

विजय भूषण पाठक, आई ए एस
संयुक्त सचिव

Vijay Bhushan Pathak, IAS
Joint Secretary



सत्यमेव जयते

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Dated: 09 November, 2015

Dear Pankaj,

As you are aware that delay in techno-economic appraisal of DPRs is one of the major constraints in the early sanction of projects under NLCPR scheme. These delays are further compounded by multiple referencing of DPRs & comments between vetting agency and concerned State Govt.

2. For streamlining and time bound techno-economic vetting of DPRs, Ministry of DoNER after detailed deliberation has prepared 'Draft Guidelines and Check-list' for planning of projects and preparation and submission of DPRs. A copy of Draft Guidelines and Check-list is attached for obtaining suggestions and comments from your State Govt. It is further requested that comments/suggestions, if any, may be forwarded to the Ministry at the earliest but not later than **30th November, 2015**.

Encls: As above.

With regards.

Yours Sincerely,

(V. B. Pathak)

To

Shri Pankaj Jain ,
Commissioner & Secretary Planning,
Department of Planning,
Govt. of Meghalaya ,
Shillong- 793003



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**Technical Guidelines for Preparation of
Detailed Propjet Reports (DPRs) under
NLCPR**

**Ministry of Développement of North
Eastern Region**

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Technical Guidelines for Preparation of Detailed Project Reports (DPRs) under NLCPR

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TECHNICAL GUIDELINES FOR DPR OF BUILDINGS

1. CODAL PROVISIONS

- a. The DPRs are to be prepared complying with the laid down norms for the concerned department and as per IS specifications.
- b. For the building projects the National Building Code 2005 and amendments should be adopted. The area to be provided for different purposes should be as per the norms provided for the same. The number of utility services like bathrooms and rest rooms should be strictly adhered. The norms adopted, should be compiled in a tabular form, indicating the relevant codal provisions.

2. Architectural Elements

- a. The facade of the building should match the surrounding and also depict the native/local/ethnic architecture.
- b. Instead of cutting the soil the layout should follow the contour of the ground as far as possible.
- c. The architecture of the building should allow for utilizing maximum sunlight and Ventilation to make it an energy efficient and environmental friendly building.
- d. The landscape drawing should be enclosed when provisions are made for the same in the cost.
- e. A layout plan of the complete scope of the works including building, roads, pathways, parking, boundary walls, overhead tank, rain water harvesting, Drains etc. should invariably be marked with dimensions.
- f. The drawing should be drawn to the scale and follow the S.I system of units. All the dimensions should be legible and it should be signed by the engineer.
- g. The use of marble, kota stone and granite for flooring be avoided unless very essential. In such case, locally available materials could be considered.
- h. A layout plan of the electric, sanitary provisions and water supply distribution lines should be worked out and enclosed for better appreciation of the project. The number of personnel utilizing the building or the structure shall dictate the provision for the water tank provided.
- i. Street lighting and water heating systems should be solar based and the cost should be as per the approved cost by the MNRE whenever required.

- j. As the parking for auditorium and stadium are seldom used hence it should not have concrete pavement but GSB (Granular Sub Base) can be provided for facilitating ground water recharging. The space provided shall not be more than 25 Sq.Mtr. per car.

3. Structural Design

Following are the documents to be provided

- a. A brief of the design Parameters should invariably be provided, wherein all the basic data, its source, reference etc. are explicitly brought out.
- b. The structural design and the detailing thereof should follow the relevant updated IS codes invariably for RCC and/or Stéel
- c. The loading adopted in the design for various floors should be indicated separately.
- d. No nominal mixes should be used in the design.
- e. Preferably, standard software should be used in the design of the buildings.
- f. As the NER is in zone V of the earthquake map of India, the building should be provided with the relevant provisions as laid down in the codes.

4. GENERAL REQUIREMENT CRITERIA OF BUILDINGS

▪ **Arrangement of exit**

Exit shall be so located so that travel distance on the floor shall not exceed 22.5 m for residential, educational, institutional and hazardous occupancies and 30m for assembly, business, mercantile, industrial and storage occupancies. For more than one exit they shall be placed remote from each other as possible. All the exits shall be accessible from the entire floor at all floor level.

▪ **Plinth Height**

Minimum plinth height shall be regulated on the basis of environmental and topographic condition and higher Plinth height may be required in areas prone to flooding.

▪ **Provision of Lift**

Provision of lift shall be made for all multistoried buildings having a height of 15m and above in height. The lift provided in the building shall not be considered as a means of escape in case of emergency. The other specifications may be followed as per NBC (National Building Code of India) and Model Building Bye Laws.

▪ **Mezzanine Floor**

Mezzanine floor shall be permitted only between ground floor and first floor in all the buildings. The mezzo area up to 25% of the actual covered area on the ground floor is permissible and shall not be counted for FAR (Floor Area Ratio) calculations. The height of the Mezzanine floor shall not be less than 2.20Mtr. and not more than 2.70 Mtr.

▪ **Land Development**

The percentages for land development shall not be considered. The detailed calculations along with contour map are required to be enclosed in the DPR. The approach road to the buildings from road/street/internal means of access shall be through pavement pathway of width not less than 1.50m, provided its length is not more than 30.0m

▪ **Soil Investigation Report**

The relevant soil investigation reports for the proposed R.C.C building as well as public buildings should be submitted along with the DPR.

▪ **The Planning, Design, Construction and installation of water supply, drainage and sanitation.**

Sanitation requirements for educational, Institutional, Residential, Assembly Building, Industrial, Hostel etc. as per the norms of Model Building Bye Laws or National Building Code of India.

▪ **Building plan and details**

The plan of the buildings and elevations and sections accompanying the DPR shall be drawn to scale 1:100. The plans and details shall include

- i. Floor plans of all floors together with the covered area clearly indicating the size and spacing of all framing members and sizes of rooms and position of staircases, ramps and lift wells.
- ii. Show exact location of essential services, for example W/C, Sink, Bath and the like.
- iii. Include schedule of finishes.
- iv. Including at least one section through the staircase.
- v. Include the structural arrangements with appropriate sections showing type/arrangement of footing, foundations, basements walls, structural load bearing walls, columns, beams, shear walls and spacing of footing members, floor slabs and roof slabs
- vi. Include terrace plan indicating the drainage and the slope of the roof.

