

Detailed Project Report of Ken-Betwa Link Project (Phase-II)
Section-1
CHECK LIST

Name of the project	Ken – Betwa Link Project (Phase-II)
Location:	
(a) State(s)	Madhya Pradesh
(b) District(s)	Vidisha, Raisen, Ashoknagar and Shivpuri
(c) Tehsil	Vidisha, Gauharganj, Gyaraspur, Ganjbasoda, Chanderi, Mungaoli and Khaniadhana
Category of the project:	
(a) Irrigation or Multipurpose	Irrigation
(b) Storage or diversion	Storage

S. No.	Item	Reference
1	2	3
D)	Planning	
1.	Has the Master plan for overall development of the river basin been prepared and stages of basin development discussed briefly?	Yes, Prepared by Govt. of M. P.
2.	Have the alternative proposals been studied and their merits and demerits discussed?	Yes
3.	Does the scheme fit in the overall development of the river basin and its priority in the overall development of the basin discussed?	Yes
4.	Are there any features which are not likely to fit in the overall development of the basin?	Nil
5.	Have the other Departments concerned with the development been informed.	Yes
6.	Is the present scheme proposed to be executed in stages? If so, are its various stages of execution and development discussed in the report?	Yes

7.	Are the effects of the scheme on the riparian rights existing upstream and downstream projects, etc. discussed?	All the requirements of u/s and d/s projects have been accounted before proposing these projects.
II)	Interstate and International Aspects	
1.	Are there any International/Interstate issues involved? If so, have these issues been identified and present status of agreement indicated specially in respect of	Interstate issues involved between MP and UP have been discussed in the Chapter -11 of Volume – I.
	(a) Sharing of water	
	(b) Sharing of cost	
	(c) Sharing of benefits	Submergence is within one of the beneficiary state only viz., Madhya Pradesh.
	(d) Acceptance of the submergence by the upstream state(s)	
	(e) Compensation of land coming under submergence	Provisions kept as per Rehabilitation & Resettlement policy of Govt. of India as furnished in Chapter – 9 of Volume – I.
	(f) Settlement of oustees	Suitable rehabilitation & resettlement plan for PAP has been described in Chapter – 9 of Volume – I.
	(g) Any other	Nil
III)	Surveys	
1.	Have the detailed topographical surveys been carried out for the following items and maps prepared as per prescribed scales?	Yes.
	(a) River surveys	Yes.
	(b) Reservoir surveys	Yes.
	(c) Head-works surveys (dam, dykes, barrages, weirs, etc., and auxiliary components)	Yes.
	(d) Plant site and Colonies	Yes.
	(e) Canals, Branch canals and water conductor system	Yes.
	(f) Major canal structures	Yes.

	(g) Power house, switch-yard, surge shafts, tailrace	N.A.
	(h) Tunnel(s), adits, penstocks, etc.	N.A.
	(i) Surveys(Detailed and sample) of areas of the command for OFD and drainage works	Yes.
	(j) soil surveys	Yes.
	(k) Surveys for soil conservation	Yes.
	(l) Any other surveys i.e. Archaeological, Right of way, communication, etc.	Yes.
IV)	Geology	
1.	Have the geological surveys for the following items been carried out and report on geology appended?	Yes.
	(a) Regional Geology	Yes.
	(b) Reservoir	
	(c) Head works and energy dissipation area	
	(d) Power house and appurtenances	
	(e) Intake and regulators	
	(f) Major canal structures	
	(g) Tunnel(s), Penstock hill, etc.	
	(h) Communication routes	
	(i) Any other	
2.	(a) Has the Seismicity of the region been studied and co-efficient of vertical/horizontal acceleration for the various structures discussed?	Yes, studied and discussed. Earthquake and Seismicity study of Lower Orr reservoir area got done.
	(b) Has the approval of the Standing Committee for recommending design of seismic co-efficient for River Valley Project been obtained?	Yes. Approval of National Standing Committee on earthquake and Seismicity has been obtained.
V)	Foundation Investigations	
1.	Have the detailed foundation investigations (including insitu tests and laboratory tests) for the following structures been carried out and detailed report(s) appended?	Yes.
	(a) Earth and rock fill dam/barrage/weir.etc	Yes.
	(b) Masonry/concrete dam/weir etc.	Yes.
	(c) Canal	Yes.

