MAINTENANCE REQUIREMENT

1.0 General

1.1 The Contractor shall, at all times maintain the Project Components in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.

1.2 The Contractor shall repair or rectify any Defect or deficiency set forth in **Repair/Rectification of Defects and Deficiencies** of this section within the time limit specified therein and any failure in this behalf shall constitute non- fulfilment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Employer shall be entitled to effect reduction in monthly lump sum payment as set forth in tender conditions, without prejudice to the rights of the Employer under this Agreement, including Termination thereof.

1.3 Repair/Rectification of Defects and Deficiencies

The obligations of the Contractor in respect of Maintenance Requirements shall include all type of repair and rectification of the Defects and deficiencies within the time limit set forth therein.

1.4 Other Defects and Deficiencies

In respect of any Defect or deficiency not specified in this section, the Employer's Engineer may, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Standards and Specifications, and any deviation or deterioration beyond the permissible limit shall be repaired or rectified by the Contractor within the time limit specified by the Employer's Engineer.

1.5 Extension of Time Limit

Notwithstanding anything to the contrary specified in this section, if the nature and extent of any Defect or deficiency justifies more time for its repair or rectification than the time specified herein, the Contractor shall be entitled to additional time in conformity with Good Industry Practice. Such additional time shall be determined by the Employer's Engineer and conveyed to the Contractor and the Employer with reasons thereof.

1.6 Emergency Repairs/Restoration

Notwithstanding anything to the contrary contained in this section, if any Defect, deficiency or deterioration in the Project Components poses a hazard to safety or risk of damage to property or any hindrance to the sports activity, the Contractor shall promptly take all reasonable measures for eliminating or minimizing such danger.

1.7 Daily Inspection by the Contractor

The Contractor shall, through its engineer, undertake a daily visual inspection of the Project Components and maintain a record thereof in a register to be kept in such form and manner as the Employer's Engineer may specify. Such record shall be kept in safe custody of the Contractor and shall be open to inspection by the Employer and the Employer's Engineer at any time during office hours.

1.8 Repairs On Account Of Natural Calamities

All damages occurring to the project components on account of a force majeure event or default or neglect of the employer shall be undertaken by the employer at its own cost. The employer may instruct the contractor to undertake the repairs at the rates agreed between the parties.

1.9 Operation Requirements

The operation requirements include deployment of sufficient manpower to run the overall system on day to day and carryout the maintenance work. Operation activity does not include the followings;

- Energy charges
- Trainer in swimming pool
- Manpower for managing of games & sports

2.0 Particular requirements

2.1 Swimming Pool

Maintenance of swimming pool will be carried out at four stages as below:

Opening of Pool

- Remove, clean and store the pool cover
- Thoroughly clean and vacuum the pool
- Add water to the desired height at the prescribed rate of 1" (25mm) per hour
- Test water balance, pH, Calcium Hardness and Total Alkalinity levels
- Inspect electrical service, filters, skimmers, drains, ladders, diving boards, plugs, gauges, and other important components of the system
- Lubricate fittings, valves, o-rings, and plugs
- Inspect tile and grout installations, and clean tiles and skimmer with cleanser
- Take a sample of pool water to a pool water expert for analysis
- Clean and inspect pool deck
- Skim pool water surface and vacuum pool bottom
- Backwash filter if necessary
- Shock pool water to breakpoint levels
- Adopt a routine maintenance program for the season
- Add algaecide as required

- Pool Maintenance 2-3 times a week:
- Empty skimmer and pump basket (may require more frequent cleaning)
- Vacuum the pool two to three times a week. Brush the sides and bottom of your pool, even if you have an automatic pool cleaner as this will loosen dirt and other particles that may adhere to pool finish.

Weekly Pool Maintenance:

- Remove any large accumulation of debris on the bottom with a leaf scoop.
- Feed the pool with chlorine or other sanitizer to satisfy its requirements either manually or automatically.
- Check that the water level is high enough for the pump to operate correctly.
- Test and adjust sanitizer level (may require more frequent testing depending upon bather load and environmental conditions)
- Visually inspect pool water for clarity, color and visible contaminants
- Remove floating leaves
- Test and adjust pH (may require more frequent testing depending upon bather load and environmental conditions)
    - The pH should be in the range 7.4 – 7.7 if the pool has a vinyl or tile finish. The range should be 7.3 -7.5 if the pool has a fiberglass finish. The range should be 7.4-7.6 for a gunite swimming pool. If the level is too high, then adjust it down using pH decreaser. The correct dosage is located on the label.
    - If the pH is too low, then add pH increaser. Again see labels for dosage. If the pH has dropped possibly so has your total alkalinity.
    - Don’t correct your pH more than once a week.
- Test chlorine levels in the pool water:
    - Free chlorine levels should be between 1-3 ppm
    - Free bromine levels should be between 3-5 ppm
- Test and adjust Alkalinity
- Test and adjust Oxidizer and Stabilizer levels
- Clean the tile at the water line
- Check filter pressure and backwash only if required
- Check water level and adjust as necessary at the prescribed rate of 1” (25mm) per hour
- Add a preventative dose of algaecide as necessary
- Shock the pool as per label instructions. This treatment restores the sparkle to the pool water and destroys germs and organic contaminants (can be done once every 2 weeks)

Monthly Pool Maintenance:

- Test and adjust Calcium Hardness
- Test and adjust for Total Dissolved Solids
- Test the total alkalinity, which should be in the range of 120-150 ppm.
- Chemically clean the filter
- Visually inspect tile, grout, sealant, and other exposed elements of pool
- Conduct Langelier Saturation Index evaluation and adjust as necessary
- Test your salt levels if you have a saltwater pool.

- If you have a vinyl liner – check for holes and tears and make any needed repairs as soon as possible.
- If you have a concrete, gunite pool or fiberglass pool, check for cracks.
- Check the seals in your motor and pump.
- Check all handrails, steps and other safety equipment to be sure that it's in proper working order.

Closing the Pool:

- Balance the pool water chemistry, typically to the following levels:
  - pH: 7.2 – 7.6
  - Total Alkalinity: 80 – 120 parts per million (ppm)
  - Calcium Hardness: 180 – 220 ppm
- Run the filter continuously for 24 – 48 hours
- Remove skimmer baskets, cleaners, ladders, wall fittings, and solar blankets from the pool
- Lower the water level in the pool to 6" (150mm) below the skimmer level at the prescribed rate of 1" (25mm) per hour
- Drain all pumping, filtering, heating, and sanitizing equipment to prevent damage caused by freezing
- Lubricate o-rings, valves and plugs to make opening the pool in the spring easier
- Thoroughly clean and vacuum the pool
- Winterize the plumbing by blowing out the lines and plug the lines with expansion plugs
- Add winterizing algaecide
- Cover the pool with a tight fitting cover

2.2 Foot ball Turf

The contractor shall follow the detailed maintenance requirements for care maintenance of natural grass foot ball filed as per manufacturer recommendation and FIFA guide line. The contractor shall provide a detailed maintenance schedule to employer for approval. Following minimum periodic maintenance requirements has to be carried out by contractor during the operation and maintenance period:

Even after the finest construction, over time the grass cover will deteriorate for many reasons. First there is compaction of the terrain resulting in a reduction in the penetration of the air and water to limit the development of the vegetation. The feet of the players on the pitch are the main cause. Sound use of the pitch in favorable weather conditions should not exceed 6-8 hours of play in the autumn-winter period and 16-18 hours in the spring-summer period. In unfavorable conditions play should be more or less halved. The commitments of football clubs in the championship season and cup play often makes it difficult to respect these limits. Among the other factors which condition the quality of the grass cover are: insufficient natural light often due to stands built too high to increase the capacity of the stadium, a shortage of nutrition, thermal stress and possible fungus attacks.

The maintenance intervals involve: mowing the grass and irrigation, defelting and aerating the soil; sand top dressing and overseeding or complete or partial re-turfing; fertilization, treatment and cleaning.

Mowing and irrigation

The ideal height for cutting the grass of a football pitch is between 25 to 30 mm. In the winter good practice is to mow at the height of 30 mm or close to it whereas in the spring-summer period it would be better to reduce the cutting height by 10% compared to the winter height. The mower, generally a ride on type, can have helicoidal blades, 8 or 10 of them, or a horizontal blade. Also robot mowers with work widths of 60-80 cm or beyond are suitable. The frequency of mowing is linked to the development of the grass so that in the summer cutting is done 2-3 times per week whereas in the winter mowing is reduced to once a week. On average over the year mowing is performed 40-50 times. Irrigation is practically indispensable. In the summer watering is needed 1-2 times a week. Irrigation can be done with mobile equipment but pitches usually have an automatic pop-up irrigation system.