▪ **Lighting and ventilation of rooms**

The minimum aggregate area of such openings, excluding doors inclusive of frames, shall be not less than

- i. One-tenth of the floor area for dry hot climate.
- ii. One-sixth of the floor area for wet hot climate.
- iii. One-eighth of the floor area for intermediate climate.
- iv. One-twelfth of the floor area for cold climate

The area of opening as given above (a) to (d) shall be increased by 25 percent in the case of kitchen.

▪ **Lofts**

Lofts shall be permitted in residential buildings and shops only. Area of such loft shall be restricted to 25% of the covered area of respective floor. Maximum height between loft & ceiling shall be 1.75 m.

▪ ***Ceiling Height for Educational and Industrial Buildings***

- i. Educational Building- Ceiling Height 3.60 Mtr. For all regions; in cold regions 3.0 Mtr.
- ii. Industrial Building – Ceiling Height 3.6 Mtr., except when air- conditioned; 3.0 Mtr.
(Factory Act 1948 and Rules therein shall govern such height, where applicable)
- iii. Minimum Height
 - For kitchen-2.60 Mtr.
 - Bath/Water-closet- 2.20 Mtr.
 - Corridor – 2.10 Mtr.
 - Habitable Room- 2.75 Mtr.

▪ ***Staircase /Exit Requirements***

- i. Residential Building (dwellings) - 1.0 Mtr. (Note- for row housing with 2- storeys, the minimum width shall be 0.75 Mtr.)
- ii. Residential Hostel Building – 1.50 Mtr.
- iii. Assembly Buildings like Auditorium and Seminar Halls – 2.0 Mtr.
- iv. Educational Building -1.50 Mtr.
- v. Institutional Building – 2.0 Mtr.
- vi. All other buildings – 1.50 Mtr.
- vii. The minimum width of tread without nosing shall be 250mm for residential building. The minimum width of tread for other buildings shall be 300mm.
- viii. The minimum height of riser shall be 190mm for residential buildings and 150mm for other building and these shall be limited to 12 per flight.
- ix. Parapet walls and handrails provided on the edges of roof terrace, balcony etc. should not be less than 1.0 Mtr and more than 1.50tr. in height.
- x. Balcony- The minimum width of individual balcony, where provided shall be 0.90 M and shall not be more than 1.20 M and it shall not project beyond the plot line and on roads or pathway.
- xi. Mumty The stair covered with Mumty not exceeding 3.0M in height.
- xii. Corridor: The minimum width of a corridor in a residential building shall be 1.0 M and in all other building shall be 1.5m

5. Cost Estimate

The cost estimate can be prepared on the basis of

- the actual quantities after design and quantity calculations as per the rates of individual item of works as per the latest SOR (with respective cost indices)

Or

- Per square meter cost as per the latest SOR (with respective cost indices) of the State or the CPWD

The items which are not in SOR shall be estimated with rate analysis based on quantities / pricelist.

6. Scales

The general scales shall be followed as enclosed at Appendix – A

7. Checklist

The checklist shall form essential part of the DPRs as enclosed at Appendix B- 1

TECHNICAL GUIDELINES OF DPR FOR ROADS AND HIGHWAY PROJECTS

1. Topographic Survey

1.1. General

Topographic survey true to ground realities should be carried out using total stations and auto levels, and bringing out data in digital form (X,Y,Z format) for developing digital terrain model (DTM) or plane table survey and using dumpy level for levelling survey.

The in-house standards, work procedures and quality plan prepared with reference to IRC: SP 19-2001, IRC: SP 20, IRC: SP 13 (in respect of surveys for rivers/stream/s) and current international practices should be followed during the above survey.

1.2. Cross Section & Detailing

Cross sections should be taken at 30 m interval and at closer interval in curved portion of the road. All physical features of the road should be recorded. (Generally, cross sections are taken at every 30m interval. In case of any major variation in the long section cross sections have to be taken irrespective of the 30m interval. The cross section details are to be taken for a further distance of half the formation width beyond the shoulders on either side of the road.)

1.3. Data Processing

All data from topographic survey recorded by total station should be downloaded and final alignment, plan, profile should be prepared and presented in AutoCAD Format.

2. Soil and Materials Survey

2.1. General

The soil and material investigations should follow the guidelines of IRC: SP: 20-2002 and IRC: SP: 72-2007 and other relevant IS Codes. The potential sources of borrow areas for soil and quarry sites will be identified.

2.2. Soil sample collection and Testing

Soil samples will be collected along and around the road alignment at three (3) locations per km, from the adjoining borrow areas, as well as one sample shall be collected from the proposed alignment of the road. Soil Classification tests like grain size analysis and Atterberg's limit should be conducted for all the samples. Standard Proctor test and the corresponding 4 day soaked CBR test should be conducted either for a minimum of one test per km for soil samples of same group or more tests due to variation of soil type. The following tests should be conducted as detailed below:

- Grain size analysis as per IS : 272 (Part 4) – 1985
- Atterberg's limit as per IS : 2720 (Part 5) – 1985
- Standard Proctor density test as per IS : 2720 (Part 7) – 1980
- 4 day soaked CBR test as per IS : 2720 (Part 16) – 1985

2.3. Analysis of Test Results

The laboratory soaked CBR value ranges from% to% and the soil laboratory test results should be summarized in Table1 below

Sl. No.	Section	CBR (%)

2.4. Coarse and Fine Aggregates

Information regarding the source of aggregate and sand will be gathered. The stone aggregates shall be procured whereas the locally available sand shall be used. The source and the lead distance from the quarry to project site will be finalized in discussion with the PIU. The aggregates and sand where available and acceptable shall be used for bituminous work, concrete works, other pavement works.

- Quarry Map should be attached with DPR.

2.5. Sub-soil investigation for bridges should be carried out in accordance with prescribed code.

3. Traffic Survey

3.1. General

Traffic counts on the project road, traffic counts must be taken on already completed or similar type of PMGSY road in the vicinity of the project road to provide a realistic count. The Classified Volume Count survey should be carried out in accordance with the requirements of the TOR and relevant codes (IRC: SP: 19-2001, IRC: SP: 20, IRC: SP: 72-2007). The surveys should be carried out by trained enumerators manually under the monitoring of Engineering Supervisor. Give description of traffic count locations. Explain why nearby road is similar to expected post construction situation of the project road. Insert map showing project road and similar road and locations of traffic counts.

