

**DEPARTMENT OF HEALTH AND FAMILY WELFARE
GOVERNMENT OF ODISHA**



**AFFORDABLE HEALTHCARE FACILITIES IN THE STATE OF ODISHA
UNDER PPP FRAMEWORK**

**ANNEXURE II: STAFF ACCOMMODATION BUILDING
SPECIFICATION**

of

SCHEDULE 4

of

TECHNICAL SCHEDULES OF THE DRAFT CONCESSION AGREEMENT

Infrastructure Facilities for Accommodation

GENERAL NOTE

These guidelines in this Annexure II have been provided for general guidance to help Concessionaire develop Design Basis Report (DBR) and Bills of Quantities (BOQ) for the Staff Accommodation. Wherever there is conflict between regulatory requirements and these guidelines and or the general guidelines provided in the Technical Schedules, the regulatory requirements shall be applicable. Additionally, in case of any conflicts in common areas of the project site between guidelines in Annexure I of Schedule 4 of the Technical Schedules (Annexure I) and this Annexure II, the guidelines of Annexure I shall be applicable to the extent practical. Further, in case the concessionaire wants to change or modify any of the specifications/ material/ approved brands in the guidelines, this shall only be allowed if it can be demonstrated without doubt that the alternate has superior qualities to the recommended requirements in this document. This will have to be approved on a case by case basis by the Independent Engineer. In case, as a result of these changes, the cost of material is reduced by more than 10%, the concessionaire shall be required to share the savings on a 50-50 basis with the Authority

I. Infrastructure Facilities

The Concessionaire shall provide requisite infrastructure facilities for the staff accommodation (Accommodation) in accordance with the provisions of this Agreement, the demarcation plan, the construction Plan, the EHS standards, applicable Laws and Permits, norms, guidelines and standards including but not limited to Planning and Building Standards Regulations, State Public Works Department (State PWD)/Central Public Works Department (CPWD) specifications for similar class of building works and standards given in the National Building Code (NBC) of India 2016, Bureau of Indian Standards (BIS) specifications for buildings, services & structures, National Electrical Code 2011 (NEC), Central Public Health and Environmental Engineering Organisation (CPHEEO), Indian Roads Congress (IRC) Codes and Standards, and any other Applicable Standards and applicable Municipal Laws, GoO and GoI, and international best practices. For the avoidance of doubt, the Concessionaire hereto agree that the Infrastructure Facilities as provided in this schedule shall be required to be developed by the Concessionaire forming part of the Affordable Healthcare Project. Infrastructure facilities for staff accommodation shall include but not only limited to following facilities:

a. Water Supply Scheme:

- i. Storage of water in the underground sumps is based on the minimum requirement to be maintained for Building as per applicable standards.
- ii. Water Supply from various sources is connected to Fire water storage, and then overflow is taken to raw water storage tank.
- iii. Distribution of Water Supply to various fixtures in all user points is by gravity. Domestic water is used for all the purposes like toilets, showers, hand wash basins, Kitchens etc.

- iv. From Domestic Water Storage tanks, suction line will be connected to pumps of required capacity and head, mounted on a common base frame along with control panel.
- v. Delivery from the water transfer pumps will be taken thru and distribution will be carried out through suitable risers in shafts.
- vi. The sizing of the entire distribution network is based on the simultaneous use of fixture unit's demand. Individual toilets/kitchens will be provided with main control valve for isolation and maintenance of the same.
- vii. Air release valve and water hammer arrester shall be provided as per requirement of the design.

b. Sewerage System

i. Key Design Features:

- 1. The drainage system shall be as per NBC Standards/ CPHEEO standards or any other applicable standard, in which the soil and waste pipes shall be distinct and separate with common vents.
- 2. Treated water quality will be adequate to meet the needs of landscape system parameter.
- 3. Achieve zero discharge concepts.
- 4. The storm water / rainwater would be in a totally independent circuit.
- 5. Deep seal P traps shall be provided for Floor drains and Urinal traps.

ii. System Description

- 1. The soil & Waste line terminating from the stack connected to soil & waste main headers respectively lines will be connected to an inspection chamber and gully trap located near to the periphery of the building.
- 2. All fixtures and appliances shall be fully trapped to prevent back flow of foul gases and odour into the toilets.
- 3. Finally, the soil and waste pipe network shall be discharged to Sewerage Treatment Plant (STP).
- 4. All manholes will be double sealed gasketed to prevent odour nuisance.

- c. **Sewage Treatment Plant (STP):** The sewerage treatment plant shall be designed as per CPEEHO or any other relevant standards to treat combined sewage (i.e. soil and waste water). The treatment plant shall be compact type housed below ground completely with sufficient Headroom, above maximum water level for maintenance.
- d. **Internal Road Network** within the demarcated area for the Accommodation area. The Internal Road Network may be provided with cautionary, mandatory and informative road signage and road markings.

- e. **Street Lighting** along the internal road network and common area lighting for all the common areas within the Accommodation area.
- f. **Fire-fighting facilities** for all Structures as per the provisions of the applicable standards.
- g. **Green belt, parks and landscaping** of the demarcated areas, with provision for rain water harvesting as per the local norms.
- h. **Landscape in the ground level:**
 - i. The landscaping in the ground shall be developed as per provisions of Planning and Building Standards Regulations and any other applicable standards and applicable law.
 - ii. In ground level all landscape or hardscape part is developed on R.C.C slab so low height plants, scrubs & grass etc. is possible with 12” to 18” garden soil filling.
 - iii. Indian Grass is used with design & levels
 - iv. All stone is used in polish with river wash combination
 - v. Seating / benches required in garden area made from Granite stone or use readymade available in wooden / Cast iron / S.S. material.
 - vi. Children Play area /walking track
- i. **Storm Water Drainage:**
 - i. **Storm water disposal is divided into 3 Groups**
 - 1. Terrace Storm water disposal.
 - 2. Site Storm water disposal.
 - 3. The entire storm water from the site would be disposed off through a Storm water drain system to the rain water recharge pits and excess is diverted to nearest existing external drain.
 - ii. **System Design:** Based on the annual rainfall at the location & as per the climatologically data, an average intensity of rainfall shall be considered accordingly and the sizes of storm water drains shall be decided as per Applicable Standards and norms.
- j. **Social Infrastructure Facilities:** As allowed by the concession agreement.
- k. **Compound Wall:** Compound Wall shall be provided as required.