Defelting and soil aeration

The formation of felt is due to the deposit of biomass vegetation in less time than it takes for this to deteriorate. When the felt layer becomes excessive conditions are created which reduce or block the penetration of air and water. Self-propelled, mounted or trailed defelting machines are equipped with horizontal rotors fitted with knives in various shapes which, when rotating, make vertical cuts in the soil down to 20-30 cm and lift out the felt.

Soil compaction reduces water permeability which, when conditions are right, should exceed 100 mm per hour. Perforation or coring the soil can be done to combat compaction. The former operation is performed by tines mounted on a rotating axle or a goose neck axle; for the latter, hollow tines extract soil cores. During the playing season there is the tendency to core the pitch at not too great a depth whereas when the pitch is at rest coring can be done to greater depths to create vertical drainage. The density of the holes left varies from 100-150/m^2 and can exceed 500 holes/m^2. Hydraulic aerators make this operation less invasive with machinery which cores the soil with high-pressure jets of water. In normal conditions, these aeration and coring operations are performed twice a year.

Sanding, overseeding and re-turfing

After aeration or coring verti-draining operations comes sand top dressing which not only fills the holes but is also done to reduce irregularities in the terrain and the formation of felt. The operations consists of spreading sand of a determined granulometric composition. Distribution is performed by a machine which gravity spreads the sand or uses centrifugal force. A *verti-brush* is used to help the sand to penetrate the soil with round brushes which also improve the smoothness and uniformity of distribution. The quantity of sand used ranges from 3.5-4.5 liters/m^2 following coring at 0.5 litrer/m^2 in other cases. There can be recourse to overseeding when the grass cover has lost density of less than 100 regrowth/m^2 or, as is the case for some stadiums in South-Central Italy, overseeding is done in the autumn with a mix of microthermal species for a microthermal cover. The cover, in fact, turns yellow when the cold arrives so overseeding microthermals have the function of

keeping the cover green. Another type of maintenance operation on the cover is the partial or total replacement of the grass turf in damaged areas of the pitch or the on entire surface area. The tendency in important stadiums is to keep available an area with the same characteristics and the same species as those on the playing field from which sod can be lifted for patching in a quick and easy operation with little impact.

Fertilizer, treatment and cleaning

Aside from the nature of the terrain, fertilization is linked to the intensity of use. For the pitches in the top division the quantity of nitrogen based fertilizer reaches 400 units annually whereas phosphorus and potassium quantities come to between 100 and 200 units. These operations come along generally 4-6 times per year; recourse to slow-release fertilizer makes it possible to reduce this number of operations. There are treatments to apply only to counter a fungus attack which is prevented mainly by good maintenance practices. Cleaning is substantially clearing the pitch of extraneous materials whereas the stands must be cleared of everything the fans leave behind using backpack blowers.

Maintenance equipment

The facility operator shall ensure that all the equipment specified by the surface manufacturer for the installed Football Turf product is available to maintain the field in accordance with the manufacturer's instructions. This may either be achieved by the facility operator purchasing the equipment or entering a service agreement with a specialist maintenance contractor of a combination of both. In the case of maintenance being outsourced, the manufacturer shall present written evidence of such an agreement to maintain the field.

Maintenance equipment on site must at least include a tractor unit, either a drag brush or drag

mat, additional infill to top up the field and a ball roll ramp. If this is not the case, the test institute shall note this on the field test report and indicate the field as failed.

The facility operator shall ensure all required maintenance equipment is available for inspection by the test institute during the field test.

Maintenance Time schedule

- Inspection of fixtures and fittings — Daily
- Watering — Daily
- Mowing — Weekly
- Remove derbies — Every 30-35 playing hours
- Fertilizer, treatment — Once in every two months
- Sanding, overseeding and re-turfing — Every 30-35 playing hours
- aeration and coring operations — Twice in a year
- Moss-Kill/ Algaecide — Annually
- Weed-Kill — As necessary

These guidelines are not intended to replace the recommendations given by the manufacturer, but simply to compliment the manufacturer's recommendations in order to

underline the importance of correct maintenance of an artificial turf foot ball field that ensures the optimum performance of the facility for the longest period of time.

2.3 Electricity and lighting works

2.3.1Scope of Work

The scope of Contractor includes O&M for the specified period in contract and Training of Employer's staff for operation and handling of the respective systems, carry out Operation & Maintenance of Electrical Distribution Network, system along with its associated components including the following;

i) HT Switchgear Panels

ii) Compact Substation

iii) Distribution Transformer

iv) DG Set

v) Elevator

vi) 415 V Switchboards

vii) HV & LV Cable network, Bus duct

viii) Earthing & Lightning protection System

ix) Lighting System with wiring

x) Comprehensive Maintenance of all the Systems installed.

2.3.2 Operation and Maintenance

- The Contractor shall also be required to operate and maintain the system Designed, Supplied, Installed, tested and commissioned by him, for the duration of **Five years**. The Operation and Maintenance Contract shall be comprehensive type. The Contractor shall take full responsibility for the care of the electrical, electro-mechanical services/ system and other allied systems during the contract period till it is handed over to the Employer at the end of 5 years of O&M. If any loss or damage occurs to the treatment works or to any other system, during the period for the contractor is responsible, the contractor shall rectify such loss or damage, at his cost, so that all the electrical, electro-mechanical services/ system conforms to its condition when the contractor took possession at the commencement of the contract.
- The Contractor shall be responsible for, but not limited to, the following:
    a. Providing the required staff, but not less than the minimum specified numbers/ level, during operation and maintenance period and additional staff as per requirement during periodic maintenance and in emergencies.

b. The Contractor shall also acknowledge that the Employer and the Employer's Personnel and other contractors may be carrying out work at the Facilities and shall endeavour to fully co-operate and work in a manner so as not to cause any obstruction or hindrance to them.
c. Providing all required consumables such as spares, tools, tackles & Equipment and consumables required for functioning of equipment.
d. Establish work control procedures including preventive and corrective maintenance so that the entire electrical, electro-mechanical services/ system shall work in automatic mode and/or semi automatic at all times.
e. Preventive maintenance shall be done as per manufacturer's O&M manuals.
f. Submission of monthly report.
g. The Contractor shall be solely responsible for the safety and security of the goods in the store and will be responsible for any loss or damages in stores for any reason.
h. Proper maintenance and housekeeping along with provision of all tools & equipment.
i. Insurance: The Contractor shall, without limiting his or the Employer`s obligations and responsibilities, undertake the following;
    i. The insurance shall be at the Contractor`s cost and shall cover the Employer and the Contractor against all losses or damages from whatsoever cause arising from the start of the O&M until the date of completion of O&M in respect of the facility or any section or part thereof as the case may be.
    ii. Insurance shall cover for all the Civil, mechanical, electrical and instrumentation works together with material to the full replacement cost.
    iii. Any amount not insured or not recovered from the insurer shall be borne by the Contractor.

- The Contractor shall comply with all Applicable Law relevant to the Contractor's Personnel, including Applicable Law relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.
- The Contractor shall ensure his employees to obey all Applicable Laws, including those concerning safety at work.
- In the event Employer becomes liable to any Employers Personnel, any Governmental authority (including but not limited to any fines or penalties levied by or payable to such authority) or to any other third party under the provisions of any Applicable Law resulting from Contractor's failure to comply with such Applicable Law, Contractor shall reimburse Employer for all payments required to be made by Employer to such Employers Personnel, Governmental authority or any other third party, plus the actual expenses that Employer may incur in investigating, settling or defending any litigation or threatened litigation.
- The Contractor will not be entitled to sub-contract any part of his obligation under these Conditions to any third party without prior approval of the Employer. Neither party may assign their rights and obligations under these Conditions without the consent of the other Party. However the Employer may assign any rights under these Conditions to any financial institution from whom any financial assistance/credit facilities have been availed by the Employer.