	(d) Power house, tunnel(s), canal structures etc.	Carried out for canal. No power house, tunnel proposed in the project.
	(e) Any other	Nil
2.	Are there any special features affecting the designs?	No.
VI)	Material Surveys	
3.	Have the surveys and laboratory tests for the following construction materials been carried out and report(s) appended?	
	(a) Soils for impervious, semi-pervious and pervious zones of earth dam.	Yes.
	(b) Sand	Yes.
	(c) Rock and aggregate	Yes.
	(d) Bricks and tiles	Yes.
	(e) Pozzolona	Yes.
	(f) Cement and lime stone	Yes.
	(g) Steel	Yes.
	(h) Other scarce materials:	No.
	(i) Any other	Nil
4.	Have the sources for each of the above material been identified and need etc. indicated?	Yes.
5.	Have the proposals for procurement of scarce materials been indicated?	Not applicable
VII)	Hydrological and Meteorological Investigations	
1.	Have the hydrological and meteorological investigations been carried out and status of data discussed in report?	Yes.
(a)	Rainfall	Yes.
(b)	Gauge	Yes.
(c)	Discharge	Yes.
(d)	Sediment	Yes.
(e)	Water quality	No
(f)	Evaporation and whether the above data has been appended?	Yes.
VIII)	Hydrology	
2.	Is the hydrology dealt with in details in a separate volume?	Yes, refer Volume – III.

(a)	Have the brief details been included in this report?	Yes in chapter – III of Volume – I.
(b)	Is an index map and bar chart showing location of various hydrometric, climatic and rainfall stations and the data availability at those stations been attached?	Yes.
(c)	Are brief notes about quality, consistency, processing and gap filling of the data included?	Yes.
3.	Have hydrological studies been carried out for the following:	
(a)	to establish the availability of water for the benefits envisaged.	Yes, refer page Nos. 120 – 132 of Volume – I.
(b)	to determine design flood for the various structures (Spillway, barrage, etc.)	Yes, refer page nos. 143 – 158 of Volume – I.
4.	Have the analysis for the water flows, evaporation and command area rainfall been discussed?	Yes.
5.	Have the studies regarding reservoir sedimentation been carried out and revised Elevation-Area Capacity curves been used in the simulation studies ?	Yes, refer para no. 3.7 at page nos. 132 – 136 of Volume – I.
6.	Have the other requirements such as low flow augmentation, water quality control, etc. been included in the project report and incorporated in the simulation studies?	Yes.
7 (a)	Design of major Civil Engineering Components have been finalized taking Seismicity of the region into consideration	Yes
(b)	Have the details of the simulation studies and conclusions arrived from the various alternatives explaining the factors and assumptions been included and discussed?	Yes, chapter – III of Volume – I.
(c)	Have the number of failures for difference aspects been indicated?	Yes, refer chapter – III of Volume – I.
8.	Have the likely desirable and undesirable changes in the hydrologic regime due to the project been brought out in the report?	Yes.
9.	Is the criteria adopted for selection of the construction in the hydrologic regime due to	Yes.

	the project been brought out in the report?	
10.	Is the basis for fixing up the storages discussed?	Yes.
11.	Have the flood routing studies been carried out?	Yes.
12.	Have the back water studies been carried out?	Yes.
IX)	Land acquisition and resettlement of Oustees	
1.	Have the type and quantum of land proposed to be acquired in the submergence area project area, area coming under canal and distribution system, area required for rehabilitation of the oustees been detailed?	Yes.
2.	Is the basis for provision for land acquisition indicated?	Yes.
3.	Have the rehabilitation measures, amenities and facilities to be provided to the oustees been discussed specially for the oustees from the upstream state?	Yes.
4.	Are the basis of land acquisition of the submerged area upon FRL/MWL etc. discussed?	Yes.
X)	Design	
1.	Has the final location of the head works and appurtenances, in preference to the other sites investigated, been discussed?	Yes. Chapter – IV of Volume – I.
2.	Has the layout of the project area viz., location of head works, workshop, sheds, offices, colonies, etc. been finalized and discussed?	Yes.
3.	Has the layout of the various major components of the headworks been discussed in the light of site feature, geology, and foundation characteristics, etc.	Yes.
4.	Have the designs been prepared for the following components and appended?	Yes.
(a)	Earth or rock fill dam, masonry or concrete dam, spillway, barrage, weir, etc. and appurtenances.	Yes.