Note: Any other infrastructure facilities not mentioned above but which may be required to be undertaken as per guidelines / Applicable Laws will need to be developed by the Concessionaire as part of this project..

II. Technical Standards:

The Concessionaire shall plan, construct and develop the Accommodation facilities for staffs in accordance with the Specifications set forth in Schedule and subject to the provisions of this Agreement. Concessionaire shall ensure compliance to all applicable regulations and laws and obtain necessary permit(s). Applicable guidelines/ specifications / standards include but not only limited to below:

- i. Bureau of Indian Standards (BIS) specifications for buildings, services & structures.
- ii. National Building Code (NBC) of India 202016
- iii. National Electrical Code 2011(NEC)
- iv. State Public Works Department (State PWD)
- v. Central Public Works Department (CPWD)
- vi. Indian Roads Congress (IRC) Codes and Standards, for roads, drainage, parking etc.
- vii. Central Public Health and Environmental Engineering Organisation (CPHEEO)
- viii. Any other applicable standards

Concessionaire shall consider latest version of the Codes, Standards, Specifications, etc., notified/published at least 30 days before the bid submission date. The requirements stated in this schedule are minimum. The Concessionaire will, however, be free to adopt international standards, practices on precast/prefabricated housing, Mivan shuttering, alternative specifications, methodologies, materials and standards to bring in innovation in the design and construction provided they are comparable with the standards prescribed in this schedule. The Specifications and techniques which are not included in the BIS/IRC specifications/State/Central PWD specifications shall be supported with authentic standards and specifications like NBO, Euro Codes, British standards and Australian Code etc.

a. Minimum specification for Accommodation

a. Minimum specification for housing unit

Sl. No.	Item	Detail for project
1	Foundation	As per the design requirements
2	Super structure	Reinforced Cement Concrete (RCC) framed construction / Pre-cast concrete structure
3	Doors & Windows	
3.1	Window frames	Mild Steel (M.S.) frame with standard steel section and a Mild steel grill confirming to IS: 1038, CPWD standards and other relevant IS standards
3.2	Door frames	Mild Steel (M.S.) frame 40mm x 40mm x 5mm shall be provided according to the thickness of door shutters.

Sl. No.	Item	Detail for project
3.3	Window shutters	Mild Steel (M.S) openable window with glazing material confirming to IS: 1038, CPWD standards and other relevant IS standards
3.4	Main Door shutters	M.S. door of 25 mm width confirming to IS: 1038, CPWD standards and other relevant IS standards
3.5	W.C / Bath room shutter	30mm thick Polyvinyl chloride (PVC) doors confirming to CPWD specifications
3.6	Kitchen door	M.S door of 30mm width confirming to IS: 1038, CPWD standards and other relevant IS standards
3.7	Other doors	Plywood Doors / M.S door confirming to IS: 1038, CPWD standards and other relevant IS standards
3.8	Fittings	i. M.S. fittings e.g. Tower bolts (IS: 204), handles (IS: 208), hinges (IS: 205/206), door stopper etc. should be provided. ii. M.S. sliding door bolts (IS: 281) to be provided at the entrance doors. All other doors shall be provided with nickel plated M.S. pull lock bolts.
4	Flooring	
4.1	Flooring in rooms, kitchen, internal circulation area	Kota stone flooring/ ceramic tile flooring/Vitrified tiles double glazed
4.2	Flooring in Common circulation area, staircase	Kota stone flooring/ceramic tile flooring / Antiskid vitrified tiles flooring
4.3	Toilets	Kota stone flooring/ceramic tile flooring/ Vitrified anti skid tiles
5	Finishing	
5.1	Plastering on walls(internal)	12/15 mm cement plaster 1:6 (1 cement : 6 fine sand)
5.2	Internal	Colour Washing
5.3	External	1 coat of primer and two coats of Weather coat
5.4	Primer	As per CPWD specifications of wood work & steel work
5.5	Painting in woodwork and steelwork	ISI mark superior quality Synthetic Enamel paint for all wood & steel work except outer faces which shall be synthetic enamel paint ISI mark.
5.6	Water Proofing	Grading Concrete with APP Membrane
6	Railings	
6.1	Staircase	0.9m height M.S. railing with 12mm square bar alternate with 50mm Galvanized Iron (G.I.) pipe
6.2	Balcony	0.9m height M.S. railing with 12mm Square bar alternate with 50mm G.I. pipe
7	Roofing	
7.1	Roof Treatment	Tar felt treatment in conformity to IS 3067/IS 1346
7.2	Rain Water Pipes	AC rainwater pipe except the bottom length of about 2 M which shall be of S.C.I. pipe

Sl. No.	Item	Detail for project
8	Common area Lighting	
8.1	Lighting	Sufficient lighting work should be provided in corridors and common areas in housing blocks, level of lighting and the type of fixtures should be as per National Building Code and IS: 3646
9	Other specifications for Kitchen	
9.1	Shelves	Cuddapah stone Shelves in tiers not more than 400mm wide along one wall 1” thick
9.2	Kitchen sink	1 Stainless steel sink without drain board size 610 x 510 mm with bowl depth 200 mm.
9.3	Kitchen worktop	2’ wide with ruby red/casts/eye brown shaded granite/jet black/cooking top laid over 40mm thick RCC cast in situ slab
9.4	Shelves under Kitchen platform	25 mm thick shelves in Cuddapah slab
10	Other specifications for Water Closet (WC)/Bath	
10.1	European / Anglo India Water Closet	One number white colour glazed vitreous chinaware European or Anglo Indian water closet conforming to IS 2556 (Part-I & II).
10.2	Wash basin	One No. White vitreous (IS: 2556), China flat back wash basin 550 x 450 with one CP brass pillar tap, ISI mark of approved brand
10.3	Fittings(Bibcock/St opcock)	WC - 1 no Bath – 1 no Kitchen sink – 1no ISI marked bibcocks or stopcocks of approved brands
10.4	Shower C.P. Brass	1 no. ISI marked fittings of approved brand
10.5	Mirror	1 Bevelled edge mirror 600 x 450 mm of 5mm thickness.

b. Minimum specifications for Community centre /Utility shops/ Common areas

S. No	Description	Specification
1.0	Foundation	As per the design requirements
2.0	Super structure	RCC framed construction / Precast concrete structure
3.0	Doors & Windows	
3.1	Frames	
3.1.1	Window frames	Mild Steel frame with standard steel section and a Mild steel grill confirming to IS: 1038, CPWD standards and other relevant IS standards