- In the event of an emergency the Contractor shall forthwith notify the Employer of the emergency, the expenditures made and the operating actions taken.
- In the event of an emergency endangering any life or property, the Contractor shall immediately take such action as may be necessary to prevent, avoid or mitigate injury, damage or loss and shall, as soon as possible, report any such incidents, including his response thereto to the Employer.
- The Contractor shall be solely and exclusively responsible for obtaining all necessary permits and consents required by Applicable Law or any Governmental authority for the Contractor to carry out the O & M Services.
- Client's representative can inspect the facility at any moment during the O& M period. The Contractor at its own cost shall provide any assistance required for such inspection of the Birsa Stadium.
- CONTRACTOR shall carry out the following maintenance activities
  a. Contractor should carry out Operation and Maintenance requirements as per O&M manual of each equipment.
  b. Carry out Preventive & Predictive maintenance of the equipment and associated system to ensure the health of the network.
  c. Carry out breakdown maintenance of equipment and systems including identifying the fault and its location; repairs with all required spares and tools; testing and regularize the operations with minimum downtime.
  d. Maintain the Critical Spares required for emergency resolution of outages of Key equipments and systems.
  e. Carry out Root Cause Analysis to find the reasons and taking measures to eliminate its reoccurrence.
  f. Provide required all the necessary latest Tools and Tackles along with Test Equipments for carrying maintenance activities
  g. Necessary Human Safety Norms as per the updated Indian Electricity Rules.
- For detailed terms & conditions regarding to O&M, please refer contract document.

2.3.3 Compact Sub Station & VCB

Cast Resin Transformers Maintenance:

- In normal operating conditions cast resin transformers do not require specific maintenance except for that indicated in the following table. All the operations performed must be recorded in order to show to manufacturer in case of necessity. Maintaining within recommended timescales will help to prevent break downs. The maintenance shall be as per the Operation & Maintenance manuals of Original Equipment Manufacturer (OEM).
- Check tightness of all bolts, clamps and connecting terminals.
- Check cleanliness of bushings.
- Check the Earthing of transformer tank and earthing healthiness shall be done for equipment neutral. Check the earthing and non conducting metallic portions.
- O&M manual of Transformer shall be referred for critical checks.
- Opening / assembly procedure and precautions to be taken during maintenance
- Do the insulation test of windings

- Indicative table on the main maintenance operations:

Sl. No.	Control activity	Frequency of checks	Tools to be used	Result
1	Correct operation of the temperature sensors Pt100 / PTC	Every 6 months and after exceptional events	Hot air tool for simulated heating	Normal behavior of the different temperature sensors
2	Correct operation of the temperature control device	Every 6 months and after exceptional events	Hot air tool for simulated heating Follow the instructions given in the installation manuals	Simulated alarm and trip
3	Cleaning of the windings from dust, dirt, grease and possible foreign bodies	Yearly	If the environment is particularly dusty, the frequency must be adequately increased Clean, dry compressed air, maximum pressure 3 bar Dry rag	The ventilation gaps between the windings must be completely clean and open
4	Cleaning of the windings from condensation	After a period with no applied voltage	Heat by short circuit up to 80 ° C	External and internal surfaces of the windings perfectly dry
5	Tightening of the bolts of HV and LV terminals and of all the electrical connections	Yearly / after exceptional events	Torque wrench Tightening torque	
6	Measurement of insulation resistance to earth of the windings	After a period with no applied voltage	Mega-ohmmeter (Megger) working up to 5000V	The measured values should be approximately as follows: • 5000 V for 60 s: Terminals HV / LV terminals to earth >= 20 MΩ • 2500 V for 60 s: Terminals LV / HV terminals to earth >= 10 MΩ • 2500 V for 60 s: Terminals HV - LV terminals / earth >= 10 MΩ
7	Verify that each couple of LV and HV windings is perfectly aligned	After exceptional events such as	Metro	Uniform centering

Sl. No.	Control activity	Frequency of checks	Tools to be used	Result
		accidental shock or short circuit downstream of the transformer		
8	Tightening of the upper spacer	Yearly / after exceptional events	Torque wrench	Tightening torque between 20 and 40 Nm
9	Tightening of mechanical parts and fixing to the floor	Yearly and after exceptional events	Torque wrench	

- Over Current & Earth fault Protection Relay - As per OEM Manual
- Air Circuit Breaker - As per OEM Manual

VCB- As per OEM Manual

Sl. No.	Control activity	Frequency of checks
1	Cleaning of bus bars, insulators, etc.	Yearly
2	Relays testing	Yearly
3	Tightness of all electrical and earthing connections	Yearly
4	Checking of indicating meters	Yearly
5	Check for change-over facility, if provided	Yearly
6	Check operation/Indications in Off-load conditions of VCB	Yearly
7	Check spring charging of VCB	Yearly
8	Functional Checking (Trip, close, etc.)	Yearly
9	Measurement of operating timings	Yearly
10	Cleaning of insulators and tightness of terminal connections of CB's, CT's, PT's, Isolators, etc.	Yearly
11	Alignment Checking of isolators	Yearly

ANNUNCIATORS

Annunciator provide essential substation condition status information to O&M personnel. Two aspects must be considered:

(1) Correct operation of the annunciator itself and

(2) Integrity of the alarm devices and interconnected wiring.

Annunciator operation is easily tested using the “Test” button provided on most annunciator and is considered an “operations” activity. Verifying integrity of the alarm devices and interconnecting wiring requires a “functional test” of these circuits. Functional testing is accomplished by

(1) Resetting the annunciator,

(2) Closing (or opening) contacts at the alarm device, and

(3) Verifying that the correct annunciator window is activated.

2.3.4 DG Set

Diesel engine for Generator set

Sl. No.	Name of the activity	Frequency of checks	Remarks
1	Check engine oil level	Weekly	
2	Drain sediment from fuel tanks		
3	Clean pre- cleaner dust pan & check air cleaner element if require replace elements		
4	Check coolant level if required top up		
5	Drain fuel filter / water separator	Daily	
6	Drain air tank	weekly	
7	Check & correct leaks of fuel, coolant etc	weekly	
8	Change engine oil & oil filter and Bypass filter	Every 6 month or 300 hrs	
9	Adjust injector & valves	First 1500 hrs	
10	Replace rocker cover gasket	First 1500 hrs	
11	Change hydraulic Gov. oil & Aneroid oil	Every 1500 hrs or every 1 year	
12	Clean fuel tank from inside		
13	Clean radiator		
14	Clean & calibrate injectors	Every 6000 hrs or every 2 year	
15	Replace rocker cover gasket		
16	Replace Fuel pump filter screen and magnet		
17	Check fuel pump calibration		
18	Replace aneroid belows & calibrate		
19	Check turbocharger compressor wheel and diffuser if required		
20	Check turbocharger bearing clearance		
21	Tighten manifold nuts or cap screw		
22	Change coolant & descale cooling		

Sl. No.	Name of the activity	Frequency of checks	Remarks
	system		

Alternator

Sl. No.	Name of the activity	Frequency of checks	Remarks
1	Inspect environmental condition & cleanliness	Every 1)250 hrs/6 month, 2)1000hrs / 1 year, 3)10000 hrs/ 2yrs, 4) 30000 hrs / 5 yrs	Alternator
2	Check Ambient temperature (inside & outside)		
3	Inspect complete machine damage, loose parts & earth bond		
4	Test Electrical nominal operating condition & excitation		
5	Inspect condition of windings	Every 1)250 hrs/6 month, 2)1000hrs / 1 year, 3)10000 hrs/ 2yrs, 4) 30000 hrs / 5 yrs	Windings
6	Test insulation resistance of all windings	Every 1)10000 hrs/ 2yrs, 2) 30000 hrs / 5 yrs	
7	Test insulation resistance of rotor, exciter and PMG	Every 1)250 hrs/6 month, 2)1000hrs / 1 year,	
8	Check working of temperature sensor	Every 1)250 hrs/6 month, 2)1000hrs / 1 year, 3)10000 hrs/ 2yrs, 4) 30000 hrs / 5 yrs	
9	Inspect condition of bearings	Every 1) 30000 hrs / 5 yrs	Bearings
10	Clean grease exhaust & trap	Every 1)250 hrs/6 month, 2)1000hrs / 1 year, 3)10000 hrs/ 2yrs, 4) 30000 hrs / 5 yrs	
11	Replace grease in re-greasable bearings	Every 1)4000 to 4500 hrs/6 month,	
12	Inspect sealed bearings	Every 1)4000 to 4500 hrs	
13	Replace sealed & greasable bearings	30000 hrs / 5 yrs	
14	Check working of temperature sensor	Every 1)250 hrs/6 month, 2)1000hrs / 1 year, 3)10000 hrs/ 2yrs, 4) 30000 hrs / 5 yrs	
15	Inspect & tighten all alternator connection & cabling		Terminal box
16	Test AVR & PFC settings		Control & Auxiliaries
17	Test synchronization		
18	Test function of auxiliaries		
19	Replace anti condensation	30000 hrs / 5 yrs	

