CHECKLIST FOR SUBMISSION AND SCRUTINY OF DPR

(STORM WATER DRAINAGE)

MINISTRY OF URBAN DEVELOPMENT
GOVERNMENT OF INDIA

March 2012

http://urbanindia.nic.in

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CHECKLIST FOR SUBMISSION & SCRUTINY OF DETAILED PROJECT REPORT
(STORM WATER DRAINAGE) (SWD)

(to be filled in and certified by the highest city –level Officials, both technical and administrative, such as Chief Engineer/City Engineer/ Municipal Commissioner)

Instructions:

1. The DPR shall be formulated as per the guidelines given in Chapter-3 of the Manual on Sewerage and Sewage Treatment published by the Ministry and as per the Department procedures.
2. DPR shall be technically sanctioned by the Competent Authority the State Govt./ULB before forwarding it to the Ministry.
3. Each and every page has to be signed at the bottom by the officials.
4. Each field has to be filled in appropriately as 'yes', 'no', 'not required', 'not done', 'not used' etc. No field has to be left blank. Give explanatory comments wherever 'no' is indicated.
5. Non- definite entries such as 'will be done later', 'will be furnished later' etc. will not be accepted.

CERTIFICATE:

This is to certify that that the undersigned have read the contents of the check list fully and have responsibly made the entries true to the best of knowledge and understanding. In case the information furnished in the check list enclosed is found to be incorrect for any reason, whatsoever, the undersigned may be held liable for disciplinary action as per applicable Government rules.

Certified that

(i) The designs and drawings have been approved by the Competent Authority.
(ii) The detailed estimates and cost estimates are as per the current schedule of rate and/or rate analysis and latest pro-forma invoices (current market rates).
(iii) The DPR has been technically sanctioned by the Competent Authority in the State Govt./ULB.

Signed: Signed:
Name: Name:

CHECKLIST FOR SUBMISSION & SCRUTINY OF DPR

(STORM WATER DRAINAGE SYSTEM)

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
3. GENERAL COMPONENTS		
3.1	Name of the town/city/District/State for which scheme has been formulated with name of the scheme (a) Name of the City/Town: (b) Name of the District: (c) Name of the State : (d) Name of the Scheme:	
3.2	Date of DPR appraised by State Level Nodal Agency (SLNA) and whether a copy of appraisal report (duly authenticated by the competent authority) has been forwarded with DPR. (a) Date of appraisal: (b) Name of the appraisal agency: (c) Original Estimated cost: (d) Appraised cost: (e) Major comments/observations made by appraisal agency.	
3.3	Whether the commitment to launch the scheme immediately after approval of Govt. of India / Administrative approval of the scheme is appended in DPR.	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
3.4	(a) Whether Project formulation justification (need for the project) has been furnished in DPR. Please justify the need of the project. Justification: (b) Whether executive summary of the project is furnished in the DPR	
3.5	Whether linkages of this scheme have been established with other ongoing STORM water drainage schemes being funded by the Central/State Govt./other agencies, if any. Please furnish the details.	
3.6	Whether the map showing administrative and political jurisdiction of the project area has been given in DPR. Area within Municipal limit : …… sq.km. Extent of area considered in the DPR : ……sq.km. Additional area (beyond Municipal limit) considered in the DPR and justify the reasons: ……..sq.km	
3.7	Whether the land use pattern of the city / town / project area as per the approved Master Plan has been given in DPR.	
3.8	Whether the DPR including the design, drawings, cost estimates, analysis of rates has been authenticated by Competent Authority of State Govt./ ULB and Quasi-Technical sanction of DPR / Technical & Financial Verification Certificate has been attached with DPR	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
3.9	In case any proposed pumping main for storm drainage lines is crossing Railway line/ Highway & their bridge (wherever applicable), whether the clearance from concerned authority such as State Pollution Control Board (SPCB), Highways, PWD, Railways has been obtained and copies of the permission and their estimate for the same has been provided in DPR. If not, the present status of action initiated may be furnished below.	
3.10	Whether the provision for separate electric feeder line to the storm water pumping stations (to take care of frequent power failure and voltage fluctuation problem) from HT line and an agreement between Electricity Department and Urban Local Bodies (ULBs) has been furnished in the DPR	
3.11	Whether the commitment from Electricity Department for un-interrupted power supply (for pumping stations) is obtained	
3.12	Whether the topographic map of the city/town/project area to the scale has been given in DPR/Zone wise maps to scale showing all streets.	
3.13	Whether soil investigation report – bore hole logs at least at a grid of 1 km x 1 km or Geological Survey Data has been forwarded with DPR.	
3.14	Whether Contour map of the project area has been annexed with the DPR.	
3.15	Whether resolution from the ULB for meeting the regular expenditure on O&M of the storm water drainage system is enclosed in DPR.	
4. ENGINEERING COMPONENTS		
4.1	Storm water drainage network detailing	
	Total length of drain & other infrastructure (Total length and drains which are in good condition and can be integrated with proposed planned drainage system): Tertiary drain : .....Km (total) .....KM (drains in good condition)	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
	Secondary drain : .....Km (total) .....KM (drain in good condition) Primary drain : .....Km (total) .....KM (drain in good condition) SWD Pumping Stations: Nos..... Capacity of Pumps.....Length of Pumping Mains..... Km	
	Proposals for Rehabilitation Tertiary drain : .....Km Secondary drain : .....Km Primary drain : .....Km SWD Pumping Stations: Nos..... Capacity of Pumps.....Length of Pumping Mains..... Km	
	Proposals for new construction Tertiary drain : .....Km Secondary drain : .....Km Primary drain : .....Km SWD Pumping Stations: Nos..... Capacity of Pumps.....Length of Pumping Mains..... Km	
4.2	Total length of road : .....Km	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
4.3	Please furnish various project components (major components)	
4.4	Project Area and population (i) Please furnish the details of city/project area, (a) Area of the town/city (municipal limit): ……Sq. km (b) Extent of the project area considered in the DPR: ……..sq. km (c) Additional Area(beyond municipal limit) considered in the DPR:……sq.km (d) No. of Households (as per 2001 and 2011 census): (ii) Whether population projection has been adopted as per CPHEEO Manual and given in DPR (a) City population As per 2001 Census :……..lakhs As per 2011 Census : ……lakhs Initial stage (…….AD) : …… lakhs +floating population (if any)----------lakh Intermediate stage (……..AD) : …… lakhs+ floating population (if any)----------lakh	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
	Ultimate stage : …… lakhs+ floating population (if any)----------lakh (……AD) Population growth rate adopted: ……. %/ year (based on the past 5-6 decadal growth rate) Demographic Method adopted and justification : (b) Whether the population projection has been made in consonance with the Developmental Master Plan (c) Project Area Initial stage : …… lakhs Intermediate stage : …… lakhs Ultimate stage : …… lakhs Population growth rate adopted: ……. %/ year (based on the past 5-6 decadal growth rate) (d) No. of wards (within municipal limit) : ……	

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td>4.5</td><td>Whether the development master plan with land use pattern, identification of existing and future roads/streets, water bodies such as lakes and ponds, natural drains and rivers has been furnished for the urban agglomeration</td><td></td></tr>
<tr><td>4.6</td><td>If yes, give the master plan year.