S. No	Description	Specification
3.1.2	Door frames	Mild Steel frame 40mm x 40mm x 5mm shall be provided according to the thickness of door shutters.
3.2	Shutters	
3.2.1	Door Shutters	Aluminium Door/Flush Door/PVC Door
3.2.2	Window shutters	Aluminium Sliding Window/Structural Glazing
3.3	Fittings	S. fittings or equivalent.
3.4	Fire check door	per fire safety specifications
4.0	Flooring	
4.1	Corridors, Rooms, Lavatory blocks	Cement concrete flooring/kota stone flooring/ceramic tile flooring
4.2	Common circulation area, staircase	Cement concrete flooring/kota stone flooring/ceramic tile flooring
5.0	Finishing	
8.1	Plastering on walls (internal)	12/15 mm cement plaster 1:6 (1 cement : 6 fine sand)
8.2	Internal	Distemper with Putty Finish
8.3	External	1 coat of primer and two coats of Weather coat
8.4	Primer	As per CPWD specifications of wood work & steel work
8.5	Painting in woodwork and steelwork	ISI mark superior quality Synthetic Enamel paint for all wood & steel work except outer faces which shall be synthetic enamel paint ISI mark.
6.0	Railing	0.9m height MS railing with 12mm square bar alternate with 50mm G.I. pipe
7.0	Roofing	
7.1	Roof Treatment	Tar felt treatment in conformity to IS 3067/IS 1346
8.0	Toilets	Mirrors with molded PVC frame White vitreous (IS: 2556), China flat back wash basin of approved brands 30mm thick PVC doors confirming to CPWD specifications White vitreous China (IS: 2556), 580 mm Odisha pattern pan with 10 lt. low level PVC flushing cistern (IS: 774) of the approved brand
9	Lighting	
9.1	Fixtures	LED lighting fixtures with sufficient level of lighting as per National Building Code 2005 and IS: 3646
10	Compound Wall	MS Grill Gate & Square Bar Fencing with flash brick masonry boundary wall

c. Minimum specifications for Electrical Installation in housing Units:

Item no.	Description	Nos. per flat
1	Connected load per Flat:	
1.1	EB	1KW
2	Hall:	
2.1	Wall light points	2Nos
2.2	6 amp points	2Nos (Including T.V. Point)
2.3	Fan points	1Nos
2.4	6 amps twin socket	1No
2.5	Call Bell Point with switch at entrance	1No
2.6	Telephone point	1No
2.7	16 amps point	1 No
3	Bed Rooms:	
3.1	Wall light points	2Nos
3.2	6 amp point	1Nos
3.3	Fan points	1No
3.4	6 amps twin socket	1No
3.5	16 amps point	1 No
4	Kitchen	
4.1	Exhaust Fan Point	1No
4.2	6/16 amps point	2Nos
4.3	Wall light point	2Nos
5	WC (Toilet)	
5.1	Wall light points	1Nos
6	Bath	
6.1	Exhaust fan point	1No
6.2	16 amps point	1No
6.3	Wall light points	1No
7	Balcony	
7.1	Ceiling light point	1No

d. Minimum specifications for public throughfare, internal roads, parking, pathways and signage:

Item No.	Description	Detail for projects
1.	Sub Grade	As per the design requirements
2.	Sub-base/Base layer	As per the design requirements

3.	Surfacing	As per the design requirements
4.	Kerb Stone	C.C. 1:2:4 precast Kerb stone 0.30 m long & 0.30 m x 0.15 m section complete as per CPWD specifications and confirming to IS: 5758
5.	Toe Wall	Brick wall 1:4 (1 cement : 4 coarse sand) with brick designation 7.5
6.	Paths	100mm Concrete Paver Block over Sub base
7.	Information Signboard/ Guide Maps.	Made up of angle iron/ Cast Iron (C.I.) Pipe and Board and to be provided at every entry point with size 240 x 185 cms

e. Minimum specifications for Public Health (PH) items of Works:

Item No.	Description	Detail for projects
1.	Internal Concealed Wiring	CPVC Pipe
2.	External Wiring	DI Pipe/GI Pipe
3.	Sewerage Line	UPVC SWR Pipe/RCC Hume Pipe
4.	Internal PH Fittings	Plaza/Essco
5.	Water Tank	Syntex Double Layer
6.	Sunken Slab Water Proofing	APP Membrane
7.	Water Supply	Bore well / UGR / Pump Room
8.	Rain Water Harvesting	PVC Pipe / Inspection Chamber with filter media / Recharge Pit
9.	Fire Fighting	Fire Water Tank/DI Pipe/Fire Hydrant

III. Technical Specifications:

The Concessionaire shall construct the Accommodation as per the Technical Specifications laid down by the Central Public Works Department Specifications Vol - I & II – 2009, Odisha State PWD and including up to date amendments there to, and other applicable standards and norms as mentioned above.

All Electrical works related to the Accommodation shall be those conforming to the Standards Code of Practice for Electrical wiring installations, National Building Code and Safety Procedures of Indian Electricity rules of latest revision/ version.

In the absence of any definite provisions on any particular issue in the aforesaid Specifications, reference may be made to the latest codes and specifications of BIS in that order. The Concessionaire shall also make reference to Planning and Building Standards Regulations, Central Public Health and Environmental Engineering Organisation (CPHEEO), Indian Roads Congress (IRC) Codes and Standards, and any other Applicable Standards and Applicable Laws.