Sl. No.	Name of the activity	Frequency of checks	Remarks
	heater		
20	Inspect diodes and varistors	Every 1)250 hrs/6 month, 2)1000hrs / 1 year, 3)10000 hrs/ 2yrs	Rectifier
21	Replace diodes and varistors	30000 hrs / 5 yrs	
22	Inspect condition of fan	Every 1)250 hrs/6 month, 2)1000hrs / 1 year, 3)10000 hrs/ 2yrs, 4) 30000 hrs / 5 yrs	Cooling
23	Test condition of air filter (where fitted)	Every 1)250 hrs/6 month, 2)1000hrs / 1 year, 3)10000 hrs/ 2yrs, 4) 30000 hrs / 5 yrs	
24	Replace air filter (where fitted)	Every 1)1000hrs / 1 year, 2)10000 hrs/ 2yrs, 3) 30000 hrs / 5 yrs	

2.3.5 Fire Fighting System

Electrical Motor for Pump Sets & Panel, Sprinkler / Pipe / Valves / Hose pipe

- Check the tightness of all bolts, clamps and connecting terminals.
- Check ground connections at two locations and also at the terminal box. Ensure the Grounding flat/wire is connected with Main earthing grid.
- Check the Bearing lubrication on the following basis:
  (a) Check the condition of lubricating grease by opening of bearing DE & NDE end cover. If required, change the grease.
- Check clearances inside terminal box, terminal box gasket and tightness of the power cables.
- Check the following:
  (a) Paint shade / touch up
  (b) Foundation bolts grouting and tightness
  (c) Motor fan - Check correct direction of rotation as marked on motor permanently. If the motor has a unidirectional fan, ensure that it rotates in the same direction as the arrow marked on the motor.
- Check power and control cable are dressed and glanded properly.
- Check for provision of Resistance temperature detectors for Motor Windings as well as bearings. Also check for proper cabling of these detectors to the respective Switchgears/
- Motor windings, control and power cables continuity check winding resistance of each phase.
- Insulation resistance value of each phase and with respect to earth.

Indicative table on the main maintenance operations:

Sl. No.	Name of the activity	Frequency of checks	Remarks
1	Proper cleaning of Pump Motor set, Panels, piping system & Housekeeping of pump room.	Weekly	
2	Hourly record of delivery pressure, bearing temperatures, Motor Amp. Etc	Daily checks	
3	Check Noise & vibration of pumps, motors, piping etc.	Every 3 Monthly	
4	Alignment of Pump motors	Every 3 Monthly	
5	Lubrication of bearings of Pump Motor set	6 Month	
6	Change of Motor bearings	Every 3 yrs or 40000 hrs whichever is earlier	
7	Pump Overhauled completely for to check the clearance and replaced worn part.	Annually	
8	Calibration of Pressure gauge, pressure switch etc.	Annually	
9	Check Tightening of connection of Motors, panels	Every 6 Month	
10	Check & Replace Contactors, Aux contacts, timers, control fuse if required	Every 6 Month	
11	Check Motor winding & Insulation resistance	Annually	
12	Check & repair leakage in Sprinkler / Pipe / Valves / Hose pipe if required	Every 6 Month / Whenever leakage occurred	

Diesel engine for firefighting pump

Sl. No.	Name of the activity	Frequency of checks	Remarks
1	Check engine oil level	Weekly	
2	Drain sediment from fuel tanks		
3	Clean pre- cleaner dust pan & check air cleaner element if require replace elements		
4	Check coolant level if required top up		
5	Drain fuel filter / water separator	Daily	
6	Drain air tank	weekly	
7	Check & correct leaks of fuel, coolant etc	weekly	
8	Change engine oil & oil filter and	Every 6 month or 300	

Sl. No.	Name of the activity	Frequency of checks	Remarks
	Bypass filter	hrs	
9	Adjust injector & valves	First 1500 hrs	
10	Replace rocker cover gasket	First 1500 hrs	
11	Change hydraulic Gov. oil & Aneroid oil	Every 1500 hrs or every 1 year	
12	Clean fuel tank from inside	Every 1500 hrs or every 1 year	
13	Clean radiator	Every 1500 hrs or every 1 year	
14	Clean & calibrate injectors	Every 6000 hrs or every 2 year	
15	Replace rocker cover gasket		
16	Replace Fuel pump filter screen and magnet		
17	Check fuel pump calibration		
18	Replace aneroid belows & calibrate		
19	Check turbocharger compressor wheel and diffuser if required		
20	Check turbocharger bearing clearance		
21	Tighten manifold nuts or cap screw		
22	Change coolant & descale cooling system		

Note: Items not included in this manual should follow OEM O&M manuals for maintenance. All stand-by equipment to be operated as per mutually agreed programme.

2.3.6 Electrical Main Panels / PDB / APFC panels / MCC panels / Junction box

It is recommended that the following maintenance be performed on a regular basis with the Main panel / PDB/ APFC Panel/ MCC Panel de-energized and incoming power locked out:

- Feel the doors, enclosures, and enclosure sides and dead front surfaces over all circuit breakers and switches with the palm of the hand. Any surface with a temperature which the palm of the hand cannot stand for about 3 seconds may indicate trouble. Heat detectors are also available to detect trouble spots.
- Wipe all bus insulators and vertical bus barriers and vaccum any accumulation of dust.
- Check the following for tightness:
    a. Bus Connections
    b. Power cable connections
    c. Control wire connections
- Inspect all wiring for insulation deterioration, wear or cuts. Replace if necessary.
- Look for wear of the plating on the unit stab fingers and on the vertical bus at the location where the unit stab fingers and on the vertical bus at the location where the unit stabs fingers engage the vertical bus. The plating is part of environmental protection

system for the copper. Oxide and/or other films can form on exposed copper or aluminium, resulting in a poor contact.

- These parts must be replaced when the plating is worn to the point where copper can be seen, because contact resistance becomes higher, increasing the heat generated at the contact point, which, in turn, may lead to arcing and possible bus flashover.
- Check all operating handles and mechanical interlocks for proper operation
- Check and replace defective pilot lamps
- Inspect starter contacts and replace if over half-eroded. Do not dress silver alloy contacts. Replace contact springs at the same time the movable contacts are replaced.
- Look for indications for overheating, arcing or insulation breakdown and replace defective parts.
- Visually inspect all instruments and check instrument calibrations.
- Always replace fuses with those of the same type and rating. Even though another replacement fuse may be physically interchangeable with the original. It may not have the same short circuit interrupting capacity and current limiting ability.
- Operate each switch or circuit breaker several times to ensure that all mechanisms are free and in proper working order.
- Check all devises for missing or broken parts, proper spring tension, free movement, rusting or corrosion, dirt and excessive wear.
- Look for any moisture or signs of previous wetness or dripping inside the PANEL. Condensation in conduits or dripping from outside sources is a common cause of control centre failure. if evidence of moisture is found, seal all cracks and openings and eliminate all sources of moisture such as those which cause a dripping on the PANEL enclosure.
- Check for Tightness of all bolts, clamps and connecting terminals, locking of all the bolts.
- Check the Earthing of Panel and earthing healthiness shall be done for equipment neutral. Check the earthing and non conducting metallic portions.
- Ensure the grounding flat/wire is connected with Main earthing grid.

CIRCUIT BREAKERS

- Check for any physical damage.
- Check for the tightness of all bolts, clamps and connecting terminals, vermin proofing of all holes
- Ensure proper sealing of any extra hole/any gap.
- Check power and control cable are dressed and glanded properly.
- Check for earth connections. Check earth switch/earthing truck interlock with shutter. Also, earthing of the breaker trucks. Ensure the grounding flat/wire is connected with Main earthing grid.
- Check cleanliness of insulators and bushings (including seal-off bushings, wherever applicable).
- Check all moving parts are properly lubricated.
- Ensure space heater connections are proper.
- Check control wiring for correctness of connections, continuity and Insulation resistance values of each pole. Space heater operation, module light if applicable.
- Check for power closing/opening operation manually and electrically, Trip free and anti-pumping operation, three phase auto-reclose operation.