(b)	Energy dissipation arrangements, training wells, etc.	Yes.
(c)	Opening through dam-galleries, head regulators, penstocks, other outlets, sluices, etc.	Yes.
(d)	Regulators	Yes.
(e)	Canal and water conductor system	Yes.
(f)	Canal structures	Yes.
(g)	Power House, tunnels, surge shaft	Not proposed in the project.
(h)	Instrumentation	Yes.
5.	Have the assumptions made in the design of above components of the project been indicated and basis of assumption discussed?	Yes.
6.	Have any model studies been carried out for location of the dam, spillway and other appurtenances checking the design profile of the spillway, energy dissipation arrangements, location of outlets/ regulators, etc?	To be conducted at construction stage.
7.	Has the final alignment of canal(s) and branch canal(s) been discussed in the light of various alignments studied?	Yes
(a)	Does the canal design provide for meeting requirements of rush irrigation?	Yes.10% extra discharge has been provided for rush irrigation
(b)	Have any intermediate storages and tail tanks been considered to reduce the canal capacities?	No intermediate storages considered along the link canal.
8.	Is the canal and distribution system being lined and if so what is the minimum capacity of the channel proposed to be lined?	Only main canals are to be lined.
9.	Is the location of canal structures on main and branch canals fixed after detailed surveys of the final alignments?	Yes.
10.	Are the regulation arrangements of the off-taking channel both near and away from the cross regulators discussed?	Yes.
11.	Are sufficient escapes including terminal escapes provided on the main/branch canal	Yes.

	distributaries/minors?	
12.	Have the basis for adopting water way for the cross drainage works been discussed?	Yes.
13.	Have the proposals for rating the canal section by providing standing wave flumes, rating of the falls, broad crested weirs. V-notches etc. been discussed for the canal and distribution system?	No.
14.	Has any model studies for major canal structure(s) been carried out and if so, are the results discussed and incorporated in the design?	No.
XI)	Irrigation and Command Area Development	
1.	Have the conveyance and field irrigation efficiencies for paddy and upland crops during Kharif, rabi, etc. been indicated, discussed and justified?	Yes.
2.	Have the weekly/fortnightly Crop water requirements at the canal head been worked out?	No, monthly crop water requirement worked out.
3.	Are there any proposals for introducing Warabundi and if so have these proposals been discussed in the report and sample calculations for a typical distributary /minor/ sub-minor furnished?	It may be considered after construction of project.
4.	Has the present position of irrigation in the command through existing canals, tanks, lift schemes, wells, etc. been brought out in the report?	Yes.
5.	Are the particulars for minor irrigation projects existing/proposed in command been indicated?	Yes.
6.	Are there potential areas, indicating the potential where ground water is available? If so, has the quality of the ground water been indicated?	Yes.
7.	Has the quantum of available ground water been assessed indicating the basis for conjunctive use with surface water discussed?	Yes.

8.	Have the semi-detailed soil surveys been carried out for the entire command and soil and land irrigability classifications brought out in the report?	Yes.
9.	Is the method used for determining the crop water requirements discussed?	Yes.
10.	Has the pre-project cropping pattern and justification for the proposed cropping pattern been furnished?	Yes.
11.	Are the areas and percentages of the CCA that will be irrigated during kharif, rabi, two seasonal, summer and perennial been indicated?	Yes.
12.	Is justification furnished for irrigating perennials and summer crops from the reservoir?	Yes.
13.	Have the monthly reservoir operation studies carried out at least for 20 years and summary on annual basis attached?	Yes.
14.	Have the number of blocks selected for detailed surveys for On Farm Development (OFD) works including drainage and total area covered by such blocks been indicated?	Yes.
15.	Have the existing locations of the (Trial cum Demonstration Farm) inputs centres, (seeds, fertilizers and insecticides) in the command been indicated and proposal to strengthen the same discussed?	Nil.
16.	Have the arrangements for financing the OFD works and proposals for strengthening the same been discussed?	Nil.
17.	Have the agencies responsible for execution of the OFD works been identified and simultaneous planning of execution of OFD works along with engineering works discussed?	Nil.
18.	Has the yearwise phasing of irrigation development as a result of the project been discussed?	Not proposed.

19.	Is the existing communication system within command area sufficient to meet the requirement after full development of irrigation? If not, have the new proposals been planned and discussed?	Yes. However, suitable provisions have been kept in the estimate for future demand also.
20.	Is the adequacy of the marketing centres in the Command Area and new proposals to meet the requirements after full development of irrigation been discussed?	Yes.
XII)	Flood Control and Drainage	
1.	Have the various flood control components of the multipurpose project been indicated?	N.A.
2.	Have the damage areas been identified and flood intensities worked out at each of the damage centre(s) which gets affected?	N.A.
3.	Have the following aspects been discussed?	
	(a) Flood cushion in the reservoir	N.A.
	(b) Maximum moderated flood out flows over the spillway etc. and its frequency	Yes
	(c) Safe carrying capacities of the channel below in the dam existing and after construction of flood embankment, channel improvement, river diversion, etc.	Yes
	(d) Synchronized moderated peak floods due to release (s) from the Dam upstream and un intercepted catchment upto the damage centres	Yes
	(e) Average annual expenditure incurred on flood relief works	N.A.
	(f) Area and population affected/likely to be affected before/after the project	N.A.
	(g) Estimated saving in annual loss of life, property, cattle, crops, etc. (evaluated in terms of money) due to flood control.	N.A.
4.	Have the following aspects drainage been discussed?	
	(a) Surface and sub-surface drainage problems of the command area with details of studies on sub soil water table.	Yes
	(b) Maximum intensity of 1,2 & 3 day rainfall	N.A.