3.2. Traffic Data and Analysis

The envisaged traffic count shall be classified into different vehicle category as given below:

- Motorized vehicle comprising of light commercial vehicle, medium commercial vehicle, heavy commercial vehicle, trucks, buses, agricultural tractors with trailers, car, jeep, two wheelers etc.
- Non- motorized vehicles comprising of cycle, rickshaw, cycle van, animal drawn vehicle etc. The number of laden and un-laden commercial vehicles was recorded during the traffic counts. Traffic volume count for the project road was done during desired season. The seasonal variation is based on local enquiry.

Table2 Average of 3 day traffic data					
Sl.-No.	Type of Vehicle	Day-1	Day-2	Day-3	Average
1	Car, Jeep, Van				
2	Auto Rickshaw				
3	Scooters/Motorbikes				
4	Bus / Minibus				
5	Trucks				
6	Tractors with trailer				
7	Tractor without trailer				
8	Cycles				
9	Cycle Rickshaw / Hand Cart				
10	Horse cart / Bullock Cart				
11	Pedestrian				
Total commercial vehicle per day (cvpd)					
Total motorised vehicle per day					
Total non-motorised vehicle per day					

4. Hydrological Survey

4.1. General

Hydrological survey is necessary for design of adequate and safe Cross Drainage Structures so that the rain water can pass as per natural slope. Hydrological survey of the proposed road should be based on the following observations:

- Rainfall Data
- Catchments Area
- Time of Concentration
- Existing Cross Drainage Structures

4.2. Rainfall Data

Rainfall Data as applicable for the project road should be collected with maximum rainfall occurring in the relevant months

4.3. Catchment Area

The Catchments area should be calculated by gathering local information and topographical survey data

4.4. Time of Concentration

Time of concentration (t_c) in hours should be calculated from the formula

$$(0.87 \times 3L/H)^{0.385}$$

Where L is distance from the critical point to the structure site in km and H is the difference in elevation between the critical point and the structure site in meters.

4.5. Existing Cross Drainage Structures

There are numbers of cross drainage structures along the project road should be listed as below:

Sl.	Chainage (km)	Description of Existing Structure		
		Type	Span/ Dia. (m)	Condition

5. Adopted Geometric Design Standards

5.1. General

The geometric design standards for the project should conform to guidelines. Recommended design standards vis-à-vis the standards should follow for the road are described below.

5.2. Terrain

The classification of terrain should be selected from plain/rolling/hilly/steep classification for which following criteria will be applicable.

Terrain classification	Cross slope of the country	
Plain	0-10%	More than 1 in 10
Rolling	10-25%	1 in 10 to 1 in 4
Mountainous	25-60%	1 in 4 to 1 in 1.67
Steep	Greater than 60%	Less than 1 in 1.67

5.3. Design Speed

The proposed design speed along the project road will be selected from the following table

Road classification	Plain terrain		Rolling terrain		Mountainous terrain		Steep terrain	
	Ruling	Min.	Ruling	Min.	Ruling	Min.	Ruling	Min.
Rural Roads (ODR and VR)	50	40	40	35	25	20	25	20

5.4. Right of Way (ROW)

The requirement of ROW for the road should be as follows (as specified in IRC-SP 20:2002):

Road classification	Plain and Rolling Terrain				Mountainous and Steep Terrain			
	Open Area		Built-up Area		Open Area		Built-up Area	
	Normal	Range	Normal	Range	Normal	Range	Normal	Range

Rural roads (ODR and VR)	15	15-25	15	15-20	12	12	12	9
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5.5. Roadway Width

Roadway width for the road should be given as bellow:

Terrain Classification	Roadway Width (m)
Plain and Rolling	12.00
Mountainous and Steep	6.0

5.6. Carriageway Width

The width of carriageway for the project road is 3.75m / 7.5m. Carriageway width may be restricted to 3.0m, where traffic intensity is less than 100 motorised vehicles per day and where the traffic is not likely to increase due to situation, like dead end, low habitation and difficult terrain condition.

5.7. Shoulders

It is proposed to have wide shoulder as the case may be on both sides of which at least 0.875m is hard shoulder where required.

5.8. Roadway width at cross-drainage structures should be as per prescribed standards.

5.9. Sight Distance

The safe stopping sight distance is applicable in the geometric design. The sight distance values for the road as per IRC recommendations are presented below:

Design Speed (km/hr)	Safe Stopping Sight Distance (m)
20	20
30	30
40	45
50	60

5.10. Radius of Horizontal Curve

According to IRC recommendations/standards, the minimum radius of horizontal curve for the project road is given below:

Terrain Category	Radius of Horizontal Curve (m)	
	Ruling Minimum	Absolute Minimum
Plain	90	60

To minimize extra land arrangement, minimum radius should be used is 20 m and design speed in the curves should be restricted to 20 km/hr.

5.11. Camber & Super elevation

A camber adopted on the road section is given below. The maximum super elevation is 5.0% for the project road.

Surface type	Camber (%)	
	Low rainfall (Annual rainfall <1000mm)	High rainfall (Annual rainfall >1000mm)
Earth road	4.0	5.0
WBM Gravel road	3.5	4.0
Thin bituminous road	3.0	3.5
Rigid Pavement	2.0	2.5

5.12. Vertical Alignment

Vertical alignment should be designed well within ruling gradient. Generally, minimum gradient of 0.3% for drainage purpose is considered for designing the vertical alignment of the road. Vertical curves are not required when grade change is less than 1%, however a minimum vertical curve should be provided to avoid vertical kink.

5.13. Vertical Curves

For satisfactory appearance, the minimum length of vertical curve for different design speed is given in IRC-SP 20:2002. Vertical curves will be designed to provide the visibility at least corresponding to the safe stopping sight distance. Valley curves will be designed for headlight sight distance.

5.14. Side slope

Side slope for the road where embankment height is less than 3.0m is given in the table below.