If no, give present status of master plan preparation;</td><td></td></tr>
<tr><td>4.7</td><td>Land use patterns, present and proposed.
<table>
<tr><td rowspan="2">Land Use</td><td rowspan="2"></td><td colspan="2">Master Plan</td><td colspan="2">City/ULB Area</td><td colspan="2">Project Area</td></tr>
<tr><td>Present Master Plan: Year .....</td><td>Proposed Master Plan: Year .....</td><td>Present Area ..... (Year .....</td><td>Proposed Area ..... (Year .....</td><td>Present Area ..... (Year .....</td><td>Proposed Area ..... (Year .....</td></tr>
<tr><td rowspan="2">Total Area</td><td>Hectares (Ha)</td><td>.....</td><td>.....</td><td>.....</td><td>.....</td><td>.....</td><td>.....</td></tr>
<tr><td>%</td><td>100%</td><td>100%</td><td>100%</td><td>100%</td><td>100%</td><td>100%</td></tr>
<tr><td rowspan="2">Residential area</td><td>Ha</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>%</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Area under Roads>3m wide</td><td>Ha</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>%</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Area under Roads & streets <3</td><td>Ha</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table></td><td></td></tr>
</table>

S. No	Description	Write 'Yes' or 'No' etc. in the column below / **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof

m wide	%							
Markets (wholesale, vegetable, grain, other	Ha							
	%							
Area under Railways, Airports	Ha							
	%							
Institutional Area	Ha							
	%							
Industrial Area	Ha							
	%							
Green, open, park, agricultural area	Ha							
	%							
Lakes, Ponds	Ha							
	%							
Natural drains, sub-drain, nallahs, rivers	Ha							
	%							

Give Coefficients of Imperviousness adopted for design for various land uses:

Land use classification	Coefficient of Imperviousness as per Manual / Derived	Coefficient of Imperviousness as per DPR
Residential	0.60 to 0.75	
Roads, paved surface of footpaths	1.00	
Commercial	0.70 to 0.90	
Paved markets	1.00	
Unpaved markets	0.40 to 0.70	
Mixed type markets	0.40 to 0.90	

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td></td><td>
<table>
<tr><td>Mixed Development</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Industrial</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Institutional</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Large establishments</td><td></td><td></td></tr>
<tr><td>PSUs</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Railways</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Airports</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Lakes, ponds</td><td>1.00(considering FSL)</td><td></td></tr>
</table>
</td><td></td></tr>
<tr><td>4.8</td><td>List out all natural drains in the city/project / master plan area. Give the names (IDs)and length

Natural storm water drains (use additional sheets if required):
<table>
<tr><td>S No</td><td>Name / ID</td><td>Length, Km</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>
</td><td></td></tr>
</table>

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td>4.9</td><td>Give width-wise detailing of natural storm water drains(use additional sheets if required):

<table>
<tr><td>S No</td><td>Width</td><td>Length, Km</td></tr>
<tr><td></td><td>Upto 2m</td><td></td></tr>
<tr><td></td><td>>2m upto 5m</td><td></td></tr>
<tr><td></td><td>>5m upto 10m</td><td></td></tr>
<tr><td></td><td>>10m upto 30m</td><td></td></tr>
<tr><td></td><td>>30m(give further widths if necessary)</td><td></td></tr>
</table></td><td></td></tr>
<tr><td>4.10</td><td>Whether the storm water drainage network has been divided into basins, sub-basins, catchments and overlaid on the development master plan? Give details.</td><td></td></tr>
<tr><td>4.11</td><td>Division of area into catchments and sub-catchments(use additional sheets if required):
<table>
<tr><td>Whether the Master Plan Area/Project Area has been divided into catchments and sub-catchments for Storm Water Management</td><td colspan="3">Yes/No</td></tr>
<tr><td>Total no. of catchments (storm water drainage Zones)</td><td colspan="3"></td></tr>
<tr><td>Name/No. of catchment (zones)</td><td>1</td><td>2</td><td>3 etc</td></tr>
<tr><td>Area under catchment (various zones), Ha.</td><td></td><td></td><td></td></tr>
<tr><td>No. of sub-catchments (sub-zones) under each zone</td><td></td><td></td><td></td></tr>
<tr><td>Describe boundaries of each catchment (use separate pages) Ridge/Road/Rly. Line etc.</td><td colspan="3"></td></tr>
<tr><td>Give name/no. of each sub-catchment, its boundaries and arial extent (use separate pages)</td><td colspan="3"></td></tr>
<tr><td>Give land-use classification for each catchment and sub-catchment with totals ((use additional sheets if required))</td><td colspan="3"></td></tr>
<tr><td>Whether Catchment areas which are out of municipal limit likely to contribute in the project area has been taken into account</td><td colspan="3"></td></tr>
</table></td><td></td></tr>
</table>

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If **No**, reasons thereof</td></tr>
<tr><td>4.12</td><td>Details of each sub-catchment (use additional sheets if required):

<table><tr><td>Name/ID No of sub-catchment</td><td></td></tr><tr><td>Total area</td><td></td></tr><tr><td>Define boundaries</td><td></td></tr><tr><td>Land use classification</td><td></td></tr><tr><td>Area under..... Residential</td><td></td></tr><tr><td>.....Roads etc.</td><td></td></tr><tr><td>.....Institutional</td><td></td></tr><tr><td>.....Industrial</td><td></td></tr><tr><td>.....Lakes/Ponds</td><td></td></tr><tr><td>.....Any other (add rows)</td><td></td></tr><tr><td>Total of above</td><td></td></tr><tr><td>Name/ID of main drain of sub-catchment</td><td></td></tr><tr><td>Total length of main drain</td><td></td></tr><tr><td>Width-wise length of main drain (proposed)</td><td></td></tr><tr><td><2m</td><td></td></tr><tr><td>>2m – upto 5m</td><td></td></tr><tr><td>>5m- 10 m</td><td></td></tr><tr><td>>10m-30m</td><td></td></tr><tr><td>>30m</td><td></td></tr><tr><td>Total of above</td><td></td></tr><tr><td></td><td></td></tr></table></td><td></td></tr>
</table>

S. No	Description		Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
	Whether boundary of main drain demarcated and protected	Yes/No	
	Length of main drain protected		
	Length of main drain not protected		
	Action, if any for full protection		
	Whether drain outfall free or obstructed?		
	Invert level of drain outfall		
	Upstream invert levels of drain At 30m above outfall, +60m, +90m and so on....		
	Invert at outfall		
	at + 30m		
	at +60m		
	at +90m		
	at +120m : etc		
	Storm water disposal body HFL Normal water level Bed level		
	Whether drain trained/untrained		
	Trained length		
	Untrained length		
	Any constrictions like culvert		
	Identify each such culvert		
	Drain -- Bed surface material & condition		
	Manning's 'n' value		

