implemented by the States including the cost of land acquisition and R&R for these components shall be funded as 60% Central grant, 30% Central loan to States and 10% by States.
iii. The escalation on land acquisition cost shall be limited to three years say @ 5 percent per annum. Any further escalation on land acquisition shall be borne by the States.
iv. The expenditure only on preparatory works shall be allowed before all clearances are in place. The work on major works shall be taken up only after land acquisition of significant portion.
v. All funds shall be routed through proposed Ken-Betwa Link Project Authority (KBLPA).
vi. Time line for commencement of various activities should be strictly adhered to.

2. The proposed central support and funding pattern as above shall be limited to Ken-Betwa Link Project only and not form a precedence.

The meeting ended with a vote of thanks to the Chair.

Appendix-I

LIST OF PARTICIPANTS

Ministry of Finance

Secretary, DoE, Mo Finance – In Chair

Ministry of Jal Shakti

1. Shri Pankaj Kumar, Secretary, DoWR,RD&GR
2. Ms. Debashree Mukherjee, Additional Secretary, DoWR,RD&GR
3. Shri Sanjay Awasthi, Joint Secretary (RD&PP), DoWR,RD&GR
4. Shri Bhopal Singh, Director General, NWDA
5. Shri ManojSethi, Joint Secretary (JS&FA), DoWR,RD&GR
6. Shri Rakesh Kumar, Sr. Joint Commissioner (BM), DoWR,RD&GR

Note: Representatives from MoEF&CC, NITI Aayog, Mo Agriculture, Mo Tribal Affairs, etc also attended the PIB meeting.

Annexure-XIV

भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन नदी विकास एवं गंगा संरक्षण विभाग
केंद्रीय जल आयोग
लागत मूल्यांकन) सिंचाई-)-2 निदेशालय

Government of India
Ministry of Jal Shakti
Dept. of water Resources, RD & GR
Central Water Commission
Cost Appraisal(Irrigation)-2 Directorate

Sub: - Finalised Cost of "Lower ORR Major Irrigation Project" (Part of Ken Betwa Link Project Phase-II) – regarding.

Ref:- 1. CWC Lr. No. 4/11/2019/NP-II/Vol-I/3040-51 dated:16.08.2019.
2. NWDA Lr. No. CE(N)/LKO/T-16(54)/Phase-II/Lower Orr dated 25.10.2019
3. CWC Letter No T-49030/1/2020-CA(I)-II DTE dated 12.10.2020
4. NWDA Lr. No. राजविअ /अप्रभो/तक-45/901 दिनांक 12.11.2020
5. CWC Letter No T-49030/1/2020-CA(I)-II DTE/I/72914/2021 dated 11.10.2021
6. NWDA Letter No राजविअ /अप्रभो/तक-45/835-837 दिनांक 18.10.2021

The Cost Estimate of Comprehensive Project Report of Ken-Betwa Link Project for an amount of Rs.35111.24 crore at PL 2017-18 has been received vide letter under reference (1) for examination of Cost aspects. In this Report, the Cost Estimate of "Lower Orr Major Irrigation Project" (Part of Ken-Betwa link Project Phase-II) amounting Rs.3065.14 Cr. has also been submitted. The discussion on the Cost Estimate of Lower Orr Major Irrigation Project was held with the Project Officials from 25th to 29th October, 2021. NWDA has submitted revised cost estimate of Rs 3013.51 crores at 2017-18 Price Level on 20.10.2021.

After detailed examination of estimates, and the data available, the cost of Lower Orr Major Irrigation Project have been finalised for Rs 265703.68 lakhs (Rs 2657.04 crores) at SoR 2017-18. The Unit wise finalised cost of the project is as under-

Sl No	Item	Cost (in lakhs)
1	Unit I	104521.08
2	Unit II	151011.91
3	Unit III	10170.70
	Total Cost	265703.68

The Project Cost is provisional subjected to the correctness of the quantities as per the detailed survey carried out and rates indicated in the cost estimates at Madhya Pradesh Unified Schedule of Rates 2017-18. NWDA have also submitted a certificate regarding the correctness of quantities as per Design and Drawings proposed for preparation of Cost Estimate. The Abstract of Cost of the Project at SoR 2017-18 is enclosed.

This issue with the approval of the Chief Engineer (PAO), CWC, New Delhi.

Signed by Ajay Shivlal Banode
Date: 02-11-2021 11:48:44
Reason: Approved

(Ajay Shivlal Banode)
Director

Annexure

GENERAL ABSTRACT

Amount in Lakh

Sl. No.		Sub-head	UNIT-I (Head Works like Dam, Barrage etc.)			UNIT-II (Canal Works)			UNIT-III			Grand Total		
			Expenditure incurred upto Sept- 2021	Balance Cost	Total Cost	Expenditure incurred upto Sept- 2021	Balance Cost	Total Cost	Expenditure incurred upto Sept- 2021	Balance Cost	Total Cost	Expenditure incurred upto Sept- 2021	Balance Cost	Total Cost
A		**DIRECT CHARGES:**												
I		**WORKS:**												
1	A	Preliminary	402.13	453.46	855.59	126.53	44.94	171.47				528.66	498.40	1027.06
2	B	Land	26685.96	268.41	26954.37	4328.04	2047.81	6375.85				31014.00	2316.22	33330.22
3	C	Works	22552.93	18209.89	40762.82	36061	9083.02	45144.02				58613.93	27292.91	85906.84
4	D	Regulators and Measuring Devices					31.57	31.57					31.57	31.57
5	E	Falls					0.00	0.00					0.00	0.00
6	F	Cross Drainage Works					2816.91	2816.91					2816.91	2816.91
7	G	Bridges					376.75	376.75					376.75	376.75
8	H	Escaps					85.20	85.20					85.20	85.20
9	I	Navigation Works					0	0					0	0
10	J	Power plant & Civil works					0.00	0.00					0.00	0.00
11	K	Buildings												
		Temporary Buildings		696.36	696.36								696.36	696.36
		Permanent Buildings		213.00	213.00		0.00	0.00					213.00	213.00
12	L	Earth work & Lining			0	3000.00	1188.23	4188.23				3000.00	1188.23	4188.23
		a) Earth work			0									
		b) Lining			0									
		c) Service road			0									
		d) Tunnel												
13	M	Plantation		54.73	54.73		94.68	94.68					149.41	149.41
14	N	Tanks & Reservoir			0.00		365.99	365.99					365.99	365.99
15	O	Miscellaneous		201.50	201.50		0.00	0.00					201.50	201.50
16	P	Maintainance		429.87	429.87		1187.13	1187.13			0.00		1617.00	1617.00
17	Q	Special T&P		69.00	69.00		105.50	105.50					174.50	174.50
18	R	Communication		565.00	565.00		800.00	800.00					1365.00	1365.00
19	S	Power plant & Electric system			0.00		598.14	598.14			10070.00			
20	T	Water supply works			0.00									
21	U	Distributories and Minors			0.00	61350.00	658.20	62008.20				61350.00	658.20	62008.20
22	V	Water Courses			0.00		0.00	0.00					0.00	0.00
23	W	Drainage			0.00									
24	X	Environment & Ecology	12507.84	5703.56	18211.40							12507.84	5703.56	18211.40
25	Y	Losses on Stock & Unforeseen @ 0.25% on all heads excluding A, B , Q & X		106.23	106.23		294.98	294.98					401.21	401.21
		Total of I- Works	**62148.86**	**26971.00**	**89119.86**	**104865.57**	**19779.06**	**124644.63**			**10070.00**	**167014.433**	**56820.05**	**223834.49**
		Add GST @ 12% of (I-Works-B land- S Power)	4255.55	3204.31	7459.86	12064.50	2055.97	14120.47	0.00	0.00	0.00	16320.05	9515.83	21580.33
II		Establishment & Pensionary Charges @ 8% of I-Works less B - Land		4973.24	4973.24		9461.50	9461.50	0.00	0.00	0.00		16594.88	14434.74
III		Ordinary T&P @ 1% of I - Works		891.20	891.20		1246.45	1246.45	0.00	0.00	0.00		2768.65	2137.65

		Total	**66404.41**	**36039.75**	**102444.16**	**116930.07**	**32542.98**	**149473.05**	**0.00**	**0.00**	**10070.00**	**183334.48**	**85699.41**	**261987.21**
IV		**Receipts & Recoveries(-)**												
	(a)	Recoveries on account of resale value of Q - Special T&P 25%			17.25	26.38	0	26.38						43.63
	(b)	Recoveries by resale/transfer of Generator sets, electric lines, telephone lines and other accessories under Capital Cost of Q-Miscellaneous @20%			40.30	0	0	0.00						40.30
	(c)	Recoveries on account of resale value of Temporary Buildings @ 15%			104.45	0	0	0.00						104.45
		Total deduction	**0.00**	**162.00**	**162.00**			**26.38**						**188.38**
		Total Direct Charges	66404.41	35877.74	**102282.16**	116930.07	32516.60	**149446.67**		10070.00	**10070.00**	183334.48	78464.34	**261798.83**
B		**INDIRECT CHARGES**												
	(a)	Abatement of Land Revenue on the area occupied by the Project @ 5% of B-Cost of Land (Item(1))	0	1347.719	1347.719		318.79	318.79		0.00	0.00		1666.51	1666.51
	(b)	Audit & Account Charges @ 1% of I - Works	0	891.2	891.20	1048.6557	197.79	1246.45		100.70	100.70		2238.35	2238.35
		Total Indirect Charges	**0.00**	**2238.92**	**2238.92**	**1048.66**	**516.58**	**1565.24**	**0.00**	**100.70**	**100.70**		3904.85	**3904.85**
		NET COST	**66404.41**	**38116.66**	**104521.08**	**117978.73**	**33033.18**	**151011.91**	**0.00**	**10170.70**	**10170.70**	**183334.48**	**82369.20**	**265703.68**