Where even these are silent, the construction and development of the Accommodation shall conform to sound engineering practice as approved by the Independent Engineer/ Monitoring Agency appointed by the Authority. More specifically, the Concessionaire shall adhere to the following technical requirements, when constructing the accommodation, in addition to the requirements spelt out in the various specifications and standards specified within this schedule.

a. Building Materials for Civil Works:

- i. **Bricks:** Bricks shall be of locally available best quality kiln burnt. Bricks shall be well burnt, uniform deep red, cherry or copper coloured, free from cracks and flaws, well-shaped, uniform in size, homogeneous in textures and shall emit a clear metallic sound when struck; bricks shall have a minimum crushing strength 75 Kg/Cm² and shall not absorb water more than 20% by weight. The bricks shall conform to IS: 1077-1992.
- ii. **Cement Mortar:** Mortar shall be well mixed to a uniform colour and consistency in the proportion conforming to IS 2250-1981.
- iii. **Cement should conform to the following standards:**

Materials	BIS Code for	
	Specifications IS:	Sampling/ Testing: IS

Portland Slag Cement (PSC)	455 – 1989	4031-1988 & 4032-1985
Ordinary Low heat Portland Cement (OPC)	269 – 2013	4031-1988 & 4032-1985
Masonry Cement	3466-1988	4031-1988
White Portland Cement	8042-1989	4031-1988 & 4032-1985
Standard sand for testing of cement	650-1991	

- iv. **Sand:** Locally available best river sand of medium size.
- v. **Coarse Aggregates:** The aggregates shall confirm to I.S. 383-1970. Porous Course aggregate shall not be used. The aggregate shall be free from clay films and other adherent coatings. Aggregates containing clay films over the stone materials shall be thoroughly washed. The aggregate shall be from approved quarry and crusher broken. Course aggregates shall be composed of particles ranging between the sizes 2.36 to the maximum size as may be specified in the relevant item of work, within the range, the aggregates shall be well graded so as to produce a dense concrete.

Materials	BIS Code for	
	Specifications IS:	Sampling/ Testing: IS
Coarse and Fine Aggregates from natural sources	383-1970	2386 (Part 1-8) 1963
Sand For Plaster.	1542-1992	1727-1967, 2250-1981, 2386-1963

- vi. **Reinforcements:** Mild steel Round Bars, cold twisted and deformed bars of steel of medium tensile strength will be used as reinforcement as per approved drawing and design. Mild steel bars shall confirm to I.S.: 226/1975 standard quality or IS: 432 /1982 - Grade-I. Black annealed wire (Not thinner than 24 gauge for tying the reinforcements shall be used).

b. Water Supply, Sanitary and Plumbing:

- i. **Design Standards:** The CPHEEO guidelines and IS: 1172-1993 shall serve as the baseline for development of the design criteria for Water supply system. Relevant latest Indian standards should be followed for carrying out the detailed design.
- ii. **Water Supply Pipes and Fittings:**
- Material:** All G.I. Pipes are to be of mild steel continuous welded, screwed tubes, medium quality confirming to I.S.S. and bearing ISI Marks manufactured by reputed Firms and approved brands as specified. The pipes shall confirm to IS.1239 (Part-1) -2004.
 - Laying:** The layout of the mains and service pipe set etc. will be done in accordance with the approved drawings.

3. **Testing:** The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg/Cm². The test pressure should maintain without loss of for at least half an hour.
4. **Painting:** On completion of the test, the exposed pipes and fittings are to be painted with two coats of synthetic enamel paint of ISI mark over a coat of priming.
5. **Ball Valve:** The ball valve shall be high or low pressure class as per the design and shall confirm to I.S. 1703-2000, the nominal size of ball valve shall be that corresponding to the size of Pipe for which it is used. The Ball valve shall be of brass or gun-metal and the float for low pressure polyethylene and for high pressure in copper.
6. **Ferrule:** The ferrules for connection with C.I. main shall generally confirm to I.S. 2692-1989 and shall be of nominal bore as required.
7. **Non-return Valve (Check Valves):** The non-return valve shall be of Brass or Gunmetal and shall be of horizontal or vertical flow type and of the size as specified and confirm to I.S. 778-1984.
8. **Foot Valve:** Foot valve is generally placed at the lower end of the suction pipe of the centrifugal pump to prevent the suction pipe from emptying. On vertical non-return valve may also be fixed in place of foot-valve. The foot valve shall confirm to I.S.4038-1986.
9. **Water meters (Domestic types):** Water meter up to 50mm nominal size and shall confirm to I.S: 779-1994 with ISI Mark. The meter body shall be of bronze/ Gun-metal and marked to read in litres complete with registration box and lid. The water meters shall be provided with Strainers. Strainer and not permit disturbing the registration box.
10. **Bibcock & Stopcock:** These shall confirm to I.S781-1984 and bear ISI Mark. The stopcocks should be of C.P open type/concealed type/angle valves type. Bibcock should be also C.P Brass bibcock.
11. **Full way Valve (Brass):** The valve shall be of brass fitted with a cast-iron wheel and shall be of gate valve type confirming to I.S. 14846-2000.
12. **Gun Metal Full way Valve:** This shall be of the Gun-Metal fitted with wheel and shall be of Gate-Valve type opening full way. This shall confirm to I.S. 778-1984. Class I. The Valves should bear ISI Mark.
13. **P.V.C (S.W.R.) & P.V.C. (Rigid) Pipes & Fittings:** The P.V.C. (S.W.R.) and P.V.C. (Rigid), soil Waste & Vent Pipes (Spigot & Socket, & couples joints), shall be of make & brand as specified (Under List of materials of approved brands and manufacturers) confirming to I.S.S., B.S.S. & DIN are to be used. The main specification of P.V.C. Soil & Waste pipes and fitting are as below.

<u>Item</u>	<u>Specification</u>
Materials	Un-plasticized Poly Vinyl-Chloride (uPVC)
Colour	Grey

<u>Item</u>	<u>Specification</u>
Dimensions (Diameter)	
Fittings	75mm/110mm/63mm
Pipes	75mm, 110mm, on lengths of 3or 6 mt.
Wall thickness	
Fittings	Minimum 3.2mm at any port.
Pipes	As per application
For Rainwater	75mm - 1.8 to 2.2 mm, 110mm - 2.5 to 3mm
Waste & Soil	75mm -1.8 to 2.2mm, 110mm -2.5 to 3 mm, 63mm
Underground drainage with light/NIL Traffic	110mm - 2.5 to 3mm
Underground drainage with Heavy traffic	110mm - 3.7 to 4.3mm
Standards that the attribute have to confirm to (Standard No.)	
Fittings & Wall thickness	B.S. 4514, DIN 10531, DIN 19534 I.S.7834 - PVC (Rigid)
Pipe Wall thickness	IS 4905
Rubber ring	IS 5382
Fitting dimensions	DIN 19531 - P.V.C., DIN 19534-S.W.R, IS - 7834 V.C. (Rigid)
Pipe Dimensions	IS 4985

c. Water Supply Arrangement:

i. **Scope of Work:** The water supply arrangement consists of the following items including installation, testing and commissioning of all equipment.