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td></td><td>
<table>
<tr><td colspan="2">Sidewalls material & condition</td><td></td></tr>
<tr><td colspan="2">‘n’ value</td><td></td></tr>
<tr><td colspan="2">Combined ‘n’ value at every multiple o.1 m depth of flow</td><td></td></tr>
</table>
</td><td></td></tr>
<tr><td>4.13</td><td>Coefficient of Roughness for use in Manning’s Formula:
(in the DPR column, fill values only for the material used and mark others as ‘not used’)
<table>
<tr><td></td><td colspan="2">Type of Material</td><td>‘n’ as per Manual</td><td>‘n’ as per DPR Design</td></tr>
<tr><td>1</td><td rowspan="2">Salt glazed Stoneware Pipes</td><td>a) Good</td><td>0.012</td><td></td></tr>
<tr><td></td><td>b) Fair</td><td>0.015</td><td></td></tr>
<tr><td>2</td><td rowspan="2">Cement Concrete Pipes(with collar joints)</td><td>a) Good</td><td>0.013</td><td></td></tr>
<tr><td></td><td>b) Fair</td><td>0.015</td><td></td></tr>
<tr><td>3</td><td colspan="2">Spun Concrete Pipes (RCC & PSC) with socket & spigot joints (Design value)</td><td>0.011</td><td></td></tr>
<tr><td>4</td><td rowspan="7">Masonry</td><td>a) Neat Cement Plaster</td><td>0.018</td><td></td></tr>
<tr><td></td><td>b) Sand & cement plaster</td><td>0.015</td><td></td></tr>
<tr><td></td><td>c) Concrete –steel troweled</td><td>0.014</td><td></td></tr>
<tr><td></td><td>d) Concrete – Wood troweled</td><td>0.015</td><td></td></tr>
<tr><td></td><td>e) Brick in good condition</td><td>0.015</td><td></td></tr>
<tr><td></td><td>f) Brick in rough condition</td><td>0.017</td><td></td></tr>
<tr><td></td><td>g) Masonry in bad condition</td><td>0.020</td><td></td></tr>
<tr><td>5</td><td rowspan="3">Stone Work</td><td>a) Smooth dressed Ashlar</td><td>0.015</td><td></td></tr>
<tr><td></td><td>b) Rubble set in cement</td><td>0.017</td><td></td></tr>
<tr><td></td><td>c) Fine, well packed gravel</td><td>0.020</td><td></td></tr>
</table>
</td><td></td></tr>
</table>

<table>
<tr><td>S. No</td><td colspan="5">Description</td><td>Write 'Yes' or 'No' etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td></td><td></td><td>6</td><td>Earth</td><td>a) Regular surface in good condition</td><td>0.020</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>b) In ordinary condition</td><td>0.025</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>c) With stones and weeds</td><td>0.030</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>d) In poor condition</td><td>0.035</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>e) Partially obstructed with debris or weeds</td><td>0.050</td><td></td></tr>
<tr><td></td><td></td><td>7</td><td>Steel</td><td>a) Welded</td><td>0.013</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>b) Riveted</td><td>0.017</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>c) Slightly tuberculated</td><td>0.020</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>d) With spun cement mortar lining</td><td>0.011</td><td></td></tr>
<tr><td></td><td></td><td>8</td><td>Cast Iron</td><td>a)Unlined</td><td>0.013</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>b)With spun cement mortar lining</td><td>0.013</td><td></td></tr>
<tr><td></td><td></td><td>9</td><td>Asbestos Cement</td><td></td><td>0.011</td><td></td></tr>
<tr><td></td><td></td><td>10</td><td>Plastic (smooth)</td><td></td><td>0.011</td><td></td></tr>
<tr><td>4.14</td><td colspan="5">Whether the authenticated data of autographic rainfall data for the project area for the last 25 to 50 years has been obtained from India Meteorological Department and furnished in the DPR? Whether it has been analysed as described in the CPHEEO Manual and the intensity – duration – frequency (IDF) curve for the project area has been drawn? Give details as per the model below:</td><td></td></tr>
<tr><td>4.15</td><td colspan="5">Rainfall Data & Analysis (use additional sheets if required):

<table><tr><td>No. of years of autographic rainfall
Data from IMD(India Meteorological Department)</td><td></td></tr><tr><td>Whether autographic rainfall data analysed and arranged in duration (minutes) and intensify (mm/hr)</td><td></td></tr><tr><td>Duration-wise compilation of rainfall data (refer Manual)</td><td></td></tr></table></td><td></td></tr>
</table>

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof

Frequency of storms of different duration	
Total no. of rainfall events of 5 min duration (arranged in ascending intensity)	
Similarly, events of 10 min duration (arranged in ascending intensity)	
Similarly, events of 15 min duration	
20 min duration	
30 min duration	
40 min duration	
60 min duration	
90 min duration	
120 min duration	
150 min duration	
180 min duration, etc	

Storm Frequency (or Storm Return Period / Flooding design interval):

Land Use Classification	Storm frequency as per Manual	As per DPR Design
a)Residential Areas		
i) Peripheral areas	Twice a year	
ii) Central and comparatively high priced areas	Once a year	
b)Commercial and High-priced areas	Once in 2 years	

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If **No**, reasons thereof</td></tr>
<tr><td></td><td>Analysis of Frequency of Storms (Rainfall Events)(Historical data)
<table>
<tr><td rowspan="2">Duration of rainfall, in minutes</td><td colspan="8">No. of storms of particular duration of the intensity(mm /hr) given below or more during the data period</td></tr>
<tr><td>20</td><td>30</td><td>35</td><td>40</td><td>45</td><td>50</td><td>60</td><td>Etc.</td></tr>
<tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>30</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>40</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>60</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>90</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>120</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>150</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>180</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>etc</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Time (Duration) – Intensity values of storms from step curve.(for use in log-log graph)
<table>
<tr><td>i (mm/hr)</td><td>t (min)</td></tr>
<tr><td>20</td><td></td></tr>
<tr><td>30</td><td></td></tr>
<tr><td>35</td><td></td></tr>
<tr><td>40</td><td></td></tr>
<tr><td>45</td><td></td></tr>
</table></td><td></td></tr>
</table>