- Check the electrical & mechanical interlocks.
- **Checks on spring charging motor:** correct operation of limit switches and time of charging, Insulation resistance values
- **Checks on CTs:** Ensure that the CT secondary is not open circuited. Check all CT connections. Also ensure that CT secondary is grounded.
- Check the condition of PT fuse, continuity and health check.
- All functional checks in different modes viz. Local/Remote, Auto/Manual.
- Check breaker operation with protective relays.
- Check for annunciators in the control room.

ADDITIONAL CHECKS FOR AIR-BLAST CIRCUIT BREAKERS

- Calibration of pressure gauges and pressure switches.
- Air leakage test.
- Adequacy of air receivers, for the designed set of operations.
- Operation of breaker (by pneumatic and electric impulses) at the pressure specified.
- Time of blowing-out of air during closing and opening operation.
- Check on 'drying air device'.
- Blocking of opening at low pressure.
- Pneumatic pole discrepancy protection.
- Safety valve settings.
- Check the compressed air supply system and pressure switch settings.

Sl. No.	***Name of the activity***	***Frequency of checks***	***Remarks***
1	General cleaning of panels	Every Week	All faulty spare parts should be replaced immediately.
2	Check Proper operation of ACB, SFU, MCCB etc.	Every Month	
3	Check healthiness of protection system of ACB in MCC.	Every 3 Month	
4	Check looseness of connection in panels, PDB etc	Every 6 Month	
5	Check operation of APFC relay & healthiness of capacitors banks.	Every 3 Month	
6	Check operation of UPS in online mode & Bypass mode.	Every 6 Month	
7	Check healthiness of batteries & Back up.	Every 6 Month	

2.3.7 LIFT/Elevator

Sl. No.	**Name of the activity**	**Frequency of checks**	**Remarks**
1	Check and clean car door sill& landing door sill.	Every week	
2	Check and replace if necessary lights	Every 3 month	
3	Check operation of elevator control system.	Every 3 month	
4	Check proper operation of car operating panel & landing operating panel.	Every 3 month	

Sl. No.	**Name of the activity**	**Frequency of checks**	**Remarks**
5	Check & if necessary replace all limit switches, control interlock for safety operation.	Every 6 month	
6	Check condition of Hoist pulley, wire rope and other parts for wear & tear, if necessary replace it.	Every Year	
7	Check operation of machine drive	Every Year	

2.3.8 CABLES

Maintenance tests can detect problems in cables that are approaching failure without accelerating the insulation deterioration process due to operational or environmental conditions. Except for infrared scanning, de-energize the cable circuit before maintenance.

Sl. No.	**Name of the activity**	**Frequency of checks**
1	Equipment Ratings	Every 5 year
2	Visual inspection of cables	Every month
3	Checking and recording or IR values of all cables with megger of suitable range.	Every month
4	Checking all cable terminals & joins for overhauling / loose connections and tightening, terminating, rejoining, if required	Every month

2.3.9 EARTHING SYSTEM

Sl. No.	**Name of the activity**	**Frequency of checks**
1	Checking of all earthing connections, joints and cleaning and tightening thereof	Every 3 month
2	Putting adequate quantity of water in earth pits.	Every 3 month
3	Checking and recording of earth resistance of all points, pits and taking corrective action to improve it, if required.	Every 3 month

2.3.10 METERS

Sl. No.	**Name of the activity**	**Frequency of checks**
1	Checking of each meter (analog/digital) for its correct operation	Every year
2	Calibration of indicating meter.	Every month

Maintenance schedules listed in the manual are to be adhered by the Operation and Maintenance staff and Observation so made during such inspections are required to be

properly recorded giving complete details of the activity, observed parameters, remarks/views about the inspection carried out. Such observations are to be duly signed by the Maintenance engineer in-charge and deviations with reference to acceptable norms/limits are to be approved by the competent authority having requisite experience and expertise since this is considered very vital for providing reliable and quality power to the consumers.

2.3.11 Preventive maintenance:

- The Contractor shall plan the day-to-day and the preventive maintenance shall be done as per manufacturer's O&M manuals.
- Checks to be performed daily
    a) Tightness
    b) Working of gauges and other measuring devices.
- Checks to be performed weekly
    a) Pipeline leakages
    b) Tightness of all electrical connections
    c) Tightness of all cable connections
    d) Operation of all sluice and butterfly valves, scour and pressure relief valves, gates and air valves.
    e) Contractor shall be equipped with dewatering pump of required capacity of pumping sewage; the unit shall also consist of power generating set.
    f) All parts of the machinery and electrical equipments liable to wear and tear shall be replaced by the contractor as per direction of engineer in charge.
    g) Current and voltages in all electrical equipments.
- Checks to be performed monthly
    a) Gland packing
    b) Wear and tear of moving parts.
    c) Maintenance of Valve actuator, Battery, etc. shall be carried our as approved by the Engineer-in-charge.
- Checks to be performed bi-annually
    a) Battery and Battery charger
- Checks to be performed annually
    a) Overhauling requirement of all equipment
    b) Testing and calibration of all instruments

2.3.12 Safety

- The Contractor shall be responsible for safety of his staff during O & M of the Plant and shall procure, provide and maintain all safety equipment necessary for satisfactory O & M such as gasmasks, gloves, boots, mats etc.,
- The Contractor shall utilize safety awareness procedures in every element of operation and maintenance.
- The Contractor shall emphasize site safety including adoption of

  (a) Safe working procedures

  (b) Cleanliness and care of the plant as a whole

  (c) Accident and hazardous conditions prevention and reporting.

  (d) Safe practice while working near digester / gas holder areas

- The Contractor shall impart safety training to all members at regular intervals, especially for new comers.
- The Contractor shall provide Notice boards and display boards at appropriate locations detailing precautions to be taken by O & M personnel to work in conformity to regulations and procedures and by the visitors to the Plant.
- The Contractor shall notify the Engineer in Charge representative immediately if any accident occurs whether on-site or off site in which Contractor is directly involved and results in any injury to any person, whether directly concerned with the site or a third party. Such initial notification may be verbal and shall be followed comprehensive report within 24 hours of the accident.

2.3.13 Documents Records / Log Book

- The contractor will be responsible for keeping up to date records of documents including History Card for equipment and maintaining every day log book relating to various analysis performed and to prepare and submit a daily report and also maintain complaints register.
- The contractor shall maintain an updated log book and details of operational parameters like H.T. Voltage, Current, Power Factor, energy meter reading, pressure; daily consumption report, summary of operation and other reading required are recorded in every shift at regular interval as per Client's requirement.
- Printing of log sheets, registers and all necessary stationery required for maintaining records of operations and maintenance has to be arranged by the Contractor at his cost.

2.3.14 Monthly Report:

- Monthly statements on all the records, data maintenance schedules, spares available, manpower list available at site, routine test result, monthly consumable and repair maintenance during the month shall be furnished by the contractor.

2.3.15 Repair / Rectification Of Defects And Deficiencies

i) **Complaints**

The Contractor shall receive calls for any and all problems experienced in the operation of the system under this contract, attend to these within 2 hours of receiving

the complaints and shall take steps to immediately correct any deficiencies that may exist. Corrective actions to problem experienced, if takes longer time, shall be complied 100% by during next business hours.

ii) Repairs

All equipment that require repairing shall be immediately serviced and repaired as defined below. Since the period of Maintenance runs concurrently with the defects liability period, all replacement parts and labour shall be supplied promptly free-of-charge to the Owner.

a) Minor rectifications - 2 to 4 hours

b) Major rectifications - 12 to 24 hours

iii) Extension of time limit

Notwithstanding anything to the contrary as specified above, if the nature and extent of any Defect or deficiency justifies more time for its repair or rectification than the time specified herein, the Contractor shall be entitled to additional time in conformity with Good Industry Practice. Such additional time shall be determined by the Owner's Engineer and conveyed to the Contractor and the Owner with reasons thereof.

iv) Emergency Repairs/Restoration

Notwithstanding anything as mentioned above, if any defect, deficiency or deterioration in the Project Components poses a hazard to safety or risk of damage to property, the Contractor shall promptly take all reasonable measures for eliminating such danger.

2.3.16 All Inclusive Maintenance Contract

a. Scope.