Radius of Curve (m)	Upto 20	21 - 60	Above 60
Extra Widening for 3.75 m wide single lane carriageway, (m)	0.9	0.6	Nil

5.15. Extra Widening of Pavement

The Extra Widening of Pavement at Curve as per IRC guideline is given below:

Condition	Slope (H:V)
Embankment in silty/sandy/gravel soil	2:1
Embankment in clay or clayey silt or inundated condition	2.5:1 to 3:1
Cutting in silty/sandy/gravelly soil	1:1 to 0.5:1
Cutting in disintegrated rock or conglomerate	0.5:1 to 0.25:1
Cutting in soft rock like shale	0.25:1 to 0.125:1
Cutting in medium rock like sandstone, phyllite	0.083:1 to 0.0625:1
Cutting in hard rock like quartzite, granite	Near vertical

6. Pavement Design

6.1. Design Life

A design life of 10 years should be considered for the purpose of pavement design of flexible and granular pavements.

6.2. Design Traffic

The average annual daily traffic (AADT) for the opening year as well as the total commercial vehicle per day (CVPD) was presented in Table 2.

6.3. Determination of ESAL applications

Only commercial vehicles with a gross laden weight of 3 tonnes or more are considered. The design traffic should be considered in terms of cumulative number of standard axles to be carried during the design life of the road. The numbers of commercial vehicles of different axle loads should be converted to number of standard axle repetitions by a multiplier called the Vehicle Damage Factor (VDF). An indicative VDF value should be considered as the traffic volume of the road does not warrant axle load survey. For calculating the VDF, the following categories of vehicles should be considered as suggested in paragraph 3.4.4 of IRC: SP: 72 – 2007.

- Laden heavy/medium commercial vehicles
- Un-laden /partially loaded heavy/medium commercial vehicles
- Over loaded heavy/medium commercial vehicles

Indicative VDF values considered 10% of laden MCV and 10% laden HCV as overloaded & given below:

Vehicle type	Laden	Un-laden /Partially laden
HCV	2.86	0.31
MCV	0.34	0.02

Lane distribution factor (L) for Single lane road = 1.0 Cumulative ESAL application = $T_0 \times 4811 \times L$, where T_0 = ESAL application per day. The Cumulative ESAL application for the project road as per paragraph 3.5 of IRC: SP: 72 – 2007

6.4. Subgrade CBR

The subgrade CBR range should be considered and the traffic falls in the given category.

7. Design of Cross Drainage Works

7.1. Design Feature

Design Standards for culverts should be prepared based on standard codes and guidelines of IRC: SP: 20: 2002 and similar type of on-going projects. General features of the designed cross drainage structures are given below:

For hume pipe culvert, minimum road width should be taken

Width of culvert with parapet.

Width of Bridge with parapet.

7.2. Justification for retaining/widening and replacement of culverts

7.3. Hydraulic calculation for Culvert

The design discharge should be calculated by the rational method considering peak runoff from catchment using the formula,

$$Q = 0.028 \times P \times A \times I_c$$

Where P = Coefficient of Run Off for the catchments characteristics,

A = Catchments Area in Hectares & I_c = Rainfall Intensity

Small bridge-site length of which exceeds 15 m to be jointly visited by STA and S.E. Design – as per SP-20 & SP-13 and relevant IRC Codes for Bridges.

Causeways and submersible bridges – Design to be done as per SP-20 and SP-82:2005.

Sl. No.	Chainage	Type of Culvert	Span/dia
1.			
2.			
3.			
4.			

8. Checklist

The checklist shall form essential part of the DPRs as enclosed at Appendix – B2.

TECHNICAL GUIDELINES FOR WATER SUPPLY PROJECT

1. CODAL Provisions

The DPRs shall be prepared complying with the prescribed norms and guidelines of Central Public Health Environment Engineering Organisation Guidelines (CPHEEO), Ministry of Urban Development as well as IS Codes 10500, IS: 383-1970, IS-516-1959, IS-456-2000, IS-269, IS-8112, IS-12269, IS-10262-1982, and IS-2062-1999

2. Sources of water

- i. Type of source- river/stream. Criteria for selection of the water sources should be based on raw water quality test for physical, chemical and bacterial character
- ii. Catchment Area of the source of water, location map
- iii. Whether the source is perennial or non-perennial. In case of non-perennial indicate the alternative arrangement being made during those dry season.
- iv. Do the Plants require the Water Treatment processes? State clearly the different stages of the Treatment Plant intended to propose.

3. Hydrological Studies

- i. Hydrological inputs such as daily, monthly, annually discharge/ rainfall of the main source should be highlighted in the DPR. Minimum 3 yrs Hydrological data need to be incorporated in the DPR.
- ii. The details of sedimentation studies should be provided in the DPR as this will determine the life span of the scheme.

4. Planning And Design

A brief note on the planning and the various design parameters adopted for designing of all the civil and hydraulic structures should be brought out in the DPR. Planning and design should indicate the following important design parameters:

- i. The reasons for choice of the layout of the projects adopted. If water treatment plant is required state its design criteria and the O&M procedure to be adopted after the commission so as to make the scheme more viable on long term basis.
- ii. State clearly the process of testing the quality water to be adopted and whether the department is equipped with all this laboratory equipment's and man power needed for the safety of the health of the users.
- iii. General layout should indicate the different components of civil structures such as intake head work, different type of reservoir tanks, layout of the main pipe and the main distribution pipes.
- iv. Foundation Soil: General aspect of the available foundation soil where the heavy structures is to be erected should be highlighted.
- v. All construction drawings of all the civil components should indicate the technical and general specifications.

- vi. All construction drawings should be readable and clear and soft copy in Auto-Cad format should form part of the DPR.

5. Cost Estimate

5.1 All civil cost estimate should be prepared in detailed measurements in line with the design construction drawings prepared as mention above and the estimates for each component should be given under separate sub-head such as:

- i. Preliminary which covers the various investigations, surveys, water test and ecological studies is any.
- ii. Civil works such as buildings, road communication, water tanks, pipes and pipes fittings etc.
- iii. Electro-mechanical components such as pumps, transformers and other electrical fittings.
- iv. Miscellaneous activities will cover environmental aspect such as plantation, controlling of siltation, catchment area treatment plan, preventive measures of the water sources from being polluted in near future etc. if there is any provision for free land available within the vicinity of the intake headwork and upstream catchment area that can be taken up for environmental protection and increase recharge of rain water.