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
	50 | 55 | 60 | Derived values of *i* & *t* from log-log graph of above table. $i = a/t^n$ Derived value of 'a' = Derived value of 'n' = Storm Intensity Equation $i = a/t^n$ i = ... Time of concentration: As per Kirpitch Formula $Tc = [(0.885\ L^{3)}/H]^{0.385}$ Where Tc = time of concentration, minutes L = Length of overland flow in kilometres from critical (farthest) point to the inlet of drain. H = Fall in level from critical point to the inlet of drain in metres. Whether the IDF (Intensity-Duration-Frequency) curve has been drawn –Yes/No	
4.16	Whether the provision of the land / land acquisition for the SWD pumping station/mains , SWD network, if any, has been made as per 30 years requirement and future expansion in the DPR (a) Total requirement of land for: SWD Pumping Station : ..... Hectares Laying of SWD pumping mains : ..... Hectares SWD network : ..... Hectares --- Total : ..... Hectares	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
	(b) Whether land in possession with Implementing Agency : Hectares (c) Whether Govt. land is yet to be transferred to the Implementing Agency and specify time required for transfer : ……..Hectare, …… months (d) Whether private land under acquisition and time required for acquisition: ……..Hectare, …… months (e) Status of action initiated for transfer of Govt. land and acquisition of private land (please specify) :	
4.17	Whether all components of storm water drainage system such as inlets, catch pits, SWD pipelines/drains, points of confluence and natural drains with outfalls have been designed as per the CPHEEO Manual and detailed drawings have been provided in the DPR	
4.18	Give Design values and infrastructure proposals for each component(use additional sheets)	
4.19	Whether the Computer Aided Design of SWD system has been furnished in DPR. Please enclose design input files (sheets) and output files (sheets) separately	
4.20	Whether the rising main of SWD system, if any, has been designed for catchment flows with respect to time of concentration and checked for minimum velocity of 0.6 m/s and maximum velocity of 3 m/s?	
4.21	Whether node spacing while designing have been adopted as per CPHEEO Manual ?	
4.22	Whether the designs of SWD pipes/drains have been checked for minimum self-cleaning velocity of 0.6 m/s by providing proper slope	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
4.23	Whether surge / water hammer analysis for rising main has been calculated and furnished in the DPR	
4.24	Whether the provision for rising main units, wherever needed, such as thrust blocks, anchor blocks, expansion joints, scour / drain valves, air/vacuum releases valves and surge protection devices has been provided in the DPR	
4.25	Whether drawings to scale of L-sections of SWD drains/pipelines with all details such as ground level, crown level, invert level, depths of excavation, bedding details etc., have been furnished in DPR	
4.26	Whether the configuration of the pumps proposed in SWD/drainage pumping stations is in conformity with the general guidelines of CPHEEO Manual for conveying maximum design flood, need for standby and operational capability above high flood level (HFL)	
4.27	Whether the pipe material has been selected considering the topography, efficiency in service, ease of laying and economy in DPR	
4.28	Whether bedding conditions for different reaches of the proposed SWD pipelines/drains have been designed in the DPR as per CPHEEO Manual with reference to soil characteristics	
	Class A Bedding: Length proposed .....Km in soils of ..... Classification	
	Class B Bedding: Length proposed .....Km in soils of ..... Classification	
	Class C Bedding: Length proposed .....Km in soils of ..... Classification	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
4.29	Whether a detailed note on performance of existing SWD/drainage network and pumping station, if any has been furnished in the DPR	
4.30	Whether SWD system has provision for flood diversion to water bodies and for enabling ground water recharge	
4.31	Whether the ULBs certificate to the effect that no municipal sewage shall be discharged into the SWD system has been provided in the DPR	
4.32	Whether Bill of Qualities (BOQ) and cost estimates of individual components of sewerage system prepared as per latest SOR and copy of latest Schedule of Rates (SOR) and Pro-forma invoices have been annexed with DPR. (a) Schedule of Rates adopted (please specify the year): ----------year (b) In case the SOR adopted is old, please specify the cost index for escalation approved by State Govt. (c) Any price escalation proposed in cost estimates as notified by State Govt. (d) Whether analysis of rate has been worked out for all the items and appended with DPR (e) Whether Bill of Quantities of individual component has been furnished in DPR (f) Whether lump sum(LS) provision for any item has been proposed, please specify	
4.33	Whether detailed drawing, estimation & detailed BOQ for ancillary works such as boundary wall / fencing, approach & internal road, external electrification, buildings, site development / landscaping etc. has been provided in the DPR for any SWD Pumping Station	
	Give the General Abstract Cost Estimate and Component-wise or package-wise Abstract Cost Estimate: (use additional sheets if required)	

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td>4.34</td><td>Whether provision for DG set has been made in the DPR to tide over interruptions in power supply, if any</td><td></td></tr>
<tr><td>4.35</td><td>If yes, whether the calculations to arrive at the capacity of the same has been mentioned in the technical reports</td><td></td></tr>
<tr><td>4.36</td><td>Whether provision for road restoration has been made as per CPWD/ State PWD/ Urban Local Body norms</td><td></td></tr>
<tr><td>4.37</td><td>Give the List of Tender Packages made for ‘notice inviting tender’ (Use additional sheets if required) . Furnish the title-wise Tender packages and their value.</td><td></td></tr>
<tr><td>4.38</td><td>Calculate service level benchmark as per MoUD. Please furnish SLB.
<table><tr><td>Sl. No.</td><td>Indicator</td><td>Benchmark</td><td>After implementation of the project</td></tr><tr><td>1.</td><td>Coverage</td><td>100%</td><td></td></tr><tr><td>2.</td><td>Incidence of water logging</td><td>0 numbers</td><td></td></tr></table></td><td></td></tr>
<tr><td>4.39</td><td>Whether project implementation period of project has been furnished in DPR

Specify the implementation period:……..year</td><td></td></tr>
<tr><td>4.40</td><td>Whether detailed BAR Chart and PERT/CPM network showing implementation schedule has been furnished in DPR</td><td></td></tr>
<tr><td>4.41</td><td>Whether Internal rate of return (IRR) / Economic rate of return (ERR) has been furnished in DPR</td><td></td></tr>
<tr><td>4.42</td><td>Whether traffic diversion/ control arrangements for public and workers’ safety, arising out of construction phase of storm water drainage works have been furnished in the DPR</td><td></td></tr>
<tr><td>4.43</td><td>Whether Institutional and financial status of Project Executing Agency (PEA) has been reported in DPR</td><td></td></tr>
<tr><td>4.44</td><td>Whether Operation & Maintenance cost and revenue generation details (O & M Framework – existing & proposed) has been furnished in DPR</td><td></td></tr>
</table>

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td></td><td>(a) Existing tariff / cess / charges (in Rs.):
Residential --
Commercial --
Institutions --
Industries --

(b) Proposed tariff/cess/charges (in Rs.)
Residential --
Commercial --
Institutions --
Industries --</td><td></td></tr>
<tr><td></td><td>(c) Annual O & M cost (Rs. in lakhs)
(i) Existing (last 5 years)

(ii) Proposed</td><td><table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table></td></tr>
</table>

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof				
	(d) Annual Revenue (Rs. in lakhs)					
	(i) Existing (last 5 years)	1	2	3	4	5
	(ii) Proposed					
4.45	Whether Environmental and social problems (if applicable) has been furnished in DPR					
4.46	Whether provision has been made @ 0.5% of the project cost in the DPR for capacity building of ULBs for further O&M of the scheme after taking over the scheme from implementing agency. Please furnish the action plan for conducting capacity building programme. The action plan must specify specific actions such as the number of officials to be deployed in the project post commissioning, their designations, qualifications and training proposed to be given.					
4.47	Whether Rehabilitation and Resettlement plan (if applicable) has been given in DPR					
4.48	Whether all the hard copies of the DPR furnished along with soft copies/					
4.49	Period of completion of the project					

Signed:
Name:
Designation:

Signed:
Name:
Designation:

This part to be filled-in by the Ministry		
Sl. No	Description	Remarks
1	Details of project area (State/District/City/Town)	
2	Whether the SLNA/SLSC recommendation is attached with DPR	
3	Project cost recommended by SLNA/SLSC	
4	Period of project implementation	
5	Date of receipt of first DPR	
6	Date of final acceptance of DPR	
7	Date of checklist confirmation	
8	Date of first information sent to the State Govt. on scrutiny of check list	
9	Date of receipt of DPR after reformulation (revision) if applicable	
10	Date of DPR sent to the Appraisal Agency (CPHEEO)	
11	Date of Comments / appraisal report of appraisal agency	
12	Date of comments conveyed by the Admn. Division to the State Govts. & ULBs for revision of DPR, if any	
13	Date of Receipt of Revised DPR for appraisal	

(**Signature of Verifying Officer**)

NOTE: The DPR should be forwarded to the Ministry along with the complete checklist duly filled in without which DPR shall not be processed and shall be returned to the State Government.