GOVERNMENT OF MADHYA PRADESH
WATER RESOURCES DEPARTMENT
LOWER ORR PROJECT

(Rs. In Lakhs)

BC Ratio Calculation

		Before Irrigation(Without Project)	After Irrigation (With Project)
A.	Gross Receipt		
1.0	Gross value of farm produce	28013.68	92288.00
2.0	Dung receipts (at 30% of the fodder expenditure)	1260.62	2768.64
3.0	**Total Gross Receipts (A) = (1+2)**	**29274.30**	**95056.64**
B.	**EXPENSES**		
1.0	Expenditure on Seeds	1935.37	5192.32
2.0	Expenditure on Fertilizers,Chemicals etc.	3444.27	6067.70
3.0	Expenditure on hired labour (human, animal & machinery) & Misc	6721.09	11762.92
4.0	Fodder expenses (as percentage of gross value of produce)		
	a) 15% Gross value of farm produce before irrigation	4202.05	
	b) 10% Gross value of farm produce after irrigation		9228.80
5.0	Depreciation on implements at 2.7% of the gross value of farm produce	756.37	2491.78
6.0	Share and Cash Rent		
	a) 5% Gross value of farm produce before irrigation	1400.68	
	b) 3% Gross value of farm produce after irrigation		2768.64
7.0	(x) Land Revenue at 2% of gross value of farm produce	560.27	1845.76
8.0	Total Expenses (B) = (Sum 1 to 7)	19020.11	39357.92
C.	NET VALUE OF PRODUCE		
1.0	Total Gross receipts (Total A.3)	29274.30	95056.64
2.0	Total Expenses (Total B.8)	19020.11	39357.92
3.0	Net value of produce (C) = (1-2)	**10254.19**	**55698.72**
D.	ANNUAL AGRICULTURAL BENEFITS		
1.0	Net value after irrigation (C.3)		55698.72
2.0	Minus Net value before irrigation(C.3)		10254.19
3.0	**Net Annual Benefits (D) = (1-2)**		**45444.54**
	(i) from Fish production		5298.50
	(ii) from Power production		3665.10
E.	(iii) from Water Supply		0.00
	a) Domestic		0.00
	b) Industrial		0.00
F.	Total Net Annual Benefits (D.3+E)		**54408.14**
	General Costs		
	(i) Estimated cost of the Project		265703.68
G.	(ii) Land Development Cost @Rs 20000 per Ha		18000.00
	(iii) cost of tubewell		1097.00
	General Costs Total (G)		**284800.68**
	ANNUAL COSTS		
1	Interest on capital @ 10% (Estimated total cost of the project including cost of land development)		28480.07
2	Depreciation of the project @ 1% of the cost of project for 100 years life of the project and @ 2% for 50 years life of the project		2848.01
3	Annual operation and maintenance charges @ 1175 Rs Per Ha		1057.50
4	Maintenance of the head works @ 1% of H/W cost less B Land		703.55
5	Depreciation of the pumping system @ 8.33% of the estimated cost of the pumping system assuming life of the system as 12 years (Applicable to lift irrigation)		254.09
6	Depreciation of the rising mains @ 3.33% of the estimated cost of the rising mains assuming life of the system as years (Applicable to lift irrigation)		90.44
7	Power Charges for lift water Rs 4410 @ per Ha. (as per 5 rs /kw unit)		1764.00
8	Annual cost of tubewell after assuming 12 year service life of pump		91.38
8	Total Annual Costs (G) = Sum (1 to 7)		**35289.02**
	Average Benefit Cost Ratio = Annual Benefits (F) / Annual Costs (G)		**1.54**

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Construction Schedule of Lower Orr Dam Project

Sr. No.	Task Name	Up to March 2022			April to Dec 2022									2023											2024											2025										
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1	**Precons. Invest survey**																																														
2	**Infrastruction Works**																																														
	Detailed Desgin & Drawing																																														
	Tendering & Award of Contract																																														
3	**River Diversion Works**																																														
4	**Lower Orr Earthen Dam**																																														
	Cutt off Excavation																																														
	Stripping																																														
	Cut-off Trench Filling																																														
	Fill Placement (Embakement)																																														
5	**Lower Orr Concrete Dam**																																														
	Excavation (Dam Foundation)																																														
	Concreting																																														
	Gate Installation																																														
6	**Lower Orr Main Bank Canal**																																														
	Tendering																																														
	Excavation of Carrier canal																																														
	concreting																																														
	Pump house construction																																														
	Laying of pipe																																														
	Transmission line																																														

संचालनालय
किसान कल्याण तथा कृषि विकास
मध्यप्रदेश भोपाल

कमांक/ल.सिं./1/सिं.क्षे./2018/ भोपाल दिनांक /11/2021.

प्रति,

परियोजना संचालक,
बेतवा परियोजना प्रबंधक इकाई **(बी.पी.एम.यू.)**
जल संसाधन विभाग, तुलसी नगर, भोपाल **(म.प्र.)**

विषयः— **केन–बेतवा लिंक राष्ट्रीय परियोजना के अन्तर्गत "लोअर ओर" परियोजना को मौजूदा फसल पद्धति (Crop pattern) और उत्पादकता (production) परियोजनाओं के पूर्व (pre-project) तथा परियोजनोपरांत (crop pattern) और उत्पादकता (production) के अनुमोदन बाबत्।**

संदर्भः— आपका पत्र क0 38/तक/बी.पी.एम.यू./344 दिनांकः 29/10/2021.

——000——

विषयान्तर्गत संदर्भित पत्र के अनुसार केन–बेतवा लिंक राष्ट्रीय परियोजना के अन्तर्गत "लोअर ओर" परियोजना को मौजूदा फसल पद्धति (Crop pattern) और उत्पादकता (production) **परियोजनाओं के पूर्व (pre-project)** तथा परियोजनोपरांत (crop pattern) और उत्पादकता (production) **के अनुमोदन** के संबंध में प्रस्तावित कांपिंग पैटर्न जिलो की सिंचाई प्रतिशत की गणना के लिये खरीफ एवं रबी फसलों की प्रस्तावित सिंचाई की जानकारी अनुमोदन कर संलग्न प्रेषित है।

संलग्नः— उपरोक्तानुसार ।

संचालक
किसान कल्याण तथा कृषि विकास
म0प्र0 भोपाल

क कमांक/ल.सिं./1/सिं.क्षे./2018/ भोपाल दिनांक /11/2021.

प्रतिलिपिः—

1. प्रमुख अभियंता, जल संसाधन विभाग, तुलसी नगर भोपाल ।
2. संयुक्त संचालक, किसान कल्याण तथा कृषि विकास संभाग सागर एवं ग्वालियर म.प्र.।
3. उप संचालक कृषि, किसान कल्याण तथा कृषि विकास, जिला छतरपुर,दमोह, टीकमगढ़, निवाड़ी,पन्ना, शिवपुरी, एवं दतिया (म0प्र0)

संचालक
किसान कल्याण तथा कृषि विकास,
म0प्र0 भोपाल.

GOVERNMENT OF MADHAYA PRADESH
WATER RESOURCES DEPARTMENT
LOWER ORR PROJECT
EXISTING CROP PATTERN AND PRODUCTIVITY PRE- PROJECT

(All rates in Rs., Amount in Rs. Lakh and Area in Ha.)

o.	Crop	Area	Yield (Qtl/ Ha)	Yield (Qtl)	Price per Qtl.	Gross Income	Breakup of Expenditure						Total Expenditure (Amount in Lakhs)	Net Income (Amount in Lakhs)
							Seed		Fertilizers, Chemicals etc.		Human, Animal & Machinery & Misc			
							Rate/ Ha (Rs.)	Amount (in Rs Lakh)	Rate/ Ha (Rs.)	Amount (in Rs Lakh)	Rate/ Ha (Rs.)	Amount (in Rs Lakh)		
rif														
	Jowar	180	12	2160	1725	37.26	1800	3.24	3564	6.42	6776	12.20	21.85	15.41
	Maize	3150	15	47250	1425	673.31	6000	189.00	3582	112.83	6300	198.45	500.28	173.03
	Soyabean	17050	10	170500	3050	5200.25	4500	767.25	4158	708.94	9000	1534.50	3010.69	2189.56
	Ground nut	28770	8	230160	4000	9206.40	1400	402.78	5940	1708.94	9240	2658.35	4770.07	4436.33
	Vegetable	1810	30	54300	3500	1900.50	375	6.79	1500	27.15	2160	39.10	73.03	1827.47
	Til (Sesamum)	1800	4	7200	8000	576.00	450	8.10	1188	21.38	6000	108.00	137.48	438.52
	Total	52760		511570		17593.72		1377.1575		2585.66		4550.59	8513.41	9080.32
bi														
1	Wheat(Local)	12400	20	248000	2000	4960	3600	446.40	4050	502.20	8100	1004.4	1953.00	3007.00
2	Gram	11930	10	119300	4000	4772	2250	268.43	2500	298.25	8300	990.19	1556.87	3215.14
3	Mustard	10310	8	82480	3800	3134.24	160	16.50	3500	360.85	7500	773.25	1150.60	1983.64
4	Tur	180	6	1080	6940	74.952	600	1.08	4050	7.29	4200	7.56	15.93	59.02
	Total	34820		450860		12941		732		1169		2775	4676	8265
	Grand Total	87580.00		962430.00		30534.91		2109.56		3754.25		7325.99	13189.80	17345.12

O.P.Singh Khushwah 28/10/2021
SE & Expert Consultant
WRD, o/o E-in-C, Bhopal

shirish Mishra 29/10
Project Director
Betwa Project Management Unit
Bhopal

01/11

101

LOWER ORR PROJECT

PROPOSED CROP PATTERN AND PRODUCTIVITY POST PROJECT

(All rates in Rs., Amount in Rs. Lakh and Area in Ha.)