5.2 The relevant pages of the item rates adopted for framing the estimates should be enclosed in the DPR including the rates of the major construction materials such as cement, sand, aggregates etc.

5.3 The terms and conditions for fixing transportation charge of construction materials should only be included for those items which have not been specified in the relevant Govt. approved scheduled of rates. In case some items, additional transportation charge is required to be included in the cost estimate, proper justification should be given such as the reason for this additional transportation charges, distance in km. to be covered, certificates indicating the location of the source of the construction materials to be transported, such as the distant of the stone, sand quarries etc. from the source to the nearest site of construction.

5.4 Any items which are not available in the prescribed scheduled of rates, analysis should be carried out on the basis of the relevant Ministry guidelines and the rates should be adopted on the basis of company's price list or minimum three quotations issued from any Govt. Recognized authorize dealers. These should be approved by the head of the concerned department not less than the rank of Chief Engineer.

6. Economic Evaluation

6.1 Six months phasing of the expenditure based on the construction planning and programme should be indicated in the form of bar chart

6.2 The construction duration of the project should be worked out on the basis of the actual volume of works of the project

6.3 Benefits of the project: The project authority should highlight in brief, the overall socio-economic impact after the project, benefit-cost ratio or any direct and indirect benefits that would be accruing from the projects.

6.4 All economic evaluation should be based on normal practice of 90:10 funding pattern

7. Check List

The checklist shall form essential part of the DPRs as enclosed at Appendix – B3.

TECHNICAL GUIDELINES OF POWER SUPPLY PROJECTS

1. CODAL PROVISIONS

The scheme to upgrade/improve / provide new power supply including transmission & distribution are generally taken up. These shall be conforming to guidelines of CEA, Indian Electricity Rules/Electricity Act with latest amendments as well as REC Guidelines and relevant BIS codes briefly mentioned hereunder:-

- (i) IS 5613 (Part 1&2) -1985 :Code of Practice for Design, Installation and Maintenance of Overload Power Lines.
- (ii) IS 2026 (Part I to IV) : Specification for Power Transformers.
- (iii) IS 1180 (Part I & II) : Specification for outdoor Three Phase Distribution Transformer upto and including 100 KVA, 11KV.
- (iv) IS 7098/8130 : 11KV XLPE Cables.
- (v) IS 398 : Bare Conductors – AAAC, ACSR & AAC

2. SOURCE OF POWER SUPPLY

- (i) The capacity of source substation from where load is proposed to be met needs to be properly evaluated.
- (ii) The capacity of incoming 66/33 KV Transmission line should be checked to facilitate in meeting existing &future power demand of the new T&D infrastructure proposed in the DPR.
- (iii) Similarly, rating of power Transformers, Breakers and other equipments of source substation may be checked and considered in the DPR for replacement/up gradation.
- (iv) All transformers should be planned / designed considering up to 70% of loading.
- (v) The DPR should consider future load growth of 10 years of the system network.

3. 33/11 KV SYSTEM NETWORK

- (i) The rating of 33 KV Substation /Line may be evaluated to meet the proposed load.
- (ii) Generally, new Power Transformers and lines are proposed although the same system could be upgraded by augmenting the size of existing 33/11 Transformers and augmenting the lower size conductor by higher size on 33KV lines.
- (iii) Some times for 33 KV lines, tower lines are proposed, despite of the fact that source substation is getting supply only on pole lines.
- (iv) While extending 33 KV lines from existing 33 KV feeders in the system, it should be ensured that the size of the conductors of new lines are not higher than that at the point of extension or tapping.

4. 11 KV DISTRIBUTION NETWORK

- (i) At times, exiting 11KV line is extended/tapped to feed the large scattered area by adding Distribution Transformers without keeping in view the rating of line, voltage regulation and system stability resulting frequent breakdowns.
- (ii) The 11 KV feeders should not be very large and loading of line should be restricted to 3-4 MVA. If need be, a switching station on 11 KV be established at load center/receiving end which will be fed from this 11KV line and outgoing feeders should emanate from proposed switching station to control the breakdown and to avoid interruption of supply in the entire area. The provision of 11KV Breakers may be considered at the switching station to localize the fault.

5. COST ESTIMATES

- (i) In the DPR, the Cost Estimates of various equipments such as Transformers, conductors, poles etc. are generally on higher side which should be properly checked and certified copy of approved rates be placed in the DPR.

- (ii) The relevant pages of the item rates adopted for framing the estimates should be enclosed in the DPR including the rates of the major construction materials such as cement, sand, aggregates etc.
- (iii) The terms and conditions for fixing transportation charge of construction material should only be included for those items which have not been specified in the relevant Govt. approved scheduled of rates. In case for some items, additional transportation charge is required to be included in the cost estimate, proper justification should be given
- (iv) Any items which are not available in the prescribed scheduled of rates, analysis should be carried out on the basis of the relevant Ministry guidelines and the rates should be adopted on the basis of company's price list or minimum three quotations issued from any Govt. Recognized authorize dealers. These should be approved by the head of the concerned department not less than the rank of Chief Engineer.

6. TECHNO-ECONOMIC EVALUATION

As brought out earlier, technical feasibility and economic considerations should invariably be kept in mind while preparing the Detailed project Report.

7. BENEFITS OF THE PROJECT

The project authority should highlight briefly, the overall socio-economic impact after the project, benefit-cost ratio or any direct and indirect benefits that would be accruing from the projects.

8. REDUCTION IN AT&C LOSSES

Calculation showing reduction in AT&C losses arising out of execution of 33/11 KV Project should be worked out indicating the benefits accrued due to implementation of the project.

9. CHECK LIST

The checklist of DPR for Power Supply Project enclosed at Appendix B4.

GENERAL SCALES OF ACCOMODATION

A. Educational Buildings (School/College)

1. No basement or cellar room shall be designed constructed, altered, converted or used for the purpose of study or instruction.
2. Every such building exceeding two storeys in height shall be constructed of fire resisting material throughout.
3. A minimum of 1.0 Sq.Mtr of net floor space per student shall be provided.
4. The size of rooms, opening, heights etc. as per the NBC or Model Building Bye Laws.