1. Providing underground tank of the capacity calculated in accordance to guidelines of Odisha Water Supply & Sewerage Board and as per other applicable standards and applicable laws.
2. Providing booster pump house of suitable size including booster pumping sets along with provision of 100% standby arrangement with all allied accessories and items such as sluice valve, C.I. flanged type pipe, flanged type bend, taper and puddle pipe wherever required.
3. Providing cubicle type L.T. Panel Board suitable for operation of booster pump sets and D.G. set.
4. Providing water level indicator (electronic type)
5. Earthing
6. Fire Extinguishers, rubber mat and exhaust fan

ii. **Specifications:**

1. The booster pump set shall be designed as per the technical data available, i.e. discharge and head calculated on the basis of actual water requirement. The model and make of the pump and motor shall be based

on the performance curve and duties of the pump of the individual manufacturer.

2. C.I. pipe, bend, tee, puddle pipe etc. shall be of double flanged type.
3. All sizes of sluice valve, C.I. / G.I. Pipe, bend, Tee, taper, and puddle pipe required at site shall be as per BIS specifications.

iii. **Pump Set:**

1. **Pumps:** The centrifugal pump shall be of cast iron body consisting of steel shaft and dynamically balanced C.I. impeller. The pump shall be capable of developing the required total head of rated capacity. Pumps shall be furnished complete with flexible coupling along with coupling guard bolted to the base plate. Base plate for pump and motor shall be common. Suitable holes shall be provided for grouting. The foundation bolt shall be completed with nuts and washers.
2. **Induction Motor:** The motor shall generally conform to I.S: 325-1996. Additionally, the specific requirements mentioned in the following clauses shall also be met. The guaranteed performance of the motor shall be met with tolerance specified as admissible and its minimum efficiency shall be 85%. It shall be wound with Class 'B' insulation and shall be of continuous rating and be capable of giving rated output without reduction in the expected life-span even when operated continuously vide the following supply conditions:
 - a. Variation in supply voltage + 10%
 - b. Variation in supply frequency + 5%
 - c. Combined Voltage and frequency variation + 10%
- iv. **Diesel Generating Set (With acoustic enclosure):** The generating set of required capacity as such to generate 415/440 volts at 0.8 PF (lag) suitable for 50 HZ, three-phase four wire system. Engine shall be water cooled, vertical cylinder, electric start, compression-ignition, 4 stroke multi-cylinder designed to run continuous at 1500 RPM. .
- v. **Alternator:** Self excited, self-regulated, three-phase, 50 C/S, 1500 RPM, screen protected drip proof conforming to IS: 4712.
- vi. **Earthing:** As per I.S.: 732-1989 and I.S.: 3043-1987

d. **Sewerage Works:**

- i. **Stoneware Pipes (materials):** The Stone ware (S.W.) pipes & fitting should be of Grade 'A' confirming to I.S 651-2007. The pipes shall be sound, free from visible defects such as fire crack or hair crack and flow or blister. The pipes shall give a sharp clear line when struck with a light hammer and should be perfectly salt glazed.
- ii. **Excavation of Trench for laying Sewer Pipes:** The trenches for the pipes shall be excavated to the lines & level as per approved drawings. After the excavation of the trench is completed, foundation of cement concrete 1.4.8 in hard granite aggregate (size 40mm) shall be laid with proper level all along under the length of the pipe.

- iii. **Laying, Jointing, hunching of the Pipes and fittings:** Shall be carried out in accordance with the approved layout drawings. The whole of the drain work shall be tested when laid, and at the completion of the construction, to the satisfaction of the Independent Engineer/ Monitoring agency. The test shall be made by means of water under pressure at the highest point of the Section under test and providing an air pipe at the lower end of the line. Maximum head of 1.5m must be maintained.
- iv. **Excavation and refilling:** Excavation for drain and pipe trenches shall be straight and to correct depth and gradient. The trench bottom shall be of required width as per specification to allow working space for pipe jointing. The pipeline shall not be refilled and covered, until the line therein has been passed and tested.
- v. **Buried Services:** All pipes, cable mains and other services exposed by the excavations shall be effectively supported by timbering. The Concessionaire shall be responsible for any damage occurring to buried services and make good the same to the satisfaction of the Independent Engineer / Monitoring agency.
- vi. **Inspection Chambers/Manholes:** At every change of alignment, gradient or diameter of a drain there shall be a manhole or Inspection Chamber. The maximum distance between manhole chambers shall be 30 meters for the line laid straight. The design of the manhole shall be done in accordance with I.S.: 4111 (Part 1) – 1986. The Manhole and Inspection Chambers shall be covered with R.C.C. cover slab of thickness 100mm to 150mm according to the requirement at site. One C.I. Manhole cover of diameter and weight as conforming to I.S. 1726/1974 shall be fixed on the cover slab. Heavy duty covers etc., under heavy vehicular traffic condition and capable of bearing wheel loads up to 11.25 tons are to be used and medium duty under light type wheel traffic loads and light duty for domestic premises are to be used. Covers and Frames shall be clearly cast, double water seal type and they shall be free from all and sand holes. The cover shall be gas tight and water tight with proper water-seal. The C.I. Cover and frame shall be coated with two coats of black bituminous paint. The frame of Manhole cover shall be fixed on the slab while the slab is cast.
- vii. **Gully Trap Chamber:** The size of chamber for 100mm HCI yard gully shall be of 300mm X 300mm (Inside).

e. Internal Electrification Works:

- i. **Internal wiring:** All internal wiring shall be done in conformity to the latest Indian standard specification/Rules, code of practice adopted by CPWD and other standard practices prevalent in the part of the country. For the purpose of the specification the terminology used shall be as defined in IS: 732-1989 and IS: 1356-1972 of the definition of points wiring. The installation shall be carried out in conformity to all requirements of IE Act, 1910 and IE Rules 1956.
 - 1. Ceiling rose in (in case of ceiling fan).
 - 2. Ceiling rose or connector (in case of pendants except stiff pendant points)
 - 3. Bank plate (in case of stiff pendant).