Sr.No.	Crop	Area	Yield (Qtl/ Ha)	Total yield (Qtl)	Price per Qtl. (in Rs.)	Gross Income (in Lac)	Breakup of Expenditure						Total Expenditure	Net Income (in Lac)
							Seed		Fertilizers, Chemicals etc.		Human, Animal & Machinery & Misc			
							Rate/ Ha (Rs.)	Amt. (in lac)	Rate/ Ha (Rs.)	Amt. (in lac)	Rate/ Ha (Rs.)	Amt. (in lac)		
Rabi														
1	Wheat (HYV)	39105.00	55	2150775	2000	43016	7200	2815.56	8000	3128.40	15000	5865.75	11809.71	31206.29
2	Wheat (OLV)	31995.00	45	1439775	2000	28796	5000	1599.75	7200	2303.64	13000	4159.35	8062.74	20733.26
3	Gram N1 (Peas)	9999.00	25	249975	3500	8749	8500	849.92	7500	749.93	15500	1549.85	3149.70	5599.30
4	Gram N2	7101.00	23	163323	4000	6533	5250	372.80	3800	269.84	13500	958.64	1601.28	4931.72
5	Vegetables RA	1800.00	150	270000	5000	13500	1200	21.60	9000	162.00	16000	288.00	471.60	13028.40
	Total	90000.00		4273848		100594		5659.63		6613.81		12821.59	25095.03	75498.97

O.P.Singh 28/10/2021

O.P.Singh Khushwah
SE & Expert Consultant
WRD, o/o E-in-C, Bhopal

shirish Mishra 29/10
Project Director
Betwa Project Management Unit
Bhopal

01/11

राष्ट्रीय जल विकास अभिकरण
जल शक्ति मंत्रालय, भारत सरकार
(जल संसाधन, नदी विकास और गंगा संरक्षण विभाग)
National Water Development Agency
Ministry of Jal Shakti, Government of India
(Department of Water Resources, River Development and Ganga Rejuvenation)

No. NWDA/Tech-II/152/1/2021/180 Date: 05.04.2021

To,

The Chief Engineer
Project Appraisal Organization
Central Water Commission,
Sewa Bhawan, R.K. Puram,
New Delhi-110066.

Sub: Submission of Memorandum of Agreement amongst Government of Madhya Pradesh, Government of Uttar Pradesh and Union Government for implementation of Ken-Betwa Link Project-regarding.

Ref: NWDA letter no. NWDA/Tech-II/152/23/2020/450-53 dated 23.12.2020

Sir,

Kindly refer to the letter cited above vide which it was requested to consider the clearance of all the three Phase-II projects of Ken-Betwa Link Project (KBLP) from Interstate angle. It was also requested that the other issues as discussed during the review meeting held in November, 2020 may also be examined expeditiously for early appraisal/clearance of TAC.

In this regard, it is to state that a tripartite Memorandum of Agreement (MoA) for the implementation of the Ken-Betwa Link Project has been recently signed by the Hon'ble Union Minister for Jal Shakti and Hon'ble Chief Ministers of Madhya Pradesh and Uttar Pradesh on 22nd March, 2021 in the august presence of Hon'ble Prime Minister. A signed copy of the MoA is enclosed for ready reference please.

Keeping in view of the above, it is again requested that appraisal of DPRs of all the three projects viz. Lower Orr, Kotha Barrage and Bina Complex Multipurpose Project may please be expedited for early implementation of KBLP.

This issues with the approval of Director General, NWDA.

Yours faithfully,

Encl: As above

(D.K. Sharma)
Superintending Engineer

205, पालिका भवन, आर. के. पुरम, नई दिल्ली–110066
दूरभाष / 011-24671681, 24674855, 24195731
फैक्स: 011-24671681 | वेबसाइट : www.nwda.gov.in
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केन-बेतवा लिंक परियोजना (केबीएलपी)
के क्रियान्वयन पर मध्य प्रदेश, उत्तर प्रदेश और संघ सरकार
के मध्य सहमति ज्ञापन (एम.ओ.ए.)

MEMORANDUM OF AGREEMENT (MoA)
AMONGST THE STATES OF MADHYA PRADESH, UTTAR PRADESH AND THE UNION GOVERNMENT ON THE IMPLEMENTATION OF KEN-BETWA LINK PROJECT (KBLP)

22 मार्च, 2021

22nd March, 2021

केन-बेतवा लिंक परियोजना (के.बी.एल.पी.)
के क्रियान्वयन पर मध्य प्रदेश, उत्तर प्रदेश और संघ सरकार
के मध्य सहमति ज्ञापन (एम.ओ.ए.)

I. पक्षकारों के नाम और पते

1. मध्य प्रदेश सरकार (म.प्र. सरकार), जल संसाधन विभाग, वल्लभ भवन, मंत्रालय, भोपाल।

2. उत्तर प्रदेश सरकार (उ.प्र. सरकार), जल शक्ति मंत्रालय, सिंचाई एवं जल संसाधन विभाग, बापू भवन, लखनऊ, उत्तर प्रदेश।

3. संघ सरकार की ओर से जल शक्ति मंत्रालय, जल संसाधन, नदी विकास और गंगा संरक्षण विभाग, श्रम शक्ति भवन, रफी मार्ग, नई दिल्ली।

II. भूमिका

क. जबकि संघ सरकार नदियों के अंतर्योजन के कार्यक्रम को राष्ट्रीय महत्व का समझती है और इसके कार्यान्वयन और निधियन (Funding) के तरीकों और साधनों, जिसमें राज्यों का हिस्सा भी शामिल है, पर कार्य करेगी जिससे कि परियोजनाओं को समयबद्ध रूप से पूरा किया जा सके।

ख. और जबकि दिनांक 25 अगस्त, 2005 को माननीय प्रधानमंत्री की विशिष्ट उपस्थिति में मुख्यमंत्री मध्य प्रदेश, मुख्यमंत्री उत्तर प्रदेश एवं संघ सरकार के मध्य हस्ताक्षरित समझौता ज्ञापन के आधार पर राष्ट्रीय जल विकास अभिकरण (राजविअ) जो जल शक्ति मंत्रालय के अधीन ऑटोनामस बाडी है, ने केन-बेतवा लिंक परियोजना की विस्तृत परियोजना रिपोर्ट (डीपीआर) अप्रैल, 2010 में तैयार की।

ग. और जबकि राजविअ द्वारा तैयार किए गए समेकित डीपीआर के आधार पर केन-बेतवा लिंक परियोजना का क्रियान्वयन किया जाएगा। इस परियोजना का उद्देश्य दोनों राज्यों में लगभग 6.2 मिलियन लोगों को पेयजल उपलब्ध कराने के अतिरिक्त मध्य प्रदेश में 6.57 लाख हेक्टेयर तथा उत्तर प्रदेश में 2.51 लाख हेक्टेयर सिंचाई विकसित और स्थिर करना है।

घ. और जबकि संघ सरकार किए गए अनुबंधों के अनुसार राज्यों के परामर्श से केन तथा बेतवा बेसिनों में समुचित जल नियंत्रण क्रियाविधि, जल का लेखा-जोखा तथा जल विनियमन के लिए राज्यों को शामिल करते हुए एक उचित संस्थानिक व्यवस्था का निर्माण करेगी। इस संस्थान के संबंध में इसकी संघटना, संदर्भ की शर्तें तथा संबंधित अन्य मुद्दों पर उचित समय पर निर्णय लिया जाएगा।

MEMORANDUM OF AGREEMENT (MoA)
AMONGST THE STATES OF MADHYA PRADESH, UTTAR PRADESH AND THE UNION GOVERNMENT ON THE IMPLEMENTATION OF KEN-BETWA LINK PROJECT (KBLP)

I. NAME & ADDRESS OF PARTIES

1. Government of Madhya Pradesh (GoMP), Water Resources Department, Vallabh Bhawan, Mantralaya, Bhopal.

2. Government of Uttar Pradesh (GoUP), Ministry of Jal Shakti, Irrigation & Water Resources Department, Bapu Bhawan, Lucknow, Uttar Pradesh.