B. GENERAL REQUIREMENTS OF AN ASSEMBLY BUILDING

Sl. No	Type of Assembly Building	Min. Land required
1	Community room (1 for every 5000 population)	750 m ²
2	Community hall, mangal karyayala/kalyana mandapam/barat ghar/library (1 for every 15000 population)	2000 m ²
3	Recreational club (1 for every 1,00,000 population)	10000 m ²
4	Music, dance and drama centre (1 for every 1,00,000 population)	1000 m ²
5	Meditation and spiritual centre (1 for every 1,00,000 population)	5000 m ²
6	Socio-cultural centre (1 for every 10,00,000 population)	15 ha

C. GENERAL REQUIREMENTS OF A HOSPITAL BUILDING

Sl. No	Type of Health care facility Building	Min. Requirement
1	Dispensary (1 for every 15000 population)	Area= 0.08 ha to 0.12 ha
2	Nursing home, child welfare and maternity centre (1 for every 45000 to 100000 population)	Area= 0.20 ha to 0.30 ha Capacity= 25 to 30 beds

3	Poly-clinic with some observation beds (1 for every 100000 population)	Area= 0.20 ha to 0.30 ha	
4	Intermediate hospital (category B) (1 for every 100000 population)	Total Area= 1.00 ha a). Area for hospital = 0.60 ha b). Area for residential accommodation= 0.40 ha Capacity= 80 beds (initially the provision may be for 50 including 20 maternity beds)	
5	Intermediate hospital (category A) (1 for every 100000 population)	Total Area= 3.70 ha a). Area for hospital = 2.70 ha b). Area for residential accommodation= 1.00 ha Capacity= 200 beds (initially the provision may be for 100 beds)	
6	General Hospital (1 for every 250000 population)	Total Area= 6.00 ha hospital = 4.00 ha residential accommodation= 2.00 ha Capacity= 500 beds (initially the provision may be for 300 beds)	a). Area for b). Area for
7	Multi-specialty hospital (1 for every 100000 population)	Total Area= 9.00 ha a). Area for hospital = 6.00 ha b). Area for residential accommodation= 3.00 ha Capacity= 200 beds (initially the provision may be for 100 beds)	
8	Specialty Hospital (1 for every 100000 population)	Total Area= 3.70 ha a). Area for hospital = 2.70ha b). Area for residential accommodation= 1.00 ha Capacity= 200 beds (initially the provision may be for 100 beds)	

D. Sanitation Requirements for Institutional (Medical) Occupancy- Hospital

Sl. No.	Sanitary Unit	Hospitals With indoor Patient Ward	Hospitals With outdoor Patient Wards	
		For Males & females	For Males	For Females
1	Water Closet (W.C.)	One for every 6 beds or part thereof	One for every 100 persons or part thereof	Two for every 100 persons or part thereof
2	Ablution taps	One in each W.C.	One in each W.C.	One in each W.C.

3	Wash Basins	Two up to 30 bed; add one for every additional 30 beds; or part thereof	One for every 100 persons or part thereof	One for every 100 persons or part thereof.
4	Baths with Shower	One bath with shower for every 8 beds or part thereof.	--	--
5	Bed pan washing sink	One for each ward	-	--
6	Cleaner' Sinks	One for each ward	One per floor minimum	One per floor minimum
7	Kitchen sinks & dish Washers (where Kitchen is provided)	One for each ward	--	--
8	Urinals	--	One for every 50 persons or part thereof	--

Area and Space norms of the hospital

LAND AREA (DESIRABLE)

Minimum Land area requirement are as follows:	
Upto 100 beds	= 0.25 to 0.5 hectare
Upto 101 to 200 beds	= 0.5 hectare to 1 hectare
500 beds and above	= 6.5 hectare (4.5 hectare for hospital and 2 hectare for residential)

SIZE OF HOSPITAL AS PER NUMBER OF BEDS

a. **General Hospital** - 80 to 85 Sqm per bed to calculate total plinth area (desirable). The area will include the service areas such as waiting space, entrance hall, registration counter etc. In addition, Hospital Service buildings like Generators, Manifold Rooms, Boilers, Laundry, Kitchen and essential staff residences are required in the Hospital premises.

In case of specific requirement of a hospital, flexibility in altering the area be kept.

b. **Teaching Hospital** - 100 to 110 sqm per bed to calculate total plinth area.

Following facilities/area may also be considered while Planning hospital (Desirable)

Sl. No.	COMPONENT	REQUIREMENT
1	Operation Theatre	a) One OT for every 50 general in-patient beds b) One OT for every 25 surgical beds.
2	ICU beds	= 5 to 10 % of total beds.
3	Floor space for each ICU bed	= 25 to 30 sq m (this includes support services)
4	Floor space for Paediatric ICU beds	= 10 to 12 sq m per bed
5	Floor space for High Dependency Unit (HDU)	= 20 to 24 sq m per bed
6	Floor space Hospital beds (General)	= 15 to 18 sq m per bed
7	Beds space	= 7 sq m per bed.
8	Minimum distance between centres of two beds	= 2.5 m (minimum)
9	Clearance at foot end of each bed	= 1.2 m (minimum)
10	Minimum area for apertures (windows/Ventilators opening in fresh air)	
	a).if on same wall	= 20% of the floor area
	b).if on opposite walls	= 15% of the floor area

E. GENERAL REQUIREMENTS FOR A UNIVERSITY HOSTEL BUILDING

Sl. No	Item	Admissible area As per UGC norms in the Plans
1	Rooms	
	a). Single- seater	8-9 Sq. M. per student
	b). Double seater	7.5 to 8 Sq. M. per student
	c) Three- seater	7 to 7.5 Sq. M. per student
	(d) For PG/Research scholars/ Teachers/ Other staff	not exceeding 10 Sq. M. per head
2	Common Room	@ 2 Sq. M. per user for 25% of the hostel strength, subject to maximum of 60 Sq. M.