	(c) Deficiencies in farm drains	N.A.
	(d) Deficiencies in existing natural drains	Yes
	(e) Proposal for improvement of drainage / water logging of the area with criteria	N.A.
	(f) Identification of the area in Command which will get benefited due to execution of drainage network and benefits thereof in terms of relief from crop damage, increased yields, etc.	N.A.
XIII)	Navigation	
1.	Is the present scheme for remodeling of the existing facilities and /or extension of the Navigable reach or New proposals?	N.A.
2.	Is the existing inland transport system being fully utilized? If not, have the bottlenecks in its full utilization been identified and discussed?	N.A.
3.	Have the traffic surveys been carried out and discussed in respect of present and projected:	
	(a) Goods traffic	N.A.
	(b) Passenger traffic	N.A.
	(c) Existing traffic in the area and its comparison with the other modes of transportation	N.A.
	(d) Is the extent of modification required in the existing system discussed and justified?	N.A.
4.	Have the main goods that are being carried and / or proposed to be carried been indicated?	N.A.
5.	Are the canal sections and canal structures designed from Navigation considerations or irrigation considerations?	Canal sections have been designed for irrigation considerations only.
6.	Have the proposals to develop the new scheme and phases of development in the different reaches been discussed?	N.A.
7.	If the area is being served by inland water transport, have the following been discussed:	
	(a) The existing toll rates and registration fees, for the crafts(size wise)	N.A.

	(b) Proposals for revision of tollage rates and fees, if any	N.A.
	(c) Concurrence of the competent authorities for revision of rates and fees.	N.A.
	(d) Proposal to subsidize the tariff, tollage, craft registration fee, passenger fare, etc. to attract traffic.	N.A.
8.	Has the State Inland Water Authority been consulted while finalizing the scheme and its view point discussed?	N.A.
9.	Has economic justification and viability of the Navigation component of the multipurpose project been discussed?	N.A.
XIV)	Power	N.A.
XV)	Construction Programme and Plant and Manpower Planning	
1.	Are the major components of work proposed to be done departmentally or through contractor	Through contractor
2.	Have the various alternative for construction programme been studied and proper justification furnished for the final programme adopted?	Yes.
3.	Has the proposed construction programme been prepared and synchronized for timely completion of each of the major component of work including Command Area Development?	Yes
4.	Have the yea wise quantities of the following materials of construction been worked out for various components of the project:	
	(a) Excavation – soft and hard strata	Yes
	(b)Earthwork in filling-impervious, semi-pervious and pervious	Yes
	(c)Rockfill- dam, toe, rip rap, etc.	Yes
	(d) Stone for masonry	Yes
	(e) Coarse aggregate for concrete	Yes
	(f) Sand – filter, masonry, concrete	Yes

	(g) Gravel – filter	Yes
	(h) Steel of various sizes and type – reinforcement	Yes
	(i) Cement normal, quick/slow setting with or without pozzolana	Yes
	(j) Lime –surkhi-pozzolana	Yes
	(k) Scarce material – special steel	No
	(l) Other material – fuel, electricity, explosive, etc.	Yes
5.	Have the year wise quantities to be executed by machine/labour for each of the major component been worked out for each of the above material	Yes
6.	Have the labour intensive items of the various major components of the project been identified and the quantities of such items worked out?	Yes
XVI)	Foreign Exchange	
1.	Have the details of the plant and machinery, spares, instruments, scarce materials to be imported worked out and item wise justified?	Yes
2.	Has the phasing of imports and source(s) of imports been discussed item wise?	N.A.
3.	Are the imports to be affected under foreign grants/credits or internal resources of the country?	N.A.
XVII)	Financial Resources	
1.	(a) Has the concurrence of the Finance Department been obtained?	No. Yet to be obtained.
	(b) Whether the scheme has already been started? If so, is the present stage of construction indicated?	Yet to be started.
2.	Is the scheme included in the plan? If not, what is the present position regarding its inclusion in the plan?	Ken – Betwa link project is declared as National project.
3.	Have the year wise requirement of funds been indicated?	Yes.