3. Union Government through Ministry of Jal Shakti, Department of WR, RD & GR, Shram Shakti Bhawan, Rafi Marg, New Delhi.

II. INTRODUCTION

A. WHEREAS the Union Government considers the programme for interlinking of rivers (ILR) of national importance and will work out ways and means for implementation and funding including share of the States, etc. to enable completion of the projects within the stipulated time frame.

B. AND WHEREAS the National Water Development Agency (NWDA), an autonomous body under the Ministry of Jal Shakti has prepared Detailed Project Report (DPR) of Ken-Betwa Link Project in April, 2010 as per the Memorandum of Understanding (MoU) signed by Chief Ministers of Madhya Pradesh and Uttar Pradesh with Union Minister for Water Resources on 25th August, 2005 in the august presence of the Hon'ble Prime Minister.

C. AND WHEREAS the implementation of Ken-Betwa Link Project shall be carried out as per the comprehensive DPR prepared by NWDA. The project is intended to develop and stabilize irrigation to the tune of 6.57 lakh ha in MP and 2.51 lakh ha in UP, besides providing drinking water to about 6.2 million people in the two States.

D. AND WHEREAS, the Union Government, in consultation with the States, will create an appropriate institutional arrangement involving States for control mechanism, water accounting and regulation of water in Ken and Betwa basins in accordance with agreement reached. The composition, terms of reference and other related issues in respect of this institution shall be decided in due course.

III. <u>अब, इसलिए, के.बी.एल.पी. के क्रियान्वयन के लिए पक्षकारों द्वारा निम्नानुसार अनुबंध किया जाता है:</u>

1.0 केन-बेतवा लिंक परियोजना (के.बी.एल.पी.) में जल बंटवारा

1.1 बेतवा नदी पर राजघाट तथा माताटीला बांध तथा केन बेसिन में रंगवान बांध और उर्मिल बांध के वर्तमान अंतर राज्यीय समझौतों पर बिना कोई प्रभाव डाले केबीएलपी में जल बंटवारा पूर्वाग्रह के बिना किया जाएगा।

1.2 25 अगस्त, 2005 को हस्ताक्षरित समझौता ज्ञापन में तय किये गए जल के बंटवारे को यथावत रखा जाएगा। केन बेसिन से मध्य प्रदेश (एम.पी.) दौधन बांध के अपस्ट्रीम में उपयोग करने के लिए 2,266 एमसीएम जल संरक्षित किये जाने तथा दौधन बांध पर पर्यावरण एवं जलाशय में वाष्पन हानि के लिए छोड़े जाने वाले जल की आवश्यक गणना के बाद शेष जल केन एवं बेतवा बेसिनों में केन बेसिन से बरियारपुर पिकप वीयर तक मध्य प्रदेश और उत्तर प्रदेश राज्यों द्वारा उपयोग किया जाएगा। एक सामान्य वर्ष में (केन बेसिन से दौधन बांध तक 6,590 एमसीएम या अधिक वार्षिक ग्रौस यील्ड (Gross Yield) या अधिक होने पर), केन-प्रणाली से मध्य प्रदेश राज्य कुल 2,350 एमसीएम (83 टीएमसी) जल का उपयोग करेगा जब कि उत्तर प्रदेश राज्य कुल 1,700 एमसीएम (60 टीएमसी) जल का वार्षिक उपयोग करेगा। गैर मानसून अवधि में (नवंबर से मई) दौधन जलाशय के भंडारण से मध्य प्रदेश तथा उत्तर प्रदेश को क्रमश: 1,834 एमसीएम तथा 750 एमसीएम जल का कमिटेड रिलीज (Committed Releases) किया जाएगा। उत्तर प्रदेश गैर मानसून अवधि के दौरान अपनी आवश्यकताओं के अनुसार बरियारपुर पिकप वीयर के नीचे अपने राज्य क्षेत्र की सीमा में अतिरिक्त भंडारण करने के लिए स्वतंत्र होगा।

1.3 जिस वर्ष जल की मात्रा कम होगी (केन बेसिन से दौधन बांध तक 6,590 एमसीएम से कम वार्षिक यील्ड होगी) तो उस वर्ष मध्य प्रदेश एवं उत्तर प्रदेश राज्यों द्वारा केन प्रणाली से उनके जल उपयोग के अनुपात में उत्तर प्रदेश द्वारा 1,700 एमसीएम (27%) तथा मध्य प्रदेश द्वारा 2,266 एमसीएम + 2,350 एमसीएम (73%) जल के अंतर को वहन किया जाएगा। यदि 1 नवम्बर को दौधन जलाशय के भंडारण में जल की कमी होती है तो उक्त कमी को दोनों राज्यों द्वारा दौधन जलाशय भंडारण से उनके जल अंश के अनुपात में उत्तर प्रदेश द्वारा 750 एमसीएम (29%) तक तथा मध्य प्रदेश द्वारा 1,834 एमसीएम (71%) बांटा जाएगा।

2.0 केन-बेतवा लिंक परियोजना के घटक (के.बी.एल.पी.)

केबीएलपी के सभी घटक हेड वर्क्स एवं उसकी वितरण प्रणाली तथा कैनाल पाइपलाइन एवं कमान नेटवर्क सहित **अनुलग्नक-I** पर दिए गए हैं।

III. NOW, THEREFORE, IT IS HEREBY ENTERED INTO AGREEMENT BY THE PARTIES AS FOLLOWS FOR THE IMPLEMENTATION OF KBLP:

1.0 WATER SHARING IN KEN-BETWA LINK PROJECT (KBLP)

1.1 The water sharing in KBLP will be without prejudice to existing inter-State agreements on Betwa river basin including Rajghat and Matatila dam on Betwa River, Rangwan dam and Urmil dam in Ken basin between States of Madhya Pradesh (MP) and Uttar Pradesh (UP).

1.2 The water sharing as decided in tripartite MoU signed on 25th August, 2005 shall be adhered to. After reserving 2,266 MCM for upstream uses in Madhya Pradesh (MP) in Ken basin upstream of Daudhan dam, and accounting for mandatory releases for environment and reservoir losses at Daudhan dam, the rest of the water in Ken basin upto Bariyarpur Pick Up Weir shall be utilised by the States of MP and UP in Ken and Betwa basins. In a normal year (annual gross yield in Ken basin upto Daudhan dam being 6,590 MCM or more), the State of MP shall utilise total of 2,350 MCM (83 TMC) while State of UP shall utilise total of 1,700 MCM (60 TMC) annually from the Ken system. The committed releases to MP and UP from the storages in Daudhan reservoir during non monsoon period (November to May) shall be 1,834 MCM and 750 MCM respectively. UP shall be free to create additional storages in its own territory downstream of Bariyarpur PUW to store monsoon water as per its requirement during non monsoon period.

1.3 In the years of scarcity (gross annual yield being below 6,590 MCM in Ken basin upto Daudhan dam), the deficit shall be borne by both the States in the ratio of their respective utilisation from Ken system i.e. 1,700 MCM (27%) by UP and 2,266 MCM+2,350 MCM (73%) by MP. Also any deficit in the storage of Daudhan reservoir as on 1st November shall be shared by both the States in the ratio of their share from Daudhan reservoir storage i.e. 750 MCM (29%) by UP and 1,834 MCM (71%) by MP.

2.0 COMPONENTS OF KEN-BETWA LINK PROJECT (KBLP)

The components of KBLP including head works and their distribution system and canal pipeline and command networks are given as **Annexure-I.**

3.0 पेय जल आपूर्ति का प्रावधान

इस परियोजना से क्षेत्र को पेयजल की आपूर्ति प्राथमिकता के आधार पर की जाएगी। लाभान्वित होने वाले जिलों सहित पेयजल आपूर्ति के लिए परियोजना के अनुसार किए गए प्रावधान **अनुलग्नक-II** पर दिए गए हैं। तथापि, पेयजल आपूर्ति के प्रावधान प्रत्येक राज्य की समग्र हिस्सेदारी के भीतर होंगे।

4.0 हाइड्रोपावर का बंटवारा

पावर हाउसों तथा उसके ओ. एंड एम. की लागत का वहन मध्य प्रदेश सरकार करेगी और इस हाइडेल पावर का लाभ मध्यप्रदेश को मिलेगा। हालांकि, बिजली उत्पादन के लाभ को दौधन के हेड वर्क्स के प्रचालन एवं रखरखाव खर्चों में नहीं लिया जाएगा, क्योंकि बिजली उत्पादन बहुत कम है।

5.0 ट्रांसमिशन हानि

लिंक कैनाल की ट्रांसमिशन हानि का वहन मध्य प्रदेश और उत्तर प्रदेश द्वारा इस लिंक से वास्तविक जल उपयोग के हिस्से के अनुपात में किया जाएगा।

6.0 लागत बंटवारा

6.1 केबीएलपी की लागत में भूमि अधिग्रहण, आर एवं आर तथा फॉरेस्ट लैंड डायवर्जन आदि की लागत सहित इस एम.ओ.ए. के **पैरा 2.0 (विवरण अनुलग्नक-I पर संलग्न)** में सभी सूचीबद्ध घटकों की लागत शामिल होगी। केन्द्रीय कैबिनेट के अनुमोदन के बाद केबीएलपी को एक राष्ट्रीय परियोजना के रूप में केन्द्र सरकार द्वारा 90% (केन्द्र) तथा राज्य सरकार द्वारा 10% (राज्यों) के अनुपात में निधियन किया जाएगा।