3	Dining Room	@ 1 Sq. M. per user for 50% of the hostel strength, subject to maximum of 40 Sq. M.
4	Kitchen & Pantry	@ 0.5 Sq. M. per diner subject to maximum of 60 Sq. M.
5	Toilet blocks	
	i) Water closet	@ 1 for 8 women
	ii) Bathroom	@ 1 for 6 women
	iii) Urinal	@ 1 for 8 women
	iv) Wash basin	@ 1 for 8 to 10 students
6	Kitchen servants	One room of 9.60 Sq. M. with WC and bathrooms
7	Visitors' rooms	One room of 9.60 Sq. M.
8	Sick room	One room of 9.60 Sq. M.
9	Reading Room	Two reading rooms
(Average minimum area should be @ 2.33 Sq. M. per Reader)		
10	Boundary wall	around the hostel, if necessary
11	Floor height	3.40 Mt.
12	Total built up area:	2.5 times of the total living area (Circulation space may be @ 25% of the plinth area)
13	Warden	One Warden assisted by an Assistant Warden for 100 students or so.

F. REGULATIONS TO BE ADOPTED FOR BUILDINGS

Sl. No	Components of Building	Min. requirement for plots up-to 50 sq m.	Min. requirement for plots above 50 sq m
1	Habitable Room	Area 7.50 sq m Width 2.10 m Height 2.75 m.	Area 9.50 sq m Width 2.40 m Height 2.75 m.
2	Kitchen	Area 3.30 sq m Width 1.50 m Height 2.75 m.	Area 4.50 sq m Width 1.50 m Height 2.75 m.
3	Pantry	Area Not Applicable Width Not Applicable Height Not Applicable	Area 3.00 sq m Width 1.40 m Height 2.75 m.
4	Bathroom	Area 1.20 sq m Width 1.00 m Height 2.20 m.	Area 1.80 sq m Width 1.20 m Height 2.20 m.
5	W.C.	Area 1.00 sq m Width 0.90 m	Area 1.10 sq m Width 0.90 m

		Height 2.20 m.	Height 2.20 m.
6	Combined Bath & W.C. (Toilet)	Area 1.80 sq m Width 1.00 m Height 2.20 m.	Area 2.80 sq m Width 1.20 m Height 2.20 m.
7	Store	Area No restriction Width No restriction Height 2.20 m.	Area No restriction Width No restriction Height 2.20 m.
8	Projections	Permitted within the setbacks upto 0.75 m width	Permitted within the setbacks upto 0.75 m width
9	Garage	--	Area 14.85 sq m. Width 2.75 m Length 5.40 m. Height 2.40 m.
10	Passage	--	Width 1.00 m
11	Doorways Habitable rooms For kitchen bath, W.C. etc.	Width 0.80 m Height 2.00 m. Width 0.75 m. Height 2.00 m.	Width 0.90 m Height 2.20 m Width 0.75 m. Height 2.00 m
12	Staircase	Width 0.75 m. No restriction for internal ladder	Width 0.90 m.

APPENDIX-B1

CHECK - LIST TO BE PROVIDED WITH THE DPR OF BUILDING WORK

S.No	Activities	Whether furnished		Page No. in DPR	Remarks
		Yes	No		
A	<u>Preliminary details</u>				
1.	Is there any deviation in the scope of work or provisions from the Concept Note ?				
2.	Are the Cost Indices for the relevant PARs (Either DPAR of CPWD or PAR of State Govt.) enclosed ?				
3	Is the justification for superior specification over and above as specified in DPRs enclosed ?				
B	<u>Soft copy of DPR having complete details.</u>				
1.	Soft copy of DPRs having complete details enclosed ?				
C	<u>Certificate from the State :</u>				
2.	Certificate by Chief Engineer that the provisions of relevant BIS Codes and the National Building Code have been complied.				
3.	Certificate by the State Govt. that (a) Land is available and its ownership rests with State Govt. (b) The land is free from all encumbrances.				
4	Lead chart of locally available materials such as earth, sand and stone aggregates etc.				
5	Forest clearance certificate if required.				
6	Suitability Certificate by CE of water for use in construction works.				
7.	Non-duplicity Certificate duly countersigned by Planning Department				
D	<u>Surveying details and soil investigation report :</u>				
1.	Surveying details (a) Location Plan (b) Layout Plan (c) Contour Plan (d) GPS of the project site.				
2.	Soil investigation report				
3	Videography of the site				
E	<u>Drawings and Designs :</u>				
1.	General drainage plan				
2.	Whether sewerage system is available nearby? Dovetailing of existing external services.				
3.	Source of water and electrical supply and availability certificate from the State Govt.				
4.	Road network available for accessibility to site of proposed				

	building.				
5.	Architectural drawings (sanctioned, plan, elevation) of the building to be enclosed along with all dimensions and should be to scale and numbered.				
6.	Design Calculation based on seismic considerations for all structural components (Footings, columns, beams, slabs, staircases, chajjas) if the civil works including bar bending schedule should be enclosed with a structural consultant certificate. These should be given with all dimensions and should be to scale and numbered.				
F.	<u>Estimates :</u>				
1.	Specification of relevant items of work.				
2.	Bill of quantities for calculation of item of work linked with the drawings				
3.	Abstract of quantities linked with the calculations.				
4.	All rates as per the SOR or rate analysis of specific items enclosed.				
G	<u>Works and Financial Planning</u>				
1.	CPM/Bar Chart for the Project CPM/Bar Chart for the Project				
2.	Year wise programme of execution with year wise requirement of funds indicated				

CHECK - LIST TO BE PROVIDED WITH THE DPR OF ROAD WORK

S.No.	Activities	Whether furnished		Page No. in DPR	Remarks
		Yes	No		
A.	<u>Preliminary details</u>				
1.	Is there any deviation in the scope of work or provisions from the Concept Note ?				
2.	Whether the condition survey of the existing road with respect to existing formation level, right of the way and carriage way enclosed (Applicable in case of a scheme involving improvement of existing roads) ?				
B	<u>Soft copy of DPR having complete details</u>				
1	Soft copy of DPRs having complete details enclosed ?				
C	<u>Certificate from the State</u>				
1.	Certificate by Chief Engineer that the provisions of IRC specifications and guidelines have been complied.				
2.	Certificate by the State Govt. that (a) Land is available and its ownership rests with State Govt. (b) The land is free from all encumbrances.				
3.	Lead chart of locally available materials such as earth, sand and stone aggregates etc.				
4.	Forest clearance certificate if required.				
5.	Suitability Certificate by CE of water for use in RCC works.				
6.	Non-duplicity Certificate				
D	<u>Surveying details and soil investigation report :</u>				
1.	Surveying details (a) Basis for the volume and intensity of traffic and its between the points being connected and accordingly justification for providing the type of proposed pavement. (b) Alignment Plan with L Section and cross drainage sections at required locations. (c) Curve details				