4.	Is the scheme covered under State sector or Central sector?	National project with 90% funding by Central Govt. and the rest by M.P. state
5.	Is the scheme covered under any foreign assistance/aid agreement?	No.
XVIII)	Estimate	
1.	Is the separate volume of estimate attached as appendix?	Yes.
2.	Is the year to which the rates adopted in the estimate indicated?	Yes.
3.	Have the analysis of rates for various major items of work for the major components of the project been furnished, with basis for analysis?	Yes.
4.	Are the provisions for the following items made on the basis of sample survey and sub-estimates:	
	(a) Distributaries, minor and sub-minors	Yes.
	(b) Water courses	Yes.
	(c) Drainage	Yes.
XIX)	Revenues	
1.	Are the basis for the following sources of revenues furnished?	
	(a) Betterment levy and proposal for its recovery	No revenue from Betterment levy considered.
	(b) Irrigation cess	N.A.
	(c) Flood protection cess	No.
	(d) Cropwise water rates	No revenue from cropwise water rates considered.
	(e) Sale of water for village water supply	A rate of Re.0.26/cum considered as prevailing in M.P. state.
	(f) Miscellaneous	Nil
2.	Have these rates been compared with the existing rates at the other projects in the State region?	Yes. Existing rates of the state government have been adopted.

3.	In case the rates are being enhanced, has the concurrence of the concerned departmentally been obtained?	As per prevailing adopted system.
4.	Have the organizational set up for the collection of revenue been indicated?	No. Existing system needs to be strengthened by M.P. Government.
XX)	B.C. Ratio	
1.	Are the allocated costs for the following components of the project worked out and basis furnished?	
	(a) Irrigation	Yes.
	(b) Power	N.A.
	(c) Flood Control	N.A.
	(d) Navigation	N.A.
	(e) Water supply	Yes.
	(f) Any other	N.A.
2.	Have the various departments/State agreed to the sharing of the above allocated cost?	Not yet.
3.	Have the crop wise benefits been worked out for irrigated and unirrigated crops being grown before project in consultation with the agriculture department and statement furnished?	Yes.
4.	Have the crop wise benefits been worked out for the proposed cropping pattern after the introduction of irrigation in consultation with the agriculture department and statement furnished?	Yes.
5.	Is the B.C. ratio of Irrigation Projects acceptable or otherwise justified?	Yes.
6.	Is the B.C. ratio for Flood Control Projects acceptable or otherwise justified?	N.A.
7.	Have the following financial return statements been furnished keeping in view the phasing of development:	
	(a) Irrigation	Yes.
	(b) Power	N.A.

8.	Are the benefits other than considered in the B.C. ratio and financial return statement been identified?	Yes.
XXI)	Ecological aspect	
1.	(a) Is the area likely to have any of the following environmental and ecological problems due to the altered surface water pattern and preventive measures discussed?	
	(i)Excessive sedimentation of the reservoir	Yes.
	(ii)Water logging	No.
	(iii) Increase in salinity of the ground water	No.
	(iv)Groundwater recharge	No.
	(v) Health hazard-water borne diseases, industrial pollution, etc.	No.
	(vi) Submergence of important minerals	Nil
	(vii) Submergence of monuments	Nil
	(viii)Fish culture and aquatic life	Yes. The same will be improved considerably due to the creation of the reservoir.
	(ix) Plant life – forests	Yes.
	(x) Life of migratory birds	No adverse effect.
	(xi) National Park and sanctuaries	N.A.
	(xii) Seismicity due to filling of reservoir	Nil
	(xiii) Any other	Nil
	(b) Has the concurrence of the Environmental Appraisal Committee been obtained?	Yes for Lower Orr reservoir.
XXII)	Colonies and Buildings	
1.	Has the planning of the colony/building been done keeping in view the ultimate use for optimum utilization of the investment?	Yes.
2.	Has the estimate of the extent of higher cost involved been made and details discussed?	Yes.
3.	Are the permanent buildings being constructed required for maintenance for the project only?	Yes.

4.	Can the buildings other than required for maintenance of the project being constructed to put to some other use after the completion of the project by the department or any other agencies?	Yes.
5.	Have the interested agencies been consulted in planning of the buildings to suit their requirements later on?	Not yet.
6.	Have the proposals for disposal of temporary buildings been discussed?	Yes.
XXIII)	Public participation and Cooperation	
1.	Are the possibilities of these been discussed in:	
	(a) Planning	Yes.
	(b) Construction	No.
	(c) Improved agricultural practices	N.A.
	(d) Any other	N.A.
XXIV)	Soil Conservation	
1.	Is the need for soil conservation measures in the catchment of the project discussed?	Yes.