केन्द्रीय हिस्सेदारी के लेखांकन के बाद कार्य की शेष लागत की राशि का वहन मध्य प्रदेश और उत्तर प्रदेश राज्यों द्वारा इस प्रकार किया जाएगा:-

6.1.1 दौधन बांध का हैड वर्क: मध्य प्रदेश एवं उत्तर प्रदेश के मध्य 71% मध्य प्रदेश: 29% उत्तर प्रदेश के अनुपात में।

6.1.2 केन-बेतवा लिंक कैनाल: संबंधित राज्यों द्वारा आहरित जल के अनुपात में।

6.1.3 दोनों राज्यों में से केवल एक राज्य को लाभ देने वाले कार्यों के लिए, संबंधित राज्य द्वारा।

6.1.4 मध्य प्रदेश की वन भूमि और प्रभावित राजस्व की कीमत केबीएलपी की लागत का एक भाग होगी तथा मध्य प्रदेश के अंश में इसे समायोजित किया जाएगा।

3.0 PROVISION FOR DRINKING WATER SUPPLY

The drinking water supply from project to region shall be given priority. The project wise provisions made for drinking water supply along with districts to be benefitted are given at **Annexure-II.** However, the provisions for drinking water supplies shall be within the overall share of each State.

4.0 SHARING OF HYDROPOWER

The cost of the power houses and its O&M cost shall be borne by Govt. of MP and the benefits of the hydel power shall go to Madhya Pradesh. However, the benefits of hydel power shall not be taken into reckoning for O&M expenditure of the Daudhan head works, as the power generation is meagre.

5.0 TRANSMISSION LOSSES

Transmission losses in the Ken-Betwa link canal shall be shared by MP and UP in the ratio of actual water used from this link canal.

6.0 SHARING OF COST

6.1 The cost of KBLP shall include all the components listed in **para 2.0 (details enclosed at Annexure-I)** of this MoA including the cost of land acquisition, R&R and diversion of forest land etc. The KBLP will be funded as a National Project by the Union Government with 90% (Centre) & 10% (States) funding pattern after the approval of the Union Cabinet.

After accounting for the Central share, the remaining cost of works shall be shared by the States of MP and UP as under:-

6.1.1 Headworks of Daudhan dam: between MP and UP in the ratio of 71% MP: 29% UP.

6.1.2 K-B Link Canal: In the ratio of water to be drawn by respective State.

6.1.3 For works exclusively serving either of the States, by the State concerned.

6.1.4 The value of affected revenue and forest land of Madhya Pradesh will form part of the cost of the KBLP and adjusted against share of Madhya Pradesh.

6.2 परियोजना की ऑपरेशन एवं मैंटिनेंस (ओ. एंड एम.) लागत का वहन राज्यों द्वारा इस प्रकार किया जाएगा:

6.2.1 दौधन बांध का हैड वर्क तथा पीटीआर (पन्ना टाइगर रिजर्व) के डूब क्षेत्र तथा आर एंड आर स्थलों पर होने वाले किसी प्रकार के प्रतिपूरक कार्य, मध्य प्रदेश एवं उत्तर प्रदेश के मध्य 71% मध्य प्रदेश: 29% उत्तर प्रदेश के अनुपात में।

6.2.2 केन-बेतवा लिंक कैनाल से संबंधित राज्यों द्वारा आहरित जल के अनुपात में।

6.2.3 दोनों राज्यों में से केवल एक राज्य को लाभ देने वाले कार्यों के लिए, संबंधित राज्य द्वारा।

7.0 क्रियान्वयन क्रियाविधि

केन-बेतवा लिंक परियोजना का क्रियान्वयन निम्नानुसार होगा:

7.1 केबीएलपी के क्रियान्वयन के लिए मध्य प्रदेश और उत्तर प्रदेश सरकार की भागीदारी से एक स्पेशल परपज व्हीकल (एस.पी.वी.) का गठन किया जाएगा। एस.पी.वी. **अनुलग्नक-I में दिए पैरा 1.1, 2.1.1, 2.1.2 एवं 2.1.3** के अनुसार दौधन बांध, पावर हाउस, टनल तथा केन-बेतवा लिंक वाटर कैरियर के निष्पादन के लिए उत्तरदायी होगा।

के.बी.एल.पी के शेष घटकों का क्रियान्वयन संबंधित राज्य सरकार द्वारा किया जाएगा।

7.2 केबीएलपी के क्रियान्वयन के लिए एस.पी.वी समग्र रूप से उत्तरदायी होगा। पैरा 2 में दर्शाए गए केबीएलपी के सभी घटकों को एस.पी.वी. द्वारा तैयार की गई कार्य योजना के अनुसार साथ-साथ आरंभ किया जाएगा। एस.पी.वी. के सी.ई.ओ. राज्य सरकारों द्वारा पूरे किए जाने वाले कार्यों के लिए वित्तीय तथा कार्यों की योजना, निधियन जारी करने एवं पर्यवेक्षण आदि के लिए उनके साथ निरंतर समन्वय बनाए रखेंगे।

8.0 परियोजना से प्रभावित परिवारों (पी.ए.एफ.एस.) के पुनर्वास एवं पुन: स्थापना (आर एंड आर)

संबंधित राज्य सरकारें अपने प्रादेशिक क्षेत्राधिकार के अंतर्गत परियोजना से प्रभावित परिवारों के पुनर्वास एवं पुन: स्थापना तथा परियोजना के लिए भूमि अधिग्रहण का कार्य, पुनर्वास एवं पुन: स्थापना अधिनियम, 2013 या संबंधित राज्य की नीति के अनुसार या अनुमोदित पर्यावरणीय प्रबंधन योजना के अनुसार समयबद्ध और पारदर्शी ढंग से करेंगी।

6.2 The Operation and Maintenance (O&M) cost of the project shall be borne by the States as per details below:-

6.2.1 Headworks of Daudhan dam and any compensatory works arising out of PTR submergence and R&R sites: between MP and UP in the ratio of 71% MP : 29% UP.

6.2.2 K-B Link Canal in the ratio of water drawn by respective State.

6.2.3 For works exclusively serving either of the States, by the concerned State.

7.0 IMPLEMENTATION MECHANISM

The execution of Ken-Betwa Link Project shall be as under:

7.1 A Special Purpose Vehicle (SPV) shall be created with participation of Government of MP and UP for the execution of KBLP. The SPV will be responsible for execution of the Daudhan Dam, power houses, tunnels and Ken-Betwa Link water carrier as elaborated in **paras 1.1, and 2.1.1, 2.1.2 & 2.1.3 of Annexure-I.**

The remaining components of KBLP shall be executed by respective State Government.

7.2 The SPV shall be responsible for overall implementation of KBLP. All the components of KBLP as elaborated in para 2.0, shall be taken up concurrently as per work plan devised by SPV. For works under implementation by the State Governments, the CEO of SPV will coordinate regularly with them for financial and works planning, fund releases and supervision.

8.0 REHABILITATION AND RESETTLEMENT (R & R) OF PROJECT AFFECTED FAMILIES (PAFs)

R & R of project affected families and land acquisition for the projects within their territorial jurisdiction would be carried out by respective State Governments in a time bound and transparent manner as per Land Acquisition, Rehabilitation and Resettlement Act, 2013 or as per the respective State Policy and as per approved Environmental Management Plan.

9.0 मॉनीटरिंग क्रियाविधि

9.1 सचिव (ज.सं., न.वि. व गं.सं.वि.), भारत सरकार की अध्यक्षता एवं राज्य सरकारों के प्रतिनिधित्व वाली एक **स्टीयरिंग कमेटी** समय-समय पर नीतियों, प्रगति, वित्तीयन एवं अन्य संबंधित मामलों सहित परियोजना के समग्र क्रियान्वयन की समीक्षा करेगी। क्रियान्वयन स्तर पर उभरे किसी भी मुद्दे को स्टीयरिंग कमेटी हल करेगी। स्टीयरिंग कमेटी के स्तर पर उभरे विवाद को **उच्च स्तरीय समिति** को भेजा जाएगा जिसके अध्यक्ष केन्द्रीय मंत्री (जल शक्ति) तथा जिसके प्रतिनिधि दोनों राज्यों के जल संसाधन/जल शक्ति मंत्री होंगे।

दिनांक : 22 मार्च, 2021 को हस्ताक्षरित।

(शिवराज सिंह चौहान)
मुख्यमंत्री, मध्य प्रदेश
मध्य प्रदेश राज्य के लिए

(योगी आदित्यनाथ)
मुख्यमंत्री, उत्तर प्रदेश
उत्तर प्रदेश राज्य के लिए

(गजेन्द्र सिंह शेखावत)
जल शक्ति मंत्री
संघ सरकार के लिए

9.0 MONITORING MECHANISM

9.1 A **Steering Committee** headed by Secretary (DoWR, RD&GR), Govt. of India with representatives from State Governments shall periodically review the overall implementation of project including policies, progress, funding and other related matters. Any issue arising out at implementation stage shall be resolved by the Steering Committee. Dispute arising out at Steering Committee level, shall be referred to **High Level Committee** headed by Union Minister (Jal Shakti) and represented by Water Resources/Jal Shakti Ministers of both the States.