The AMC shall cover all the items installed by the contractor including replacement of all switches, fittings etc. consumable like bulbs, tubes, oil etc. shall be excluded.

b. Routine Preventive Maintenance Schedule to be submitted

i. Schedule to cover manufacturer's recommendation and/or common engineering practice (for all plant and machinery under contract).

ii. Plant and machinery history card giving full details of equipment and frequency of checks and overhaul.

iii. Monthly status report.

iv. Entire Electrical installation to be repainted in fourth year (from commissioning) before the expiry of operation and maintenance contract.

c. Uptime during maintenance contract

i. 99.9% uptime of all systems under contract.

ii. Up time shall be assessed every month and in case of shortfall during any month the contract shall be extended by a month.

iii. There shall be no reimbursement for the extended period.

iv. Break-downs shall be attended to within ten hours of reporting.

d. Manpower

i. Adequate number of persons to the satisfaction of the Engineer In-charge shall be provided including relievers.

ii. Statutory requirements of EPF, ESIC and other applicable labour legislations to be complied with; and monthly certification to that effect to be submitted.

iii. Duty allocation and Roaster control shall be contractor's responsibility.

iv. No overtime shall be payable by Owner for any reason whatsoever.

e. Shut Downs

i. Routine shut downs shall be permitted only as allowed by the Chief Engineer.

ii. Contractor shall be at liberty to carry out routine maintenance as and when required but with prior permission of the Owner.

2.4 HVAC

The Contractor shall be required to operate and maintain the system designed, supplied, installed, tested and commissioned by him, for the duration of Five years. The Operation and Maintenance Contract shall be comprehensive type. The Contractor shall take full responsibility for the care of the mechanical services/ system and other allied systems during the contract period till it is handed over to the employer at the end of 5 years of O&M.

If any loss or damage occurs to the treatment works or to any other system, during the period for the contractor is responsible, the contractor shall rectify such loss or damage, at his cost, so that all the mechanical services/ system conforms to its condition when the contractor took possession of the treatment works at the commencement of the contract.

The Contractor shall be responsible for, but not limited to, the following:

- Providing the required staff, but not less than the minimum specified numbers/ level, during operation and maintenance period and additional staff as per requirement

during periodic maintenance and in emergencies.

- Providing all required consumables such as spares, tools, tackles & Equipment and consumables required for functioning of equipment.
- Establish work control procedures including preventive and corrective maintenance so that the entire mechanical services/ system shall work in automatic mode and/or semiautomatic at all times.
- Submission of monthly report.
- The Contractor shall be solely responsible for the safety and security of the goods in the store and will be responsible for any loss or damages in stores for any reason.
- Proper maintenance and housekeeping along with provision of all tools & equipment.
- Insurance: The Contractor shall, without limiting his or the Employer's obligations and responsibilities undertake the following;
- The insurance shall be at the Contractor's cost and shall cover the Employer and the Contractor against all losses or damages from whatsoever cause arising from the start of the O&M until the date of completion of O&M in respect of the facility or any section or part thereof as the case may be.
- Insurance shall cover for all the Civil, mechanical, electrical and instrumentation works together with material to the full replacement cost.
- Any amount not insured or not recovered from the insurer shall be borne by the Contractor.

2.5 ICT

The bidder shall be responsible for the overall management of the IT and Non-IT Infrastructure and enabling infrastructure maintenance services / facility management services at all Site locations for ensuring adherence of SLAs. Bidder shall provide the Operations and Maintenance Services for a period of 5 years following the award of the contract. The bidder shall be responsible for following:

1. The Successful bidder shall be responsible for operating and monitoring the RSCL network for any fault/ issues/ failure such that the citywide network can be maintained close to 100 %. For better Network availability, preventive maintenance activity is required to be carried out at least once in a quarter which includes configuration backup and software up-gradation/updation. Up-gradation/Updation will be part of the back to back warranty support from the OEM.
2. Successful Bidder is required to submit preventive maintenance schedule of all equipment to RSCL After performing preventive maintenance activities, successful bidder is required to submit the report of the same. All such activities should be done preferably during non-working hours.
3. As part of the Operations and Maintenance services, the bidder shall provide support for the software, hardware, and other infrastructure provided as part of this RFP. The bidder shall also provide services comprising of but not limiting to the following:

a) Operations and maintenance services for the IT and Non-IT Infrastructure supplied or commissioned by the bidder at the designated locations as defined in this RFP document at various locations during the contract period.
b) Support for each end point where the utility such as Surveillance, Wi-Fi, Display boards, sensors etc.
c) The services shall be rendered onsite from the designated premises. To provide the support at the locations where the infrastructure will be rolled out.

4. The scope of work under O&M is not limited to the IT and Non-IT Infrastructure components deployed by the successful bidder but it also includes O&M for any additional equipment/devices/hardware/software related to the project supposed to be procured during the contract period of 5 years by RSCL/AMC.

OEM Support:

1. The bidder should submit authorization certificate of Original Equipment Manufacturer (OEM) (or multiple OEMs) specific to the bid. The bidder should have a back-to-back support agreement/arrangement for services including supply of spare parts etc. with the OEMs of products like Networking devices, Servers, CCTV cameras, Digital panel/board etc. which includes the post-sales support activities for the entire project period.
2. The bidder shall furnish undertaking confirming compliance to technical specifications and complete functional requirements as stated in the bid document, interoperability and performance guarantee for the complete solution, comprising of overall proposed solutions taking complete ownership and responsibility of the complete solution and all equipment proposed from OEMs.
3. Operation and maintenance of entire project (IT, Non-IT and Software) as per the scope of work for the period of 5 years from the date of Go Live.
4. Actual power/electricity connections (required) will be arranged by bidder and expense in this account will be provided by RSCL on quarterly basis. However, extension till the last mile/actual utility will be in the scope of successful bidder.
5. The ROW (Right of Way), as required for the digging and laying of underground cables and foundations shall be arranged by bidder. RSCL will assist to bidder for obtaining the required permissions.
6. Government of Odisha and Rourkela Smart City is in the process of coming up with a state-wide Surveillance project, successful bidder will be responsible for integration entire solution procured under this project with any such centralized system that may come in the future.

Warranty Support:

As part of the warranty services bidder shall provide:

1. Bidder shall provide a comprehensive warranty and on-site free service warranty for 5 years from the date of FAT for all equipment supplied under the project.
2. Bidder shall obtain the 5-year product warranty and 5 year onsite free service warranty from OEM on all licensed software, computer hardware, peripherals, networking equipment and other equipment for providing warranty support.
3. Bidder shall provide the comprehensive manufacturer's warranty and support in respect of proper design, quality and workmanship of all hardware, equipment, accessories etc.

covered by the RFP. Bidder must warrant all hardware, equipment, accessories, spare parts, software etc. procured and implemented as per this RFP against any manufacturing defects during the warranty period.

4. Mean Time to Restore (MTTR): If during contract period, any equipment has a hardware failure on four or more occasions in a period of less than three months, it shall be replaced by equivalent or higher-level new equipment by the bidder at no cost. For any delay in making available the replacement and repaired equipment for inspection, delivery of equipment or for commissioning of the systems or for acceptance tests / checks on per site basis, RSCL reserves the right to charge a penalty.
5. During the warranty period bidder, shall maintain the systems and repair / replace at the installed site, at no charge, all defective components that are brought to the bidders notice.
6. The bidder shall as far as possible repair/ replace the equipment at site.
7. All solutions must be open standards, interchangeable, scalable and upgradable with other vendors.
8. Warranty should not become void, if RSCL buys, any other supplemental hardware from a third party and installs it within these machines under intimation to the bidder. However, the warranty will not apply to such supplemental hardware items installed.
9. The bidder shall carry out Preventive Maintenance (PM), including cleaning of interior and exterior, of all hardware and testing for virus, if any, and should maintain proper records at each site for such maintenance. Failure to carry out such PM will be a breach of warranty and the warranty period will be extended by the period of delay in PM.
10. Bidder shall monitor warranties to check adherence to preventive and repair maintenance terms and conditions.
11. Bidder shall ensure that the warranty complies with the agreed Technical Standards, Security Requirements, Operating Procedures, and Recovery Procedures.
12. Bidder shall have to stock and provide adequate onsite and offsite spare parts and spare component to ensure that the uptime commitment as per SLA is met.
13. Bidder shall develop and maintain an inventory database to include the registered hardware warranties.