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CHECKLIST FOR SUBMISSION & SCRUTINY OF DETAILED PROJECT REPORT
(STORM WATER DRAINAGE SYSTEM) (SWD)

(to be filled in and certified by the highest city –level Officials, both technical and administrative, such as Chief Engineer/City Engineer/ Municipal Commissioner)

Instructions:

1. The DPR shall be formulated as per the guidelines given in Chapter-3 of the Manual on Sewerage and Sewage Treatment published by the Ministry and as per the Department procedures.
2. DPR shall be technically sanctioned by the Competent Authority the State Govt./ULB before forwarding it to the Ministry.
3. Each and every page has to be signed at the bottom by the officials.
4. Each field has to be filled in appropriately as 'yes', 'no', 'not required', 'not done', 'not used' etc. No field has to be left blank. Give explanatory comments wherever 'no' is indicated.
5. Non- definite entries such as 'will be done later', 'will be furnished later' etc. will not be accepted.

CERTIFICATE:

This is to certify that that the undersigned have read the contents of the check list fully and have responsibly made the entries true to the best of knowledge and understanding. In case the information furnished in the check list enclosed is found to be incorrect for any reason, whatsoever, the undersigned may be held liable for disciplinary action as per applicable Government rules.

Certified that

(i) The designs and drawings have been approved by the Competent Authority.
(ii) The detailed estimates and cost estimates are as per the current schedule of rate and/or rate analysis and latest pro-forma invoices (current market rates).
(iii) The DPR has been technically sanctioned by the Competent Authority in the State Govt./ULB.

Signed: Signed:
Name: Name:

CHECKLIST FOR SUBMISSION & SCRUTINY OF DPR

(STORM WATER DRAINAGE SYSTEM)

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
3. GENERAL COMPONENTS		
3.1	Name of the town/city/District/State for which scheme has been formulated with name of the scheme (a) Name of the City/Town: (b) Name of the District: (c) Name of the State : (d) Name of the Scheme:	
3.2	Date of DPR appraised by State Level Nodal Agency (SLNA) and whether a copy of appraisal report (duly authenticated by the competent authority) has been forwarded with DPR. (a) Date of appraisal: (b) Name of the appraisal agency: (c) Original Estimated cost: (d) Appraised cost: (e) Major comments/observations made by appraisal agency.	
3.3	Whether the commitment to launch the scheme immediately after approval of Govt. of India / Administrative approval of the scheme is appended in DPR.	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
3.4	(a) Whether Project formulation justification (need for the project) has been furnished in DPR. Please justify the need of the project. Justification: (b) Whether executive summary of the project is furnished in the DPR	
3.5	Whether linkages of this scheme have been established with other ongoing STORM water drainage schemes being funded by the Central/State Govt./other agencies, if any. Please furnish the details.	
3.6	Whether the map showing administrative and political jurisdiction of the project area has been given in DPR. Area within Municipal limit : …… sq.km. Extent of area considered in the DPR : ……sq.km. Additional area (beyond Municipal limit) considered in the DPR and justify the reasons: ……..sq.km	
3.7	Whether the land use pattern of the city / town / project area as per the approved Master Plan has been given in DPR.	
3.8	Whether the DPR including the design, drawings, cost estimates, analysis of rates has been authenticated by Competent Authority of State Govt./ ULB and Quasi-Technical sanction of DPR / Technical & Financial Verification Certificate has been attached with DPR	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
3.9	In case any proposed pumping main for storm drainage lines is crossing Railway line/ Highway & their bridge (wherever applicable), whether the clearance from concerned authority such as State Pollution Control Board (SPCB), Highways, PWD, Railways has been obtained and copies of the permission and their estimate for the same has been provided in DPR. If not, the present status of action initiated may be furnished below.	
3.10	Whether the provision for separate electric feeder line to the storm water pumping stations (to take care of frequent power failure and voltage fluctuation problem) from HT line and an agreement between Electricity Department and Urban Local Bodies (ULBs) has been furnished in the DPR	
3.11	Whether the commitment from Electricity Department for un-interrupted power supply (for pumping stations) is obtained	
3.12	Whether the topographic map of the city/town/project area to the scale has been given in DPR/Zone wise maps to scale showing all streets.	
3.13	Whether soil investigation report – bore hole logs at least at a grid of 1 km x 1 km or Geological Survey Data has been forwarded with DPR.	
3.14	Whether Contour map of the project area has been annexed with the DPR.	
3.15	Whether resolution from the ULB for meeting the regular expenditure on O&M of the storm water drainage system is enclosed in DPR.	
4. ENGINEERING COMPONENTS		
4.1	Storm water drainage network detailing	
	Total length of drain & other infrastructure (Total length and drains which are in good condition and can be integrated with proposed planned drainage system): Tertiary drain : .....Km (total) .....KM (drains in good condition)	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
	Secondary drain : .....Km (total) .....KM (drain in good condition) Primary drain : .....Km (total) .....KM (drain in good condition) SWD Pumping Stations: Nos..... Capacity of Pumps.....Length of Pumping Mains..... Km	
	Proposals for Rehabilitation Tertiary drain : .....Km Secondary drain : .....Km Primary drain : .....Km SWD Pumping Stations: Nos..... Capacity of Pumps.....Length of Pumping Mains..... Km	
	Proposals for new construction Tertiary drain : .....Km Secondary drain : .....Km Primary drain : .....Km SWD Pumping Stations: Nos..... Capacity of Pumps.....Length of Pumping Mains..... Km	
4.2	Total length of road : .....Km	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
4.3	Please furnish various project components (major components)	
4.4	Project Area and population (i) Please furnish the details of city/project area, (a) Area of the town/city (municipal limit): ……Sq. km (b) Extent of the project area considered in the DPR: ……..sq. km (c) Additional Area(beyond municipal limit) considered in the DPR:……sq.km (d) No. of Households (as per 2001 and 2011 census): (ii) Whether population projection has been adopted as per CPHEEO Manual and given in DPR (a) City population As per 2001 Census :……..lakhs As per 2011 Census : ……lakhs Initial stage (…….AD) : …… lakhs +floating population (if any)----------lakh Intermediate stage (……..AD) : …… lakhs+ floating population (if any)----------lakh	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
	Ultimate stage : …… lakhs+ floating population (if any)----------lakh (……AD) Population growth rate adopted: ……. %/ year (based on the past 5-6 decadal growth rate) Demographic Method adopted and justification : (b) Whether the population projection has been made in consonance with the Developmental Master Plan (c) Project Area Initial stage : …… lakhs Intermediate stage : …… lakhs Ultimate stage : …… lakhs Population growth rate adopted: ……. %/ year (based on the past 5-6 decadal growth rate) (d) No. of wards (within municipal limit) : ……	

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td>4.5</td><td>Whether the development master plan with land use pattern, identification of existing and future roads/streets, water bodies such as lakes and ponds, natural drains and rivers has been furnished for the urban agglomeration</td><td></td></tr>
<tr><td>4.6</td><td>If yes, give the master plan year.