Signed on this day of 22nd March, 2021.

(SHIVRAJ SINGH CHOUHAN)
Chief Minister of Madhya Pradesh
FOR THE STATE OF
MADHYA PRADESH

(YOGI ADITYANATH)
Chief Minister of Uttar Pradesh
FOR THE STATE OF
UTTAR PRADESH

(GAJENDRA SINGH SHEKHAWAT)
Minister for Jal Shakti
FOR UNION GOVERNMENT

अनुलग्नक-I

केन-बेतवा लिंक परियोजना (के.बी.एल.पी.) में शामिल किए गए कार्य

1. हैड वर्क्स एवं डिस्ट्रीब्यूशन प्रणाली

1.1 दौधन बांध में शामिल हैं

1.1.1 दौधन में केन नदी पर 288 मी. एफ.आर.एल./एम.डब्लू.एल. पर मृदा तटबंध सह कांक्रीट बांध।

1.1.2 1.9 कि.मी. लम्बाई की लिंक वॉटर कैरियर तक जल पहुंचाने के लिए दौधन बांध के बांयें तट से लगभग 170 मी. अपर लेवल की टनल।

1.1.3 पावर हाउस-II को जल पहुंचाने के लिए दौधन बांध के बायें तट से लगभग 100 मी. पर एक लोअर लैवल सुरंग तथा वहां से लगभग 2.5 कि.मी. कनैक्टिंग चैनल के माध्यम से मध्य प्रदेश के लैफ्ट बैंक कैनाल तक।

1.1.4 दौधन बांध की तली में स्पिलवे के दांयी ओर पावर हाउस-I (2×30 मेगावाट)।

1.1.5 लोअर लेवल टनल के आउटलेट पर पावर हाउस-II (3×6 मेगावाट)।

1.2 कोठा बैराज में शामिल हैं

1.2.1 गांव-कोठा, तहसील गंज बसोदा, जिला विदिशा, मध्य प्रदेश में बेतवा नदी पर बैराज।

1.2.2 पम्प हाउस और राइजिंग मेन्स

1.3 बीना कॉम्प्लैक्स में शामिल हैं

1.3.1 चार भंडारण बांध: बीना नदी पर मादिया एवं चकरपुर, धसान नदी पर सेमरा घाट डायवर्जन तथा देहरा नाला पर देहरा बांध।

1.3.2 पम्प हाउस, राइजिंग मेन्स तथा पावर हाउस।

1.4 लोवर ओर परियोजना में शामिल हैं

1.4.1 गांव-दिदौनी, जिला-शिवपुरी, मध्य प्रदेश के निकट ओर नदी पर एक मृदा तटबंध सह कांक्रीट बांध।

1.4.2 पम्प हाउस, राइजिंग मेन्स तथा लिंक वाटर कैरियर।

Annexure-I

Works included in Ken-Betwa Link Project (KBLP)

1. Head Works & Distribution System

1.1 Daudhan Dam Comprises

1.1.1 An earthen embankment cum concrete dam across Ken River at Daudhan with FRL/MWL 288 m.

1.1.2 An Upper Level Tunnel about 170 m from the left bank of Daudhan dam having length of 1.9 km for conveying water to the link water carrier.

1.1.3 A Lower Level Tunnel about 100 m from the left bank of Daudhan dam having length of 1.1 km for conveying water to the Power House-II and from there to the Left Bank Canal of MP through a connecting channel of about 2.5 km.

1.1.4 Power House-I (2x30 MW) to the right of spillway at the toe of Daudhan dam.

1.1.5 Power House-II (3X6 MW) at the outlet of Lower Level Tunnel.

1.2 Kotha Barrage Comprises

1.2.1 A barrage across Betwa river at village Kotha, Tehsil Ganj Basoda, District Vidisha, Madhya Pradesh.

1.2.2 Pump Houses and Rising Mains

1.3 Bina Complex Comprises

1.3.1 Four storage dams: Madia & Chakarpur on Bina River, Semra Ghat Diversion on Dhasan River and Dehra Dam on Dehra Nalla.

1.3.2 Pump Houses, Rising Mains and Power Houses

1.4 Lower Orr Project Comprises

1.4.1 An earthen embankment cum concrete dam across Orr River near village Didauni, in District Shivpuri, Madhya Pradesh.

1.4.2 Pump Houses, Rising Mains and link water carrier.

1.5 विद्यमान परीछा वीयर के बेतवा नदी के अपस्ट्रीम तक बरवा सागर से जल पहुंचाने के लिए 7.1 किमी. लम्बा बरवा नाला उपयुक्त संरचना सहित बरवा सागर बांध बरियारपुर पिकअप वीयर की मरम्मत/मजबूत करना/रिमॉडलिंग करना।

1.6 उत्तर प्रदेश के अधिक्षेत्र में, विद्यमान बरियारपुर पिकप वीयर के डाउनस्ट्रीम में उपयुक्त बाँधों सहित दो नए बैराजों का निर्माण।

1.7 गैर मानसून अवधि के दौरान जल का उपयोग करने के लिए मानसूनी जल का भंडारण करने के लिए केन-बेतवा लिंक नहर से जल अंतरण करने के लिए कैरियर प्रणाली तथा महोबा जिले में विद्यमान टैंक तथा उसके कनेक्टिंग लिंक का नवीकरण।

2. <u>कैनाल पाइप लाइन और कमान नेटवर्क</u>

2.1 केन बेसिन

2.1.1 बेतवा बेसिन में ऊपरी सुरंग से विद्यमान बरवा सागर/बरवा नाला तक 221 कि.मी./176 किमी. (जैसा कि के.ज.आ. द्वारा तय किया गया) लम्बी लिंक वॉटर कैरियर।

2.1.2 मध्य प्रदेश के प्रस्तावित केन-लेफ्ट बैंक कैनाल को जोड़ने वाली विद्यमान लोवर लेवल टनल से एक बाई पास चैनल।

2.1.3 जब कभी जलाशय का जल अपर लेवल टनल के क्राउन लेवल से नीचे आ जाए तो केन-बेतवा लिंक कैनाल में जल आपूर्ति सुनिश्चित करने के लिए अपर लेवल टनल को जल लिफ्टिंग करने के लिए पम्पिंग सिस्टम की व्यवस्था करना।

2.1.4 मध्य प्रदेश के छतरपुर जिले के हाई लेवल कमान (43,678 हैक्टेयर) के एक भाग को जल पहुंचाने के लिए दौधन जलाशय प्राथमिक पहुँच से जल लिफ्टिंग के माध्यम से पम्पिंग सिस्टम, पाइप डिस्ट्रीब्यूशन नेटवर्क एवं माइक्रो इरीगेशन सिस्टम विकसित करना।

2.1.5 मध्य प्रदेश की 90 किलोमीटर लम्बी प्रस्तावित केन लेफ्ट बैंक नहर तथा छतरपुर जिले में 1,39,848 हैक्टेयर सी.सी.ए. क्षेत्र को जल पहुंचाने के लिए केन-लेफ्ट बैंक कैनाल पर पम्पिंग सिस्टम, पाइप डिस्ट्रीब्यूशन नेटवर्क तथा माइक्रो इरीगेशन सिस्टम विकसित करना।

2.1.6 मध्य प्रदेश के छतरपुर जिले में विद्यमान ओपन कैनाल नेटवर्क द्वारा विद्यमान बरियारपुर एल.बी.सी. से 38,890 हैक्टेयर सी.सी.ए. के अंतर्गत आ जाएगा।

1.5 Repair/strengthening/remodelling of Bariyarpur pick up weir, Parichha weir, Barwa Sagar Dam along with appurtenant structures and 7.1km long Barwa Nallah to carry water from Barwa Sagar to Betwa river upstream of existing Parichha weir.

1.6 Construction of two new barrages along with appurtenant structures d/s of existing Bariyarpur Pick up weir in the territory of UP.

1.7 Renovation of existing tanks and their connecting links in Mahoba district and carrier system for transfer of water from Ken Betwa link canal to tanks in order to enable UP to store the monsoon water to use during non-monsoon season.

2. **Canal Pipe Line and Command Networks**

2.1 Ken Basin

2.1.1 A 221 km/176 km (as decided by CWC) long link water carrier from Upper Level Tunnel to existing Barwa Sagar/Barwa Nallah, in Betwa Basin.

2.1.2 A bye pass channel from exit of Lower Level Tunnel to connect proposed Ken Left Bank Canal of MP.

2.1.3 Pumping system arrangements for lifting of water to Upper Level Tunnel to ensure the water supply in the Ken-Betwa link canal whenever reservoir depletes below the crown level of Upper Level Tunnel.

2.1.4 Developing pumping system, pipe distribution network and micro irrigation system by lifting water from Daudhan reservoir/initial reach of Link water carrier to serve a part of high level command (43,678 ha.) of Chhatarpur District of MP.

2.1.5 A 90 km long proposed Ken Left Bank Canal of MP and developing pumping system, pipe distribution network and micro irrigation system for Ken Left Bank Canal to serve 1,39,848 ha. CCA in Chhatarpur District.

2.1.6 From existing Bariyarpur LBC 38,890 ha. CCA will be covered by existing open canal network in Chhatarpur District of MP.