4. Socket outlet (in case of socket outlet points)
5. Lamps holder (in case of wall Bracket, batten holder bulk head fitting and similar other fittings)
6. Call bell / buzzer (in case words 'via' the switch shall be read 'via' the ceiling rose / socket outlet for bell push, where no ceiling rose / socket outlet is provided)

The following shall be deemed to be included in the point wiring:

1. Switch and ceiling rose are required
 2. In case of wall brackets, bulk head fittings, cables as required up to the lamp holders
 3. Bushed conduit for porcelain tubing where cables pass through walls.
 4. All wood or metal blocks, boards and boxes, R.J. Boxes sunks or surface type including those required for fan regulator but excluding those under the distribution board and main control switch.
 5. Earth wire from 3 pin socket point to the common earth including connection to the earth dolly.
 6. Earth wire with insulated single core 1/18th SWG.
 7. All fixing accessories such as clips, nails, screw, plug, raw plug, wooden plug, round blocks etc. as required
 8. Connections to ceiling rose or connection socket outlet, lamp holders, switch, fan regulators etc.
 9. Sub main shall include the earth wire of adequate size main distribution Board up to sub distribution board. For the internal lighting, either surface conduct wiring system or recessed conduit or batten wiring system shall be provided.
- ii. **Main and Sub Distribution Boards:** The scope of this specification includes installation of the panel boards and distribution boards and making necessary connections. The installation of the boards shall be done strictly in accordance with the specifications, the instructions supplied by the switchgear manufacturer, Indian standard specifications and I.E. Rules.
- iii. **Earthing:** It shall be carried out in accordance with the requirements of Indian Electricity Rules and the relevant rules and regulations of electrical supply authorities. The complete earthing work for the installation covered by these specifications shall also be provided taking into account Indian Standard Specification No.IS:732-1989 and IS: 3043-1987. The earthing system adopted shall also have adequate mechanical strength.
- iv. **Installation, testing and commissioning:** The Concessionaire shall be responsible for the installation testing and commissioning of all the equipment and materials installed. This shall also include the provision of miscellaneous wiring and supports and earthing in compliance with Indian Electricity rules and to the full satisfaction of the government representative. The Concessionaire shall get all the installation approved from the Government Electrical Inspector prior to the energisation and supply necessary drawings, test certificates and

both for tests carried out at the factory and site as well as the tests which the inspector may demand. In case any addition of alternations is required, to be made in the installation or in the equipment as per the directive of the Government Electrical Inspector / Local Authorities, the same will have to be carried out by the Concessionaire.

- v. **Testing:** Manufacture's standard tests in accordance with Indian Standard and other standards, adopted shall be carried out on all the equipment and accessories covered by this specification so as to ensure efficient and satisfactory performances of all the components and also the equipment as a whole under working conditions at site. All equipment shall be tested at site before the commissioning in accordance with the adopted standard and Indian Electricity Rules. Voltage test shall be carried out on each circuit on completion of wiring and cabling.

vi. **PVC insulated Cables and Wires:**

1. For 415V Distribution system, cables of voltage grade not less than 1000V shall be used. These cables shall be heavy-duty class, PVC insulated and aluminium/copper conductors. The wires used in the lighting installation shall be PVC insulated and copper wire/aluminium wire in case of conduits wiring and of 660V grade. Wires of different colours shall be made use of for quick identification of phase wire / neutral wire etc. All cable of wires shall comply with the requirements regarding the manufacture and testing etc., as specified in India Standard Specification IS: 694 for wire and IS 7046 Part-I. Fuse switch / switch fuse shall be metal clad dust and vermin proof suitable for use under climatic conditions prevailing at site. Switch fuse / fuse switch units shall comply in general to IS: 1567/4064 with regard to design and constructional / features.
2. The 'ON' and 'OFF' position of the switch handles shall be distinctly indicated and interlocks shall be provided to ensure that the switch cover cannot be opened unless the switch is in the 'OFF' position. Means shall, however, be provided for releasing the interlock to permit closing of switch with cover open for testing purposes. Designs with normal conventional position of switch handles, i.e. with switch handle up in the 'ON' position and down the 'OFF' position shall be preferred. All live parts inside the switch shall be properly surrounded and inter phase barrier shall be provided.
3. The bus-bars within the bus-bar chamber shall be liberally spaced for taking the riser connection. The bus bars with aluminium conductors shall be provided and PVC sleeves of different colour shall be mounted on them for easy identification, Clamped joints for taking the riser connections, instead of bolted type shall be preferred.
4. Two bolted type earthing terminals shall be provided on the switch boards. All individual switches shall be connected with suitable size earth wire to the main earthing terminals of the switchboard.
5. Hanger Board and shock treatment / charts shall be supplied wherever required.

6. At the incoming side of each pen phase, 3-neon type indicating lamps should be provided at the main board.

- vii. **Switches and Plug Sockets:** Switches provided for control of light points shall be rated for 6A/16A 250V.
- viii. **LED lighting & Fittings:** Ceiling / Wall mounted LED lighting shall be supplied and fitted and shall conform to relevant IS code. All fitting shall be complete with LED bulbs/tubes.

f. Landscaping and Tree Plantation

- i. **General:** The Concessionaire shall plant trees and shrubs of required number and type at the appropriate locations within the campus and in the land as per the applicable laws and policy. The guidelines given in this Section shall be followed in plantation of trees and shrubs.

ii. Design Considerations in various locations

1. **Set-back Distance of Trees and Other Plantation:** Trees on the roadside shall be sufficiently away from the roadway so that they are not a hazard to traffic or restrict the visibility. Most vulnerable locations in this regard are the inside of curves, junction corners and cut slopes. Preferably, the first row of trees shall consist of species with thick shade and other rows of vertical growth type providing thin shade.
2. **Spacing of Avenue Trees:** The spacing of avenue trees will depend on the type and growth characteristics of trees, requirement of maintenance, penetration of distant views, etc. A range of 3-5 m would meet the requirement for most varieties.
3. **Choice of Trees:** The following guidelines shall be kept in view while selecting the species of trees to be planted:
 - a. Trees shall be selected with due regard to soil, rainfall, temperature and water level.
 - b. The species must be capable of developing a straight and clean bole up to a height of 2.5 to 3.5 m from the ground level.
 - c. The selected trees shall, preferably, be fast growing and wind-firm. These shall not be thorny or drop too many leaves.
 - d. The trees shall be deep rooted as shallow roots injure pavements.
 - e. The species selected shall be of less spreading type, so that these do not interfere with overhead services, clear view of signs and efficiency of roadway lighting.

g. List of Reference Codes and Standards:

In addition to the IS codes referred to in the previous sections, the following IS codes shall be taken as reference.