	<p>(d) Contour Plan.</p> <p>(e) GPS of the project site.</p> <p>(f) Justification for location of bridge.</p> <p>(g) Major curve details.</p>				
2.	<p>(a) Soil investigation and soil strata study for bridge site and validation of stability of slopes and land along alignment.</p> <p>(b) Study and justification for bridge location and hydraulic data of river at different flow conditions at the location of bridge.</p>				
E	<u>Drawings and Designs:</u>				
1.	Longitudinal and cross drainage details.				
2.	Design Calculation in junction with bridge based on seismic considerations for all structural components (Footings, columns, beams, slabs, staircases, chajjas) if the civil works including bar bending schedule should be enclosed with a structural consultant certificate. These should be given with all dimensions and should be to scale and numbered.				
F	<u>Estimates</u>				
1.	Specification of relevant items of work.				
2.	Bill of quantities for calculation of item of work linked with the drawings				
3.	Abstract of quantities linked with the calculations.				
4.	All rates as per the SOR or rate analysis of specific items alongwith quotation / authenticated price list.				
G	<u>Works and Financial Planning</u>				
1.	CPM/Bar Chart for the Project.				
2.	Year wise programme of execution with year wise requirement of funds indicated				

CHECK - LIST TO BE PROVIDED WITH THE DPR OF WATER SUPPLY PROJECTS

S.No.	Activities	Whether furnished		Page No. in DPR	Remarks
		Yes	No		
A.	Preliminary details				
1.	Is there any deviation in the scope of work or provisions from the Concept Note?				
B	Soft copy of DPR having complete details				
1	Soft copy of DPRs having complete details enclosed ?				
C	Certificate from the State				
1.	Certificate by Chief Engineer that the provisions, guidelines and design criteria prescribed by CPHEEO manual of water supply has been complied with.				
2.	Certificate by the State Govt. that (a) Land is available and its ownership rests with State Govt. (b) The land is free from all encumbrances.				
3.	Lead chart of local available materials such as earth, sand and stone aggregates etc.				
4.	Forest clearance certificate if required.				
5.	Non-duplicity Certificate duly countersigned by Planning Department.				
D.	Surveying details and soil investigation report wherever required:				
1.	Surveying details (a) Alignment Plan with L Section for the water supply line. (b) Contour Plan. (c) GPS of the project site.				
2.	Soil investigation of locations where any structure is required either for making a bridge / culvert for pipeline or office for the establishment.				
3.	Videography of the area of source of water supply and also that of the alignment through which the pipeline is proposed for taking up.				

5.	Whether the new system is dove tailed with the existing system.				
G	Estimates				
1.	Specification of relevant items of work.				
2.	Bill of quantities for calculation of item of work linked with the drawings				
3.	Abstract of quantities linked with the calculations.				
4.	All rates as per the SOR or rate analysis of specific items alongwith quotation / authenticated price list.				
H.	Works and Financial Planning				
1.	CPM/Bar Chart for the Project.				
2.	Year wise programme of execution with year wise requirement of funds indicated				

E.	<u>Drawings and Designs:</u>				
1	Whether population projected based on standard methods is realistic.				
2.	In case of tubewell/dugwells, as a source of water supply, the recommendations of Central Ground Water Board.				
3.	Whether sources of water either streams, rivers or ground water are properly described with respect to its maximum and minimum discharge/yield?				
4.	Test pit in case of dugwell and working out the yield of the well.				
5.	Whether the measured yield is found adequate to meet the water demand of the proposed communities on long term basis.				
6.	Whether pumping is required, if yes, the design of pumping of water and availability of power supply should be determined and described in report.				
7.	Whether treatment of raw water is required in consistence with the test report of raw water sample of the source of for physical, chemical and bacteriological character.				
8.	Describe type of treatment adopted in consistence with the test report of raw water sample.				
9.	Whether the design of the treatments is furnished?				
10	Whether the hydraulic design of distribution system conveyance main and pumping main are furnished?				
11	Working out the requirement including availability and deficiency and identifying the source of supply to meet out the deficiency.				
12	Whether intake and other civil structures properly designed meeting the design criteria.				
13	Design Calculations showing total water heads after loss occurred due to different flow conditions at important locations and also at some regular interval of lengths of pipeline.				
F	<u>For Improvement Scheme</u>				
1.	Whether existing system is described components wise.				
2.	Whether condition survey of the existing schemes is furnished?				
3.	Whether strengthening the existing scheme or rehabilitations are required?				
4.	Whether strengthening and improving of existing distribution, conveyance, and pumping main are only required.				

APPENDIX-B4

CHECK - LIST TO BE PROVIDED WITH THE DPR OF POWER SUPPLY PROJECTS

S.No.	Activities	Whether furnished		Page No. in DPR	Remarks
		Yes	No		
A.	<u>Preliminary details</u>				
1.	Is there any deviation in the scope of work or provisions from the Concept Note?				
B.	<u>Soft copy of DPR having complete details</u>				
1.	Soft copy of DPRs having complete details enclosed ?				
C.	<u>Certificate from the State</u>				
1.	Certificate by Chief Engineer that the provisions and mandatory requirements as per IE Rules & IE Act are complied with.				
2.	Certificate by the State Govt. that (a) Land is available and its ownership rests with State Govt. (b) The land is free from all encumbrances. (c) Permission or Right of Way obtained by the concerned authority to lay Transmission Lines.				
3.	Forest clearance certificate if required.				
4.	Non-duplicity Certificate duly countersigned by Planning Department.				
D.	<u>Survey and Drawing:</u>				
1.	Whether layout of Transmission System enclosed.				
2.	Whether existing load and availability of power worked out.				
3.	Whether Maximum Demand at take over points and sub stations worked out.				
4.	Whether line diagram of Switch Yard enclosed.				
5.	Whether plan and layout of sub station enclosed.				
E.	<u>Designs:</u>				
1.	Whether the scheme as per guide lines of CEA.				
2.	Whether the design / specifications are in conformity with the fault levels.				
3.	Whether Grid Earthing is designed for major schemes.				
4.	Whether the voltage regulation is within permissible limits in all				