If no, give present status of master plan preparation;</td><td></td></tr>
<tr><td>4.7</td><td>Land use patterns, present and proposed.
<table>
<tr><td rowspan="2">Land Use</td><td rowspan="2"></td><td colspan="2">Master Plan</td><td colspan="2">City/ULB Area</td><td colspan="2">Project Area</td></tr>
<tr><td>Present Master Plan: Year .....</td><td>Proposed Master Plan: Year .....</td><td>Present Area ..... (Year .....</td><td>Proposed Area ..... (Year .....</td><td>Present Area ..... (Year .....</td><td>Proposed Area ..... (Year .....</td></tr>
<tr><td rowspan="2">Total Area</td><td>Hectares (Ha)</td><td>.....</td><td>.....</td><td>.....</td><td>.....</td><td>.....</td><td>.....</td></tr>
<tr><td>%</td><td>100%</td><td>100%</td><td>100%</td><td>100%</td><td>100%</td><td>100%</td></tr>
<tr><td rowspan="2">Residential area</td><td>Ha</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>%</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Area under Roads>3m wide</td><td>Ha</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>%</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Area under Roads & streets <3</td><td>Ha</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table></td><td></td></tr>
</table>

S. No	Description	Write 'Yes' or 'No' etc. in the column below / **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof

m wide	%							
Markets (wholesale, vegetable, grain, other	Ha							
	%							
Area under Railways, Airports	Ha							
	%							
Institutional Area	Ha							
	%							
Industrial Area	Ha							
	%							
Green, open, park, agricultural area	Ha							
	%							
Lakes, Ponds	Ha							
	%							
Natural drains, sub-drain, nallahs, rivers	Ha							
	%							

Give Coefficients of Imperviousness adopted for design for various land uses:

Land use classification	Coefficient of Imperviousness as per Manual / Derived	Coefficient of Imperviousness as per DPR
Residential	0.60 to 0.75	
Roads, paved surface of footpaths	1.00	
Commercial	0.70 to 0.90	
Paved markets	1.00	
Unpaved markets	0.40 to 0.70	
Mixed type markets	0.40 to 0.90	

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td></td><td>
<table>
<tr><td>Mixed Development</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Industrial</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Institutional</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Large establishments</td><td></td><td></td></tr>
<tr><td>PSUs</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Railways</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Airports</td><td>0.60 to 0.90</td><td></td></tr>
<tr><td>Lakes, ponds</td><td>1.00(considering FSL)</td><td></td></tr>
</table>
</td><td></td></tr>
<tr><td>4.8</td><td>List out all natural drains in the city/project / master plan area. Give the names (IDs)and length

Natural storm water drains (use additional sheets if required):
<table>
<tr><td>S No</td><td>Name / ID</td><td>Length, Km</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
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</td><td></td></tr>
</table>

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td>4.9</td><td>Give width-wise detailing of natural storm water drains(use additional sheets if required):

<table>
<tr><td>S No</td><td>Width</td><td>Length, Km</td></tr>
<tr><td></td><td>Upto 2m</td><td></td></tr>
<tr><td></td><td>>2m upto 5m</td><td></td></tr>
<tr><td></td><td>>5m upto 10m</td><td></td></tr>
<tr><td></td><td>>10m upto 30m</td><td></td></tr>
<tr><td></td><td>>30m(give further widths if necessary)</td><td></td></tr>
</table></td><td></td></tr>
<tr><td>4.10</td><td>Whether the storm water drainage network has been divided into basins, sub-basins, catchments and overlaid on the development master plan? Give details.</td><td></td></tr>
<tr><td>4.11</td><td>Division of area into catchments and sub-catchments(use additional sheets if required):
<table>
<tr><td>Whether the Master Plan Area/Project Area has been divided into catchments and sub-catchments for Storm Water Management</td><td colspan="3">Yes/No</td></tr>
<tr><td>Total no. of catchments (storm water drainage Zones)</td><td colspan="3"></td></tr>
<tr><td>Name/No. of catchment (zones)</td><td>1</td><td>2</td><td>3 etc</td></tr>
<tr><td>Area under catchment (various zones), Ha.</td><td></td><td></td><td></td></tr>
<tr><td>No. of sub-catchments (sub-zones) under each zone</td><td></td><td></td><td></td></tr>
<tr><td>Describe boundaries of each catchment (use separate pages) Ridge/Road/Rly. Line etc.</td><td colspan="3"></td></tr>
<tr><td>Give name/no. of each sub-catchment, its boundaries and arial extent (use separate pages)</td><td colspan="3"></td></tr>
<tr><td>Give land-use classification for each catchment and sub-catchment with totals ((use additional sheets if required))</td><td colspan="3"></td></tr>
<tr><td>Whether Catchment areas which are out of municipal limit likely to contribute in the project area has been taken into account</td><td colspan="3"></td></tr>
</table></td><td></td></tr>
</table>

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If **No**, reasons thereof</td></tr>
<tr><td>4.12</td><td>Details of each sub-catchment (use additional sheets if required):
<table><tr><td>Name/ID No of sub-catchment</td><td></td></tr><tr><td>Total area</td><td></td></tr><tr><td>Define boundaries</td><td></td></tr><tr><td>Land use classification</td><td></td></tr><tr><td>Area under..... Residential</td><td></td></tr><tr><td>.....Roads etc.</td><td></td></tr><tr><td>.....Institutional</td><td></td></tr><tr><td>.....Industrial</td><td></td></tr><tr><td>.....Lakes/Ponds</td><td></td></tr><tr><td>.....Any other (add rows)</td><td></td></tr><tr><td>Total of above</td><td></td></tr><tr><td>Name/ID of main drain of sub-catchment</td><td></td></tr><tr><td>Total length of main drain</td><td></td></tr><tr><td>Width-wise length of main drain (proposed)</td><td></td></tr><tr><td><2m</td><td></td></tr><tr><td>>2m – upto 5m</td><td></td></tr><tr><td>>5m- 10 m</td><td></td></tr><tr><td>>10m-30m</td><td></td></tr><tr><td>>30m</td><td></td></tr><tr><td>Total of above</td><td></td></tr><tr><td></td><td></td></tr></table></td><td></td></tr>
</table>

S. No	Description		Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
	Whether boundary of main drain demarcated and protected	Yes/No	
	Length of main drain protected		
	Length of main drain not protected		
	Action, if any for full protection		
	Whether drain outfall free or obstructed?		
	Invert level of drain outfall		
	Upstream invert levels of drain At 30m above outfall, +60m, +90m and so on....		
	Invert at outfall		
	at + 30m		
	at +60m		
	at +90m		
	at +120m : etc		
	Storm water disposal body HFL Normal water level Bed level		
	Whether drain trained/untrained		
	Trained length		
	Untrained length		
	Any constrictions like culvert		
	Identify each such culvert		
	Drain -- Bed surface material & condition		
	Manning's 'n' value		

<table>
<tr><td>S. No</td><td>Description</td><td>Write 'Yes' or 'No' etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td></td><td>
<table>
<tr><td>Sidewalls material & condition</td><td></td></tr>
<tr><td>'n' value</td><td></td></tr>
<tr><td>Combined 'n' value at every multiple o.1 m depth of flow</td><td></td></tr>
</table>
</td><td></td></tr>
<tr><td>4.13</td><td>Coefficient of Roughness for use in Manning's Formula:
(in the DPR column, fill values only for the material used and mark others as 'not used')
<table>
<tr><td></td><td colspan="2">Type of Material</td><td>'n' as per Manual</td><td>'n' as per DPR Design</td></tr>
<tr><td>1</td><td>Salt glazed Stoneware Pipes</td><td>a) Good</td><td>0.012</td><td></td></tr>
<tr><td></td><td></td><td>b) Fair</td><td>0.015</td><td></td></tr>
<tr><td>2</td><td>Cement Concrete Pipes(with collar joints)</td><td>a) Good</td><td>0.013</td><td></td></tr>
<tr><td></td><td></td><td>b) Fair</td><td>0.015</td><td></td></tr>
<tr><td>3</td><td colspan="2">Spun Concrete Pipes (RCC & PSC) with socket & spigot joints (Design value)</td><td>0.011</td><td></td></tr>
<tr><td>4</td><td>Masonry</td><td>a) Neat Cement Plaster</td><td>0.018</td><td></td></tr>
<tr><td></td><td></td><td>b) Sand & cement plaster</td><td>0.015</td><td></td></tr>
<tr><td></td><td></td><td>c) Concrete –steel troweled</td><td>0.014</td><td></td></tr>
<tr><td></td><td></td><td>d) Concrete – Wood troweled</td><td>0.015</td><td></td></tr>
<tr><td></td><td></td><td>e) Brick in good condition</td><td>0.015</td><td></td></tr>
<tr><td></td><td></td><td>f) Brick in rough condition</td><td>0.017</td><td></td></tr>
<tr><td></td><td></td><td>g) Masonry in bad condition</td><td>0.020</td><td></td></tr>
<tr><td>5</td><td>Stone Work</td><td>a) Smooth dressed Ashlar</td><td>0.015</td><td></td></tr>
<tr><td></td><td></td><td>b) Rubble set in cement</td><td>0.017</td><td></td></tr>
<tr><td></td><td></td><td>c) Fine, well packed gravel</td><td>0.020</td><td></td></tr>
</table>
</td><td></td></tr>
</table>