i. Other reference codes for execution of Civil & Structural works

Description	IS Code
Concrete	I.S 456

Brick masonry	I.S 2212
Cement plastering	I.S 9103
Mortar	I.S 2250
White and colour washing	I.S 6278
CC in foundation	I.S 2571
Anti-Termite Treatment	I.S 6313 (Part – I & Part – II)
Painting to all surfaces	I.S 2395 (Part – I & Part – II)
DPC	I.S 3067
Steel painting	I.S 1477 (Part – I & Part – II)
Hand Book on RCC Detailing	(SP 34 BIS)
Architectural and Building drawings	IS 962
Handbook on Concrete mixes	(SP 23 BIS)
Earthquake design of buildings	IS 4326 and SP 22 BIS
Code of Practice for structural safety of buildings: loading standards	(IS 875)
ISI handbook for structural engineers	(SP 6(2))
Code of Practice for natural ventilation of Buildings	(IS 3362)

ii. **Other reference codes for execution of Civil & Structural works**

Description	IS Code
Low Tension Circuit Breakers:	IS 2516
Switchgear Bus Bars	IS 375
HRC fuse links	IS 2208
Distribution MCB boards	IS 2675
Enclosure for Low Voltage switchgear	IS 2147
Wall Glass flame-proof Electric light fittings	IS 2206 (Part 1)
Water Tight Electric Light Fittings	IS 3553
Steel Boxes for Enclosure of Electrical Accessories	IS 5133
Fittings for Rigid Steel conduit	IS 2667
Rigid steel circuits for electrical wiring	IS 3837
Accessories for Rigid Steel Conduits for Electrical Wiring	IS 3837
Switch Socket Outlets	IS 3837
PVC Wiring	IS 694
Switches for domestic and similar purpose	IS 3854
Call Bell and Buzzers	IS 2268
Straight through joint boxes and leads sleeves or Paper insulated cables-	EID-0032
Switchgear	IS 3072 (Part I)
Lighting protection	IS 2309
Low Tension switch use units	IS 4064

Guide for Safety procedure in Electric work	IS 5216
Rubber Mats for Electric works	IS 5424
Earthing	IS 3043

iii. **Other reference codes for construction of Roads, Drains, Pits & Culverts**

Description	IS Code
Paving Bitumen	IS 73
Road Tar	IS 215
Cutback Bitumen	IS 217
Specification for coarse and fine aggregate from natural sources for concrete.	IS 383
Test sieves	IS 460
Common burnt clay building bricks.	IS 107
Method of test for water absorption of natural building stones.	IS 112
Sand for masonry mortars.	IS 211
Classification of burnt clay bricks.	IS 310
Method of sampling and testing of clay building bricks.	IS 349
Sealing compounds, hot applied, for joints in concrete.	IS 184
Tentative specifications for Priming of Base Course with Bituminous Primers.	IRC 1
Tentative specification for single Coat Bituminous Surface Dressing.	IRC 1
Standard specifications and Code of Practice for Water Bound Macadam	IRC 1
Tentative specification for Asphaltic Concrete Surface Course	IRC 29
Tentative specification for Bituminous Surface Dressing using Pre-coated Aggregates.	IRC 48
Specification for Road & Bridge works.	Ministry of Shipping & Transport (Roads Wing)

h. **List of Materials of approved brand and manufacturers:**

The suggested brands have been detailed in table below but the Concessionaire has the flexibility to use other equivalent / superior brands with better quality and longevity which shall be subject to approval by Independent Engineer / Independent Monitoring Agency. The brands proposed to be used should be mentioned in the DBR submitted for approval.

i. **Civil Works:**

Item	Brand
Cement Ordinary Portland cement/Portland Slag Cement of 43 grade	A.C.C., L&T, Konark, Ultratech conforming to relevant IS Codes
Steel Mild steel & medium tensile steel bars of grade-I	TATA TISCON / SAIL / VIZAG bars conforming to IS 432-1982
Water proofing compound	Pidilite, Sika, Snowcem (Ompears)
Paints & distempers	Asian Paints, Dulux, Berger,
Red oxide (zinc chromate)	Shalimar, Asian Paints
Cement paint & weather coat	Snowcem, Durocem, Berger
BITUMEN (60 – 70 grade)	Shalimar Tar, Lioud Insulation, Bitumen Product (India), Indian Oil
Anti-termite treatment	Bayer (Premise)
Hardware fittings	All hardware fittings are of brass of ISI mark
I) Ferrous	Equivalent to ISI approved manufacturers
II) Non-ferrous	Equivalent to ISI approved manufacturers
Aggregates (fine and coarse)	As per the source approved by the Independent Engineer
Water proof adhesives for slab fixing	Construction Chemical, Pidilite Industries Ltd. or any approved manufacturers

ii. **Sanitary / Plumbing works:**

Item	Brand/specification
Ferrules	Leader, Joswar, Shakti
Water meter	Capstain / Dasmass
G.I. pipes	Tata, Jindal with ISI mark
G.I. pipe fittings	K.brand / CR brand,
Foot valves, Check valves	Leader, Atom, Shakti
Gate valve, Globe valves, Fullway valve	Leader, Atom, Shakti
Ball cocks	Kingston, Ark, Luster
Polythene float	Leader / Himson
CP cock, Stop cock, Angle stop cock, Pillar cock, Conceal stop cock	Jaquar / Marc / Crab tree
C.P. Waste	Jaquar / Crab tree /Marc
Vitrous sanitary ware like wash basin, urinals, W.C. pans	Parry ware make with ISI mark / Nycer / Hindware
PVC cistern	Parryware / Slimline / Commandar
Mirrors	Golden fish, Swan, Modiguard
Polythene overflow pipes	Emco, Peacock
C.I. pipe (rain water & soil)	EXCC, Silc, Sushila, GIW, BIC
PVC SWR pipe & fittings	Oriplast, Supreme, Finolex
Water proofing compound	Impermu (2% by wt. by cement), M/s Snowcem India Ltd., Sika, Fosroc, Pidilite

iii. **Electrical works:**

Item	Brand/Specification
Single core multi strand copper conductor	Finolex / Havells / HR
6 amp flush type switch, socket	Havells/Anchor/Cona/ Legrand
Ceiling rose	Anchor / Cona
MCB / Main switch	L&T / Havells / IndoAsian / Legrand
BDB with MCB	Havells / MDS / Legrand
Bulk head fitting	Bajaj / Crompton / Philips
Angle holder	Anchor / Cona
16 amp switch and socket	Havells / MDS / Anchor.