Network operations, Services and Maintenance

The services as per the scope of the contract shall include maintaining the network equipment; ensuring running of the services (As laid down in the Scope of Work) with availability in line with the SLA and Round-the-clock Network and Equipment monitoring. This shall include:

1. Equipment Configuration Management
2. Regular review of Network and its components, end point devices and nodes
3. Regular reports as required by RSCL and authorized agency
4. Successful bidder will have to do operational liasoning with stake holders (link providers, state government, local bodies, third party agencies / consultants appointed/identified by RSCL) to keep the link up & running and any other power/supply requirements.
5. Bidder has to provide UPS & Battery Health Reports in every quarter after completing proactive maintenance every quarter.
6. Under the scope of this RFP, the successful bidder has to setup a local monitoring & control centre at Rourkela Stadium:

a) Successful bidder has to ensure proper earthing as per IS-3043 at any point of time during O&M Operations.
b) Cabling with proper tagging as per cabling standards with network diagrams need to be maintained at CCC.
c) Bidder shall establish a call centre /contact centre in case of any escalations & service resolutions.

Alarm Correlation & Root Cause Analysis Capabilities

a) Solution should provide alarm correlation and facilitate reduction of total number of alarms displayed by means of intelligent alarm correlation, suppression and root cause analysis techniques built in to the system. The system must ensure reduction in MTTR by means of advanced event correlation, filtering and root cause analysis.
b) Ability to apply severity to alarms according to predefined rules.
c) It should be possible to add description to the alarms.
d) The system should be able to clearly identify configuration changes as root cause of network problems
e) It should be possible to convert Critical Alarms into Incidents for auto ticket generation.

Network Fault and Performance Management

a) The Network Management function must monitor performance across heterogeneous networks from one end of the enterprise to the other.
b) The Network Management function should have a graphical topological display of all discovered network devices in real time.
c) The proposed Network Fault Management solution must also provide network asset inventory reports
d) The proposed Network Fault Management solution must support extensive discovery mechanisms and must easily discover new devices using mechanisms such as SNMP Trap based discovery. It must also allow for inclusion and exclusion list of IP address or devices from such discovery mechanisms
e) The proposed solution must provide sufficient reports that identify unused ports in the managed network
f) It should show live interface connections between discovered network devices and must be able to do mapping of LAN and WAN connectivity with granular visibility up to individual port levels.
g) It should be able to automatically generate a notification in the event of a link failure to ensure proper handling of link related issues.
h) The proposed solution must scale to large networks while supporting a single web interface for access to reports.
i) Should be able to present the reports through web and also generate “pdf” / CSV / reports of the same.
j) The solution should allow aggregation of historical data.

Service level Management

a) Solution should support comprehensive SLA management platform
b) Manage service levels for delivery and support of business services
c) Must allow creating and applying various operational level parameters to Incidents, Requests, Changes, and Release management modules.
d) Real-time visualization of service level targets, agreement compliance data, penalties and rewards.
e) The SLM module should integrate with incident and problem management to automate escalation, and notification activities based on response and resolution targets
f) It should also integrate with change management to provide access to service level agreement details, implementation windows, change blackout periods, and availability requirements
g) The application should have a predefined/customizable field to indicate & track the progress/status of the lifecycle of ticket(s). It should contain predefined status codes and allow defining new status codes.
h) The tool should provide an audit trail, tracking & monitoring for record information and updates from opening through fulfillment to closure For example: IDs of individuals or groups opening, updating & closing records; dates / times of status & activities updates, etc.

License Management

a) All the software licenses should be in the name of Rourkela Smart City Limited, Rourkela.
b) Successful bidder shall keep the record of all the software licenses and track software usage throughout the IT setup so as to effectively manage the risk of effective usage of software's.
c) The successful bidder shall avoid the unauthorized usage of Licensed Software. In the event of any claim asserted by Third Party of Infringement of Copyright, Patent or Trademark arising from the use of IT components or software, the successful bidder shall be entirely responsible to extinguish such a claim. If the successful bidder fails to comply and the SCDAL is required to pay the compensation to the Third Party resulting from such infringement, the O&M agency shall be responsible for the compensation including all expenses, court costs and lawyer fees.

MIS Reports

The successful bidder shall submit the reports on a regular basis (the reports may be soft copy / hard copy or both, as required by RSCL from time to time) in a mutually decided format. The following is only an indicative list of MIS reports that may be submitted to the RSCL:

a) Equipment utilization
b) Overall Network Bandwidth Utilization.
c) Summary of resolved, unresolved and escalated issues / complaints.
d) Component wise Report (Server, Network, Security devices, other utility hardware, Backup, Website Updation, etc.)
e) SLA Reports
f) Log of preventive / scheduled maintenance undertaken
g) Any other report as may be required from time to time

Database Administration & Management Services:

The activities shall include, but not limited to the following:

1. End-to-end management of different database(s) to be deployed under this project on an ongoing basis to ensure smooth functioning of the same.
2. Management of changes to database schema, disk space, storage, user roles.
3. Conduct code and configuration reviews to provide tuning inputs to the State / User Department in order to improve the application performance or resolve bottlenecks if any. The DBA is expected to monitor the performance parameters of the database and identify bottlenecks, security flaws. etc., and suggest improvements to the developer. The DBA is also expected to troubleshoot database related issues in coordination with the developer
4. Performance monitoring and tuning of the databases on a regular basis including, preventive maintenance of the database as required.
5. Regular backups for all databases in accordance with the backup and archive policies and conduct recovery whenever required with appropriate permissions.
6. Continuous monitoring and periodic review of Database Logs, to identify performance bottlenecks, suspicious activities, signs of compromise, etc.
7. Use of DBA tools related to performing database creation, maintenance, and database monitoring tasks.

O&M of Physical Infrastructure:

All the devices installed as part of the physical infrastructure should be monitored and managed on a 24x7x365 basis for period of 5 years (including the spares and consumables). The physical infrastructure management and maintenance services shall include, but not limited to the following:

1. Operation and management of Fire Alarm & Detection System (FADS) and entire sub components.
2. Monitoring and managing safety and surveillance equipment like CCTV, Access Control, Smart Display, PA System etc at the Birsa Munda Stadium and central CCC.
3. Material inward/ outward control as per policies set by the RSCL.
4. Reporting incidents to the RSCL.
5. Co-ordinate with respective trusted personnel and communicate with authorized maintenance personnel for various utilities at the Birsa Munda Stadium as required.
6. Vendor Co-ordination for various physical Infrastructure components
7. Component that is reported to be down on a given date should be either fully repaired or replaced by temporary substitute (of equivalent or higher configuration) within the time frame indicated in the Service Level Agreement (SLA). In case the selected bidder fails to meet the above standards of maintenance, there will be a penalty as specified in the SLA.
8. The selected bidder shall also maintain records of all maintenance of the system and shall maintain a logbook on-site that may be inspected by RSCL or authorized authority.
9. CCTV footage is to be kept to meet legal, regulatory, ISO Policies compliance requirements. The record retention period shall be as per policies of RSCL.

10. Ensure availability of the physical Infrastructure including Power, Cooling, CCTV, Access Control, Intelligent Racks, Fire detection systems and other components included as part of physical Infrastructure related services.
11. For the Physical infrastructure installed at site locations such as Junction boxes, Racks casings etc. the Successful bidder will have to keep a check of such items and maintain the same from weather conditions, rodents etc. for the entire duration of the contract.
12. Proactive and reactive maintenance, repair or replacement of defective components (IT and Non-IT/ Hardware and Software) related to Physical Infrastructure systems and subsystems. The cost of repair and replacement shall be borne by the selected bidder. IT and Non-IT hardware here refers to systems such as IT and non-IT hardware and software being used for maintaining and monitoring Physical Infrastructure.
13. The selected bidder shall have back-to-back arrangement with the OEMs and shall provide a copy of the service level agreement signed with respective OEMs.
14. The Bidder shall maintain documentation for installation, testing, commissioning of any system/sub-systems that is installed or upgraded.
15. Acceptance test shall be carried out for any system that is installed and/or upgraded.
16. The bidder shall carry out comprehensive fire drills as per Policy/Guidelines specified by RSCL and submit drill reports to RSCL on regular intervals.
17. Bidder shall record all the incidents/issues related to physical infrastructure services, security, systems and Sub-systems.
18. The bidder shall provide training to resources deployed at periodically.
19. Full compliance to all the policies, procedures, processes, guidelines, Government- Acts, Rules & Regulations, etc. The bidder shall provide full compliance/adherence of all activities performed by them, to the aforementioned statutes, without any additional cost to RSCL.
20. The successful bidder will be responsible for the integration of the Cameras with the NVR/DVR and ensure that at least 30 days CCTV Footage is stored on the NVR and backup of CCTV footage beyond 30 days should be taken on existing SAN/Tape Library.