2.1.7 दौधन जलाशय से जल लिफ्टिंग द्वारा 90,101 हैक्टेयर सी.सी.ए. के लिए पम्पिंग सिस्टम, पाइप डिस्ट्रीब्यूशन नेटवर्क तथा माइक्रो सिंचाई सिस्टम विकसित करना जिसमें से मध्य प्रदेश के पन्ना जिले में 70,000 हैक्टेयर सी.सी.ए. आएगा तथा दमोह जिले में 20,101 हैक्टेयर सी.सी.ए. आएगा।

2.1.8 उत्तर प्रदेश के 17,488 हैक्टेयर मार्गस्थ कमान क्षेत्र तथा मध्य प्रदेश के 96,751 हैक्टेयर मार्गस्थ कमान क्षेत्र के साथ ऊंचाई पर स्थित 42,096 हैक्टेयर छूटे हुए कमान क्षेत्र को केन बेतवा लिंक नहर से सिंचित करने के लिए पंपिंग सिस्टम, पाईप डिस्ट्रीब्यूशन नेटवर्क तथा माइक्रो इरीगेशन सिस्टम विकसित करना।

2.1.9 विद्यमान सिस्टम को मरम्मत/मजबूत करके विद्यमान केन कमान के अंतर्गत उत्तर प्रदेश के बांदा जिले में 1,92,479 हैक्टेयर क्षेत्र में सिंचाई का स्थिरीकरण करना। दाबयुक्त पाइप माइक्रो इरीगेशन सिस्टम का उपयोग करते हुए बरियारपुर राइट बैंक कैनाल (केन-कैनाल) के कमान क्षेत्र को बढ़ाना।

2.2 बेतवा बेसिन

2.2.1 कोठा बैराज- मध्य प्रदेश के 20,000 हैक्टेयर सी.सी.ए. के लिए पंम्पिग सिस्टम, पाइप डिस्ट्रीब्यूशन नेटवर्क तथा माइक्रो इरीगेशन सिस्टम।

2.2.2 बीना कॉम्पलेक्स-मध्य प्रदेश के 96,000 हैक्टेयर सी.सी.ए. के लिए पंम्पिग सिस्टम, पाइप डिस्ट्रीब्यूशन नेटवर्क तथा माइक्रो इरीगेशन सिस्टम।

2.2.3 लोवर ओर प्रोजेक्ट-मध्य प्रदेश के 90,000 हैक्टेयर सी.सी.ए. के लिए पम्पिंग सिस्टम, पाइप डिस्ट्रीब्यूशन नेटवर्क तथा माइक्रो इरीगेशन सिस्टम।

2.2.4 दाबयुक्त पाइप माइक्रो इरीगेशन सिस्टम से उत्तर प्रदेश के महोबा जिले में विद्यमान 37,564 हैक्टेयर कमान का विकास करना।

2.1.7 Developing pumping system, pipe distribution network and micro irrigation system for 90,101 ha. CCA by lifting water from Daudhan reservoir, out of which 70,000 ha. CCA will be in Panna District and 20,101 ha. CCA will be in Damoh District of MP.

2.1.8 Developing pumping system, pipe distribution network and micro irrigation system from Ken-Betwa link canal to serve left out area of 42,096 ha. of high level command & 96,751 ha. enroute command of MP and 17,488 ha. of enroute command of UP .

2.1.9 Stabilisation of irrigation in 1,92,479 ha. in Banda district in UP under existing Ken command by repair/strengthening of existing system. Enhancing command area of Bariyarpur Right Bank Canal (Ken Canal) system by utilizing pressurised pipe micro irrigation system.

2.2 Betwa Basin

2.2.1 Kotha Barrage: Pumping system, pipe distribution network and micro irrigation system for 20,000 ha. CCA of MP.

2.2.2 Bina Complex: Pumping system, pipe distribution network and micro irrigation system for 96,000 ha. CCA of MP.

2.2.3 Lower Orr Project: Pumping system, pipe distribution network and micro irrigation system for 90,000 ha. CCA of MP.

2.2.4 Development of existing command of 37,564 ha in Mahoba district in UP with pressurised pipe micro irrigation system.

अनुलग्नक-II

के.बी.एल.पी. से घरेलू जल आपूर्ति का विवरण

क्र. सं.	के.बी.एल.पी. के घटक	लाभान्वित होने वाले जिले	राज्य	घरेलू जल की आवश्यकता (एमसीएम)
1.	दौंधन बांध	दमोह	मध्य प्रदेश	1.15
		छत्तरपुर	मध्य प्रदेश	51.07
		पन्ना	मध्य प्रदेश	3.14
		टीकमगढ़	मध्य प्रदेश	4.64
	उपकुल			***60***
		बांदा	उत्तर प्रदेश	0.00
		झांसी	उत्तर प्रदेश	14.66
		ललितपुर	उत्तर प्रदेश	31.98
		महोबा	उत्तर प्रदेश	20.13
	उपकुल			***67***
	दौंधन बांध का योग			**127 एमसीएम**
2.	लोअर ओर डैम	दतिया	मध्य प्रदेश	1.13
		शिवपुरी	मध्य प्रदेश	4.36
	लोअर ओर डैम का योग			5.49 लगभग 6 एमसीएम
3.	कोठा बैराज	विदिशा	मध्य प्रदेश	3.75
	कोठा बैराज का योग			**3.75 एमसीएम**
4.	बीना कॉम्पलेक्स बहुउद्देशीय परियोजना	रायसेन	मध्य प्रदेश	0.14
		सागर	मध्य प्रदेश	56.62
	बीना कॉम्पलेक्स बहुउद्देशीय परियोजना का योग			**56.76** **लगभग 57 एमसीएम**

कुल घरेलू आवश्यकता मध्य प्रदेश: 126.75 एमसीएम

कुल घरेलू आवश्यकता उत्तर प्रदेश: 67.00 एमसीएम

कुल योग (मध्य प्रदेश + उत्तर प्रदेश): 193.75 एमसीएम लगभग 194 एमसीएम

Annexure-II

Details of Domestic Water Supply from KBLP

Sl. No.	Components of KBLP	Districts Benefitted	State	Domestic Water Requirement (MCM)
1.	Daudhan Dam	Damoh	Madhya Pradesh	1.15
		Chhatarpur	Madhya Pradesh	51.07
		Panna	Madhya Pradesh	3.14
		Tikamgarh	Madhya Pradesh	4.64
	Sub-Total			***60***
		Banda	Uttar Pradesh	0.00
		Jhansi	Uttar Pradesh	14.66
		Lalitpur	Uttar Pradesh	31.98
		Mahoba	Uttar Pradesh	20.13
	Sub-Total			***67***
	Total of Daudhan Dam			**127 MCM**
2.	Lower Orr Dam	Datia	Madhya Pradesh	1.13
		Shivpuri	Madhya Pradesh	4.36
	Total of Lower Orr Dam			**5.49 Say 6 MCM**
3.	Kotha Barrage	Vidisha	Madhya Pradesh	3.75
	Total of Kotha Barrage			**3.75 MCM**
4.	Bina Complex Multipurpose Project	Raisen	Madhya Pradesh	0.14
		Sagar	Madhya Pradesh	56.62
	Total of Bina Complex Multipurpose Project			**56.76 Say 57 MCM**

Total domestic requirement for MP: 126.75 MCM
Total domestic requirement for UP: 67.00 MCM
Grand Total (MP + UP): 193.75 MCM Say 194 MCM

Annexure-XIX

मध्यप्रदेश शासन
जल संसाधन विभाग
मंत्रालय

क्रमांक 22 (A) 337/MPS/31/737 भोपाल, दिनांक 25/04/2017

प्रति,

प्रमुख अभियन्ता,
जल संसाधन विभाग,
भोपाल (म.प्र.)

विषयः— शिवपुरी जिले की लोअर ओर वृहद सिंचाई परियोजना की प्रशासकीय स्वीकृति।

———00———

मंत्रि–परिषद की बैठक दिनांक 11 अप्रैल 2017 में शिवपुरी जिले की लोअर ओर वृहद सिंचाई परियोजना की प्रशासकीय स्वीकृति प्रदान किये जाने के लिए गए निर्णय के परिप्रेक्ष्य में राज्य शासन एतद द्वारा लोअर ओर वृहद सिंचाई परियोजना सैच्य क्षेत्र 90,000 हेक्टर (रबी) हेतु राशि रूपये 2208.03 करोड़ (रूपये बाइस अरब आठ करोड़ तीन लाख) की प्रशासकीय स्वीकृति प्रदान करता है।

2. परियोजना पर व्यय मांग संख्या 23/4700 (मुख्य सिंचाई पर पूँजीगत परिव्यय) के अन्तर्गत विकलनीय होगा।

3. यह परियोजना केन बेतवा लिंक (राष्ट्रीय परियोजना) में सम्मिलित है। अतः सभी अभीष्ठ औपचारिकताएं पूर्ण कर ली जाए।