<table>
<tr><td>S. No</td><td colspan="5">Description</td><td>Write 'Yes' or 'No' etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td></td><td colspan="5"><table>
<tr><td>6</td><td>Earth</td><td>a) Regular surface in good condition</td><td>0.020</td><td></td></tr>
<tr><td></td><td></td><td>b) In ordinary condition</td><td>0.025</td><td></td></tr>
<tr><td></td><td></td><td>c) With stones and weeds</td><td>0.030</td><td></td></tr>
<tr><td></td><td></td><td>d) In poor condition</td><td>0.035</td><td></td></tr>
<tr><td></td><td></td><td>e) Partially obstructed with debris or weeds</td><td>0.050</td><td></td></tr>
<tr><td>7</td><td>Steel</td><td>a) Welded</td><td>0.013</td><td></td></tr>
<tr><td></td><td></td><td>b) Riveted</td><td>0.017</td><td></td></tr>
<tr><td></td><td></td><td>c) Slightly tuberculated</td><td>0.020</td><td></td></tr>
<tr><td></td><td></td><td>d) With spun cement mortar lining</td><td>0.011</td><td></td></tr>
<tr><td>8</td><td>Cast Iron</td><td>a)Unlined</td><td>0.013</td><td></td></tr>
<tr><td></td><td></td><td>b)With spun cement mortar lining</td><td>0.013</td><td></td></tr>
<tr><td>9</td><td>Asbestos Cement</td><td></td><td>0.011</td><td></td></tr>
<tr><td>10</td><td>Plastic (smooth)</td><td></td><td>0.011</td><td></td></tr>
</table></td><td></td></tr>
<tr><td>4.14</td><td colspan="5">Whether the authenticated data of autographic rainfall data for the project area for the last 25 to 50 years has been obtained from India Meteorological Department and furnished in the DPR? Whether it has been analysed as described in the CPHEEO Manual and the intensity – duration – frequency (IDF) curve for the project area has been drawn? Give details as per the model below:</td><td></td></tr>
<tr><td>4.15</td><td colspan="5">Rainfall Data & Analysis (use additional sheets if required):

<table>
<tr><td>No. of years of autographic rainfall
Data from IMD(India Meteorological Department)</td><td></td></tr>
<tr><td>Whether autographic rainfall data analysed and arranged in duration (minutes) and intensify (mm/hr)</td><td></td></tr>
<tr><td>Duration-wise compilation of rainfall data (refer Manual)</td><td></td></tr>
</table></td><td></td></tr>
</table>

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof

Frequency of storms of different duration	
Total no. of rainfall events of 5 min duration (arranged in ascending intensity)	
Similarly, events of 10 min duration (arranged in ascending intensity)	
Similarly, events of 15 min duration	
20 min duration	
30 min duration	
40 min duration	
60 min duration	
90 min duration	
120 min duration	
150 min duration	
180 min duration, etc	

Storm Frequency (or Storm Return Period / Flooding design interval):

Land Use Classification	Storm frequency as per Manual	As per DPR Design
a)Residential Areas		
i) Peripheral areas	Twice a year	
ii) Central and comparatively high priced areas	Once a year	
b)Commercial and High-priced areas	Once in 2 years	

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If **No**, reasons thereof</td></tr>
<tr><td></td><td>Analysis of Frequency of Storms (Rainfall Events)(Historical data)
<table>
<tr><td rowspan="2">Duration of rainfall, in minutes</td><td colspan="8">No. of storms of particular duration of the intensity(mm /hr) given below or more during the data period</td></tr>
<tr><td>20</td><td>30</td><td>35</td><td>40</td><td>45</td><td>50</td><td>60</td><td>Etc.</td></tr>
<tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>30</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>40</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>60</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>90</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>120</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>150</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>180</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>etc</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Time (Duration) – Intensity values of storms from step curve.(for use in log-log graph)
<table>
<tr><td>i (mm/hr)</td><td>t (min)</td></tr>
<tr><td>20</td><td></td></tr>
<tr><td>30</td><td></td></tr>
<tr><td>35</td><td></td></tr>
<tr><td>40</td><td></td></tr>
<tr><td>45</td><td></td></tr>
</table></td><td></td></tr>
</table>

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
	50 | 55 | 60 | Derived values of *i* & *t* from log-log graph of above table. $i = a/t^n$ Derived value of 'a' = Derived value of 'n' = Storm Intensity Equation $i = a/t^n$ i = ... Time of concentration: As per Kirpitch Formula $Tc = [(0.885\ L^{3)}/H]^{0.385}$ Where Tc = time of concentration, minutes L = Length of overland flow in kilometres from critical (farthest) point to the inlet of drain. H = Fall in level from critical point to the inlet of drain in metres. Whether the IDF (Intensity-Duration-Frequency) curve has been drawn –Yes/No	
4.16	Whether the provision of the land / land acquisition for the SWD pumping station/mains , SWD network, if any, has been made as per 30 years requirement and future expansion in the DPR (a) Total requirement of land for: SWD Pumping Station : ..... Hectares Laying of SWD pumping mains : ..... Hectares SWD network : ..... Hectares --- Total : ..... Hectares	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
	(b) Whether land in possession with Implementing Agency : Hectares (c) Whether Govt. land is yet to be transferred to the Implementing Agency and specify time required for transfer : ……..Hectare, …… months (d) Whether private land under acquisition and time required for acquisition: ……..Hectare, …… months (e) Status of action initiated for transfer of Govt. land and acquisition of private land (please specify) :	
4.17	Whether all components of storm water drainage system such as inlets, catch pits, SWD pipelines/drains, points of confluence and natural drains with outfalls have been designed as per the CPHEEO Manual and detailed drawings have been provided in the DPR	
4.18	Give Design values and infrastructure proposals for each component(use additional sheets)	
4.19	Whether the Computer Aided Design of SWD system has been furnished in DPR. Please enclose design input files (sheets) and output files (sheets) separately	
4.20	Whether the rising main of SWD system, if any, has been designed for catchment flows with respect to time of concentration and checked for minimum velocity of 0.6 m/s and maximum velocity of 3 m/s?	
4.21	Whether node spacing while designing have been adopted as per CPHEEO Manual ?	
4.22	Whether the designs of SWD pipes/drains have been checked for minimum self-cleaning velocity of 0.6 m/s by providing proper slope	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
4.23	Whether surge / water hammer analysis for rising main has been calculated and furnished in the DPR	
4.24	Whether the provision for rising main units, wherever needed, such as thrust blocks, anchor blocks, expansion joints, scour / drain valves, air/vacuum releases valves and surge protection devices has been provided in the DPR	
4.25	Whether drawings to scale of L-sections of SWD drains/pipelines with all details such as ground level, crown level, invert level, depths of excavation, bedding details etc., have been furnished in DPR	
4.26	Whether the configuration of the pumps proposed in SWD/drainage pumping stations is in conformity with the general guidelines of CPHEEO Manual for conveying maximum design flood, need for standby and operational capability above high flood level (HFL)	
4.27	Whether the pipe material has been selected considering the topography, efficiency in service, ease of laying and economy in DPR	
4.28	Whether bedding conditions for different reaches of the proposed SWD pipelines/drains have been designed in the DPR as per CPHEEO Manual with reference to soil characteristics	
	Class A Bedding: Length proposed .....Km in soils of ..... Classification	
	Class B Bedding: Length proposed .....Km in soils of ..... Classification	
	Class C Bedding: Length proposed .....Km in soils of ..... Classification	