*** Any other material/item for which specifications are not mentioned above shall be used in Conformance with the standards of State PWD, CPWD for housing as per I.S. Specifications or of best quality when not covered by I.S. Specifications. This shall be utilized only upon prior permission/ approval of Independent Engineer / Monitoring agency.

IV. Tests

a. Schedule of Tests

- i. **Tests during construction period:** Tests shall be conducted by the Concessionaire and monitored and reviewed by the Independent Engineer / Monitoring Agency for the raw materials at the designated intervals as per the specifications for sampling of materials as mentioned in this Schedule and within the provision of this Agreement. Concessionaire shall submit all the test reports at regular intervals to the Independent Engineer/ Monitoring Agency or as per the standard operating procedures set forth by the Independent Engineer/Monitoring Agency.
- ii. **Post Construction tests:** The Concessionaire shall, not later than 30 (thirty) days prior to the likely completion of Construction of Accommodation, notify the Independent Engineer/ Monitoring Agency of its intent to subject the Accommodation development to Tests, and not later than 7 (seven) days prior to the actual date of Tests, furnish to the Independent Engineer/ Monitoring Agency detailed inventory and particulars of all works and equipment forming part of construction of Accommodations.
- iii. The Concessionaire shall notify the Independent Engineer/ Monitoring Agency of its readiness to subject the Accommodation assets to Tests at any time after 7 (seven) days from the date of such notice, and upon receipt of such notice, the Independent Engineer/ Monitoring Agency shall, in consultation with the Concessionaire, determine the date and time for each Test and notify the same to the Independent Engineer/ Monitoring Agency who may designate its representative to witness the Tests. The Independent Engineer/ Monitoring Agency shall there upon may conduct the Tests itself or cause any of the Tests to be conducted by the Concessionaire.

b. Tests:

S. No.	Material / Equipment / Other Items	Test
Tests during Construction Period		
1	Cement	<ul style="list-style-type: none"> • Consistency • Initial and final setting time • Fineness • Specific gravity • Compressive strength
2	Aggregates	<ul style="list-style-type: none"> • sieve analysis (gradation) (concrete work) • sieve analysis red book specification (w.b.m. trap laterite) • sieve analysis granular sub base (n.h.work) MORTH specification • water absorption • impact crushing (concrete wbm/ bt)

S. No.	Material / Equipment / Other Items	Test
		<ul style="list-style-type: none"> • abrasion • flakiness and elongation index • plasticity index for blinding used for wbm
3	Sand	<ul style="list-style-type: none"> • water absorption and specific gravity • fineness modulus • silt content • bulkage
4	Water (used for construction)	<ul style="list-style-type: none"> • salinity • chloride content • sulphate content • ph
5	Bricks	<ul style="list-style-type: none"> • water absorption • Compressive strength • Efflorescence
5a	Autoclaved Aerated Concrete Blocks (AAC)	<ul style="list-style-type: none"> • Dry Density • Compressive strength • Thermal Conductivity • Fire Resistance
6	Flooring tiles	<ul style="list-style-type: none"> • flexural strength • water absorption • abrasion
7	Glazed tiles	<ul style="list-style-type: none"> • water absorption
8	Concrete mix design	<p>The number of samples to be taken varies per the Qty. of mix as follows:</p> <ul style="list-style-type: none"> ➤ qty up to 5 m³ (1 sample) ➤ 6-15 m³ (2 samples) ➤ 16-30 m³ (3 samples) ➤ 31-50 m³ (4 samples) ➤ quantity above 51 m³ (4 plus an additional sample for every 50 m³)
9	Murum/ soil for earth work	<ul style="list-style-type: none"> • optimum dry density • C.B.R • liquid and plastic limit/ plasticity • Index field density 100% p.d. • field moisture content
10	Wood	<ul style="list-style-type: none"> • moisture content • density
11	Bituminous mix	<ul style="list-style-type: none"> • extraction test • gradation • Below test shall be taken before mixing. <ul style="list-style-type: none"> ➤ gradation ➤ aggregate impact value

S. No.	Material / Equipment / Other Items	Test
		<ul style="list-style-type: none"> ➤ flakiness index and elongation index ➤ water absorption ➤ marshall stability of mix ➤ density of compacted layer
12	Bitumen	Sampling to be done as per IS 1201 and the following tests shall be done as per IS 1201-20 <ul style="list-style-type: none"> ➤ penetration ➤ ductility ➤ softening point ➤ viscosity ➤ flash point ➤ specific gravity
13	Job mix design	<ul style="list-style-type: none"> • DBM/ SDBC/ BC
14	WBM	<ul style="list-style-type: none"> • aggregate gradation (0.123 cu.m/ sq.m) • water absorption • impact • flakiness index
15	Steel	<ul style="list-style-type: none"> • wt. per meter • ultimate tensile stress • yield stress • elongation
Post Construction tests		
16	Pipelines	Hydraulic Tests as per relevant IS Codes
17	Pressure Vessels like Pressure Sand Filter and Activated Carbon Filter	Hydraulic Test as per relevant IS Codes
18	Pumps & Motors	Submission of Performance Test Certificate from Manufacturer
19	Electrical Panels	Submission of Performance Test Certificate from Manufacturer
20	Electric Transformer	Submission of Performance Test Certificate from Manufacturer
21	Sewage Treatment Plant (STP)	Quality Test for treated sewage as per “surface waters discharge” standard of Central Pollution Control Board(CPCB) / respective State pollution Control Board (SPCB)
22	Water Treatment Plant (WTP) &	Establishment of power consumption norms for cubic metre of throughput treated

S. No.	Material / Equipment / Other Items	Test
	Sewage Treatment Plant (STP)	

- i. **Other Tests:** The Independent Engineer/ Monitoring Agency appointed may require the Concessionaire to carry out or cause to be carried out additional Tests, in accordance with Good Industry Practice, for determining the compliance of the developed assets with Specifications and Standards.
- ii. Testing charges including incidental charge and cost of sample for testing shall be borne by the Concessionaire for all tests as required under this Annexure.
- iii. Testing charges for additional tests that are not mentioned in this Schedule but when requested by the Independent Engineer/Monitoring Agency shall be paid by the Authority.
- iv. **Environmental audit:** The Independent Engineer/ Monitoring Agency appointed shall carry out a check to determine conformity of the Assets with the environmental requirements set forth in Applicable Laws and Applicable Permits.
- v. **Safety review:** Safety audit of the Assets shall be undertaken by the Independent Engineer/ Monitoring Agency as per industry practices and norms.