मध्यप्रदेश के राज्यपाल के नाम से
तथा आदेशानुसार

25/4/17
(व्ही.एस. टेकाम)
उप सचिव,
म.प्र. शासन, जल संसाधन विभाग

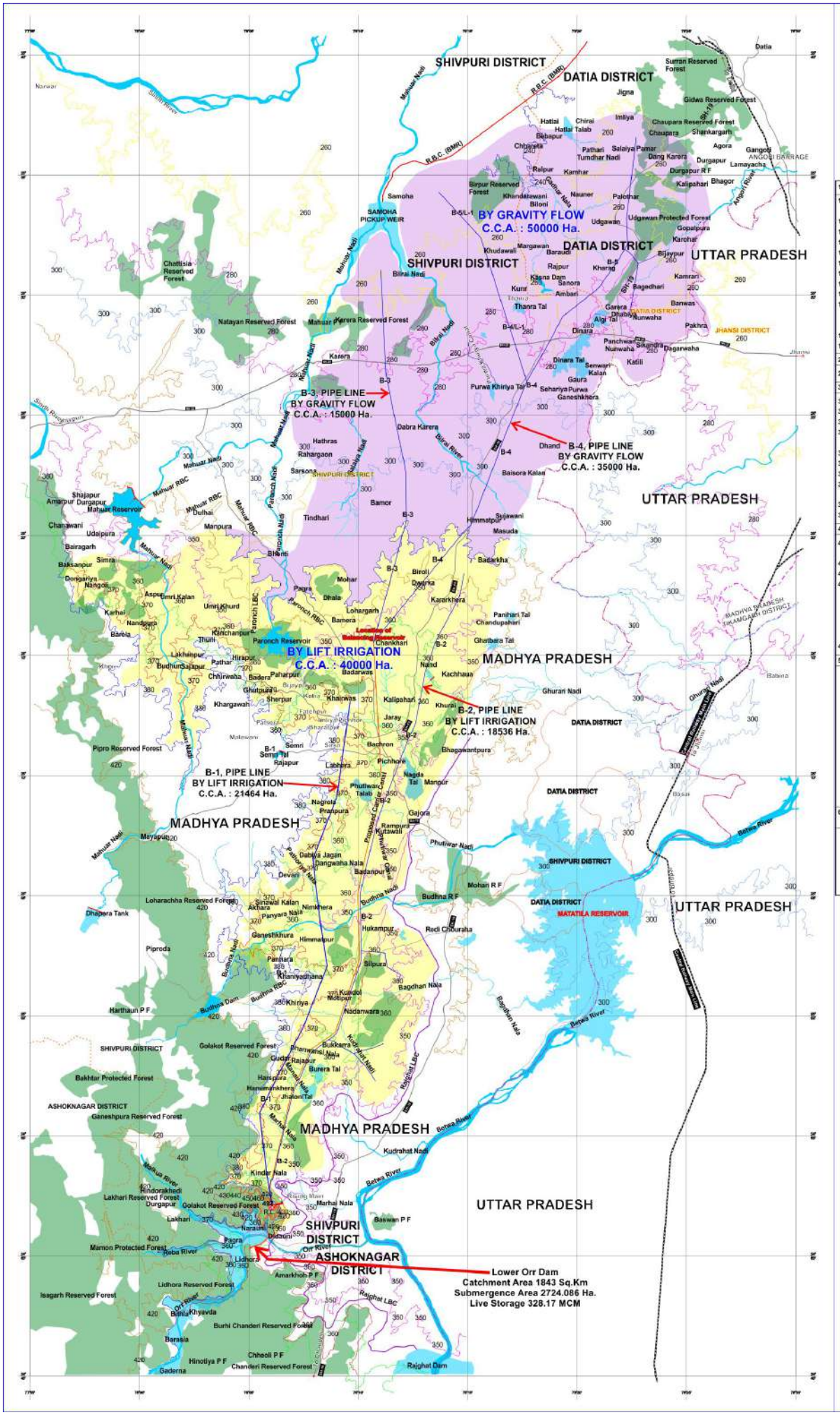
पृ. क्रमांक 22 (A) 337/MPS/31/738 भोपाल, दिनांक 25/04/2017

प्रतिलिपिः—

(1) अपर मुख्य सचिव, मध्यप्रदेश शासन, वित्त विभाग, मंत्रालय, भोपाल।
(2) अपर मुख्य सचिव, मध्यप्रदेश शासन, योजना आर्थिक एवं सांख्यिकी मंत्रालय, भोपाल।
(3) मुख्य अभियन्ता (बोधी) जल संसाधन विभाग, भोपाल।
(4) मुख्य अभियन्ता, राजघाट परियोजना, जल संसाधन विभाग, दतिया।
(5) अधीक्षण यंत्री, राजघाट नहर मण्डल, झाँसी (उ.प्र.)
(6) विशेष कर्त्तव्यस्थ अधिकारी, वृहद परियोजना नियंत्रण मण्डल, जल संसाधन विभाग, भोपाल।
(7) कार्यपालन यंत्री, राजघाट वाई तट नहर संभाग, खनियाधाना (शिवपुरी)।
(8) निज सचिव, मा. मंत्री जी, जल संसाधन विभाग, भोपाल।
(9) बैव मैनेजर, कार्यालय परियोजना संचालक, पाइकू, जल संसाधन विभाग, भोपाल को आदेश विभागीय वेबसाईट पर दर्ज करने हेतु।

25/4/17
उप सचिव,
म.प्र. शासन, जल संसाधन विभाग

dc



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N W E S

SALIENT FEATURES

1	LOCATION OF DAM	
1.1	Name of Project	Lower Orr Major Irrigation Project
1.2	District	Ashoknagar / Shivpuri
1.3	State	Madhya Pradesh
1.4	River/River basin	Orr/Betwa (Yamuna)
1.5	Name of Tributory	Malkua and Reba
1.6	Name of nearest Village	Didauni
1.7	Latitude	24° 50' 50"N
1.8	Longitude	78° 05' 55"E
1.9	Toposheet	54L/1
1.10	Location	Lower dam site is situated near village Didauni about 6 Km from Chanderi-Pichhore SH-19
1.11	Neaest Railaway Station	Lalitpur
1.12	Nearest Airport	Bhopal and Gwalior
2	HYDROLOGY	
2.1	Catchment area upto Dam site	1843 Sqkm
3	RESERVOIR DATA	
3.1	Top of Dam Level	384.00 M
3.2	Maximum Water Level	380.40 M
3.3	Full Reservoir Level	380.00 M
3.4	(i) Dead Storage Level	360.00 M
	(ii) Minimum Draw Down Level	360.00 M
3.5	River Bed Level	339.00 M
3.6	Free Board	2.94 M
3.7	Wave Height	3.54 M
3.8	Gross Storage Capacity at FRL/MWL	371.80 MCM
3.9	Live Storage capacity at FRL	328.17 MCM
3.10	Dead Storage	43.63 MCM
4	DETAILS OF SUBMERGENCE	
4.1	Submergence coming under District	Ashokanagar and Shivpuri
4.2	Water Spread at FRL	2724.086 Ha
4.3	Water spread at MWL	2724.086 Ha
4.4	(a) Culturable area at FRL	857.395 Ha
	(b) Un-culturable area at FRL	571.957 Ha
	(c) Forest area at FRL	968.24 Ha
	(d) Other Lands at FRL	325.941 Ha
	(e) Number of Village affected	12 Nos.
	(f) Number of family affected	944 Nos.
4.5	Submergence Ratio with C.C.A.	0.0094
5	Irrigation	
	(i) Gross command area	1,38,462 Ha
	(ii) Culturable Command Area	90,000 Ha
	(iii) Annual Irrigation	
	Rabi	90000 Ha
	Kahrif	-
	Total	90000 Ha
	(iv) Intensity (%)	100%
	(v) Benefitted District	Shivpuri and Datia
	(vi) Benefitted Tehsils	Khaniyadhana,Pichhore,Karera and Datia
	(vii) Number of benefitted villages	258 nos (Shivpuri 222 nos. and Datia 36 nos.)
6	Estimated Cost	Based on UCSR effective from 1.04.2016
	(i) Unit-I	68404.47 Lakhs
	(ii) Unit-II	152398.09 Lakhs
	Total =	220802.56 Lakhs
	(iii) Cost per Ha.	2.45 Lakhs/Ha. (Excluding cost of SolarPower)
	(iv) BC ratio	1.80

INDEX

- State Boundary
- District Boundary
- River
- Road
- Railway Line
- Dam and Reservoir
- Proposed Lower Orr Carrier Canal
- Existing Rajghat LBC
- Command Area Under Gravity Flow Pipe Line
- Command Area Under Pressurized Flow Pipe Line

GOVT OF MP WATER RESOURCES DEPARTMENT
CHIEF ENGINEER RAJGHAT CANAL PROJECT, DATIA (M.P.)

LOWER ORR MAJOR IRRIGATION PROJECT

BLOCK : - KHANIYADHANA | DISTRICT : SHIVPURI

COMMAND AREA MAP

DRAWN BY S/E	CHECKED BY A.E. (D) E.E. (D)
CHECKED BY SDO, WRD, KHANIYADHANA	RECOMMENDED BY S.E. RAJGHAT CANAL CIRCLE, JHANSI (U.P.)
SUBMITTED BY EXECUTIVE ENGINEER RAJGHAT LEFT BANK CANAL DIVISION - KHANIYADHANA	APPROVED BY CHIEF ENGINEER RAJGHAT CANAL PROJECT, DATIA (M.P.)
SCALE : 1 : 85000	DRG. NO. :