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
4.29	Whether a detailed note on performance of existing SWD/drainage network and pumping station, if any has been furnished in the DPR	
4.30	Whether SWD system has provision for flood diversion to water bodies and for enabling ground water recharge	
4.31	Whether the ULBs certificate to the effect that no municipal sewage shall be discharged into the SWD system has been provided in the DPR	
4.32	Whether Bill of Qualities (BOQ) and cost estimates of individual components of sewerage system prepared as per latest SOR and copy of latest Schedule of Rates (SOR) and Pro-forma invoices have been annexed with DPR. (a) Schedule of Rates adopted (please specify the year): ----------year (b) In case the SOR adopted is old, please specify the cost index for escalation approved by State Govt. (c) Any price escalation proposed in cost estimates as notified by State Govt. (d) Whether analysis of rate has been worked out for all the items and appended with DPR (e) Whether Bill of Quantities of individual component has been furnished in DPR (f) Whether lump sum(LS) provision for any item has been proposed, please specify	
4.33	Whether detailed drawing, estimation & detailed BOQ for ancillary works such as boundary wall / fencing, approach & internal road, external electrification, buildings, site development / landscaping etc. has been provided in the DPR for any SWD Pumping Station	
	Give the General Abstract Cost Estimate and Component-wise or package-wise Abstract Cost Estimate: (use additional sheets if required)	

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td>4.34</td><td>Whether provision for DG set has been made in the DPR to tide over interruptions in power supply, if any</td><td></td></tr>
<tr><td>4.35</td><td>If yes, whether the calculations to arrive at the capacity of the same has been mentioned in the technical reports</td><td></td></tr>
<tr><td>4.36</td><td>Whether provision for road restoration has been made as per CPWD/ State PWD/ Urban Local Body norms</td><td></td></tr>
<tr><td>4.37</td><td>Give the List of Tender Packages made for ‘notice inviting tender’ (Use additional sheets if required) . Furnish the title-wise Tender packages and their value.</td><td></td></tr>
<tr><td>4.38</td><td>Calculate service level benchmark as per MoUD. Please furnish SLB.
<table>
<tr><td>Sl. No.</td><td>Indicator</td><td>Benchmark</td><td>After implementation of the project</td></tr>
<tr><td>1.</td><td>Coverage</td><td>100%</td><td></td></tr>
<tr><td>2.</td><td>Incidence of water logging</td><td>0 numbers</td><td></td></tr>
</table></td><td></td></tr>
<tr><td>4.39</td><td>Whether project implementation period of project has been furnished in DPR

Specify the implementation period:……..year</td><td></td></tr>
<tr><td>4.40</td><td>Whether detailed BAR Chart and PERT/CPM network showing implementation schedule has been furnished in DPR</td><td></td></tr>
<tr><td>4.41</td><td>Whether Internal rate of return (IRR) / Economic rate of return (ERR) has been furnished in DPR</td><td></td></tr>
<tr><td>4.42</td><td>Whether traffic diversion/ control arrangements for public and workers’ safety, arising out of construction phase of storm water drainage works have been furnished in the DPR</td><td></td></tr>
<tr><td>4.43</td><td>Whether Institutional and financial status of Project Executing Agency (PEA) has been reported in DPR</td><td></td></tr>
<tr><td>4.44</td><td>Whether Operation & Maintenance cost and revenue generation details (O & M Framework – existing & proposed) has been furnished in DPR</td><td></td></tr>
</table>

<table>
<tr><td>S. No</td><td>Description</td><td>Write ‘Yes’ or ‘No’ etc. in the column below
If Yes, give Page No./DPR volume reference. If No, reasons thereof</td></tr>
<tr><td></td><td>(a) Existing tariff / cess / charges (in Rs.):
Residential --
Commercial --
Institutions --
Industries --

(b) Proposed tariff/cess/charges (in Rs.)
Residential --
Commercial --
Institutions --
Industries --</td><td></td></tr>
<tr><td></td><td>(c) Annual O & M cost (Rs. in lakhs)
(i) Existing (last 5 years)

(ii) Proposed</td><td><table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table></td></tr>
</table>

S. No	Description	Write 'Yes' or 'No' etc. in the column below **If Yes, give** Page No./DPR volume reference. If **No**, reasons thereof
	(d) Annual Revenue (Rs. in lakhs)	
	(i) Existing (last 5 years)	1 | 2 | 3 | 4 | 5
	(ii) Proposed	
4.45	Whether Environmental and social problems (if applicable) has been furnished in DPR	
4.46	Whether provision has been made @ 0.5% of the project cost in the DPR for capacity building of ULBs for further O&M of the scheme after taking over the scheme from implementing agency. Please furnish the action plan for conducting capacity building programme. The action plan must specify specific actions such as the number of officials to be deployed in the project post commissioning, their designations, qualifications and training proposed to be given.	
4.47	Whether Rehabilitation and Resettlement plan (if applicable) has been given in DPR	
4.48	Whether all the hard copies of the DPR furnished along with soft copies/	
4.49	Period of completion of the project	

Signed:
Name:
Designation:

Signed:
Name:
Designation:

This part to be filled-in by the Ministry		
Sl. No	Description	Remarks
1	Details of project area (State/District/City/Town)	
2	Whether the SLNA/SLSC recommendation is attached with DPR	
3	Project cost recommended by SLNA/SLSC	
4	Period of project implementation	
5	Date of receipt of first DPR	
6	Date of final acceptance of DPR	
7	Date of checklist confirmation	
8	Date of first information sent to the State Govt. on scrutiny of check list	
9	Date of receipt of DPR after reformulation (revision) if applicable	
10	Date of DPR sent to the Appraisal Agency (CPHEEO)	
11	Date of Comments / appraisal report of appraisal agency	
12	Date of comments conveyed by the Admn. Division to the State Govts. & ULBs for revision of DPR, if any	
13	Date of Receipt of Revised DPR for appraisal	

(**Signature of Verifying Officer**)

NOTE: The DPR should be forwarded to the Ministry along with the complete checklist duly filled in without which DPR shall not be processed and shall be returned to the State Government.