Manpower Requirement:

1. The minimum requirement of manpower resources, their qualification and responsibility of each resource is given below. The bidder has to ensure that appropriate qualified manpower with requisite skill sets is deputed for the project.
2. Birsa Munda Stadium is only operational when there is any sport or cultural events are planned. This may be for few days or weeks in a month, hence Manpower deployment is not very much required but supports on system & solutions are required on call basis and demand basis.
3. In case of any events then SI system engineer required for smooth functioning of all ICT components and solutions.
4. SI shall provide the FDAS, CCTV Experts & other ICT components resource within 24 Hours of notice.

SLA Purpose

The purpose is to define the levels of service provided by SI to the RSCL for the duration of the contract. The benefits of this are

A. Start a process that applies to Authority and SI attention to some aspect of performance, only when that aspect drops below the threshold defined by the Authority
B. Help the Authority control the levels and performance of SI's services.
C. The Service Levels are between the Authority and SI.

Service Level Applicable

SLA would be applicable during implementations phase and in operations & maintenance phase of the project. The penalties shall be applicable on Operations & Maintenance cost of the project calculated quarterly. SLA would be majorly applicable on below mentioned category but not limited to:

A. Implementation Phase Related Performance Levels
B. Fire Alarm & Detection System
C. Digital Signage's (Smart Display)
D. Public Address System
E. Power Supply & Power Backup of ICT Components
F. Connectivity - OFC/Copper and other cabling system
G. Help-Desk

Service Levels Monitoring

The Service Level parameters shall be monitored on a periodic basis, as per the individual parameter requirements. Bidder shall be responsible for providing appropriate web based/ any other online SLA measurement and monitoring tools for the same. SI shall be expected to take immediate corrective action for any breach in SLA. In case issues are not rectified to the complete satisfaction of Authority/RSCL, within a reasonable period of time defined in this RFP, then the Authority shall have the right to take appropriate penalizing actions, or termination of the contract.

Sr. No.	Description of Equipments	UP-TIME
1	Fire Alarm & Detection System (FADS)	99.99% Per Month
2	CCTV Camera	99.60% Per Month
3	Database/Application/Backup Server	99.99% Per Month
4	Routers/Switches/Hubs/ OFC/Copper/Connection Cables - Networking Gears	99.70% Per Month
5	Signage's / Smart Display	99.00% Per Month
6	Public Address System	99.00% Per Month
7	UPS & Power Backup Unit for ICT Components	99.00% Per Month

Penalties

Sr. No.	ICT Components	Unit	Penalty Rate
1	Fire Alarm & Detection System (FADS)	Per Hour /Unit	Rs. 500
2	CCTV Camera	Per Hour /Unit	Rs. 200
3	Database/Application/Backup Server	Per Hour /Unit	Rs. 200
4	Routers/Switches/Hubs/ OFC/Copper/Connection Cables - Networking Gears	Per Hour /Unit	Rs. 200
5	Signage's / Smart Display	Per Day/Unit	Rs. 200
6	Public Address System	Per Day/Unit	Rs. 100
7	UPS & Power Backup Unit for ICT Components	Per Hour /Unit	Rs. 100

2.6 Fire Fighting

2.7 Civil and Structural Works

2.8 Plumbing, Water Supply and Sewerage

All relevant materials, works and construction operations shall confirm to CPHEEO Manual on Operation and Maintenance of water supply systems , 2005, MoUD, GOI, NBC and Good Industry Practice to the satisfaction of Employer's Engineer for Potable water supply rising mains and distribution networks, Recycle rising mains and distribution networks including valves, specials, flow meters etc.

The bidder shall be responsible for the overall management of the plumbing, water and sewerage Infrastructure and enabling infrastructure maintenance services / facility management services at all Site locations for ensuring adherence of SLAs. Bidder shall provide the Operations and Maintenance Services for a period of 5 years following the award of the contract. The bidder shall be responsible for following:

Successful Bidder is required to submit preventive maintenance schedule of all equipment to RSCL After performing preventive maintenance activities, successful bidder is required to submit the report of the same. All such activities should be done preferably during non-working hours.

Internal plumbing & sanitary Installations

- The responsibility includes routine inspection of the system and rectification of any type of leakages in the pipe line, fixtures etc.
- Rectification of any leakages in the pipe line shall be repaired within 4 hours.

- Damages or leakages identified in the fittings such as bib cock, stop cock etc. shall be repaired or replaced immediately.
- For any blockage in pipe line, should be cleared immediately
- Sufficient pressure shall be ensured all time.
- Cleaning of over head tanks once in every two months and cleaning of UGT tank once in every year.

2.9 Storm Water Drainage

The system shall be maintained upto the Satisfaction of the Engineer In charges as per relevant standards. Suitable number of personal shall be deployed as per the standards. Periodic maintenance shall also be carried out for normal wear and tear of the system to the satisfaction of the Engineer In charge.

Drainage Network

Contract has to ensure there is no chocking of water at any point of time. Any chocking noticed shall be rectified within 1 hour.

Ground Water Recharge Structure

Maintenance activity	Weekly	Yearly
Removal of Silt deposits	●	
Cleaning of filter materials		●

2.10 Road

All materials, works and construction operations shall conform to the Specifications for Road and Bridge Works (Fifth Revision, April 2013), issued by the Ministry of Road Transport & Highways (MoRT&H) and the relevant IRC publications. Where the Standards and Specifications for a work are not given, Good Industry Practice shall be adopted to the satisfaction of the Employer's Engineer.

Nature of Defect or Deficiency		Time Limit For Repair/Rectification
ROADS		
(a)	**Carriageway And Paved Shoulders**	
(i)	Breach or blockade	Temporary restoration of traffic within 24 hours; permanent restoration within 15 (fifteen) days
(iii)	Pot holes	24 hours
(iv)	Any cracks in road surface	15 (fifteen) days
(v)	Any depressions, rutting exceeding 10 mm in road surface	30 (thirty) days
(vi)	Bleeding/skidding	7 (seven) days
(vii)	Any other defect/distress on the road	15 (fifteen) days
(viii)	Damage to pavement edges	15 (fifteen) days
(ix)	Removal of debris, dead animals	6 hours

(b)	**Granular Earth Shoulders, Side Slopes, Drains And Culverts**	
(i)	Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway)	7 (seven) days
(ii)	Edge drop at shoulders exceeding 40 mm	7 (seven) days
(iii)	Variation by more than 15% in the prescribed side (embankment) slopes	30 (thirty) days
(iv)	Rain cuts/gullies in slope	7 (seven) days
(v)	Damage to or silting of culverts and side drains	7 (seven) days
(vi)	De-silting of drains	24 hours
(vii)	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	**Road Side Furniture Including Road Sign And Pavement Marking**	
(i)	Damage to shape or position, poor visibility or loss of retro-reflectivity	48 hours
(ii)	Painting of km stone, railing, parapets, crash barriers	As and when required/Once every year
(iii)	Damaged/missing road signs requiring replacement	7 (seven) days

2.11 Landscaping Works

General

i. The Contractor shall maintain the landscape for a two-year period after the date certified by the Landscape Architect that the work has been satisfactorily completed (issue of Certificate of Completion).
ii. The extent of the landscape to be maintained by the Contractor shall be deemed to cover and include all soft landscape areas within the overall project boundaries as shown on the drawings including all existing soft landscape not affected by the contract works and retained intact or nearly so through the end of the contract period as well as all the landscape works covered in the contract scope of works. No additional maintenance charges will be allowed unless specifically agreed to by the Landscape Architect in writing.
iii. The Contractor shall ensure that a senior qualified supervisor is made available for organising and running the maintenance programme. The Contractor shall also have available an experience foreman who can supervise the workers on a day-to-day basis. An adequate trained labour force of at least 3 workers must be available for routine work and they must be on site for at least half a working day, 5 days per week during the maintenance period. Additional grass cutting operators will be needed to ensure adequate cutting and cleaning.
iv. The Contractor's Supervisor shall inspect the site once per week during the maintenance period and shall prepare a brief schedule of operations required for the coming week. The format for the schedule of operations will cover each distinct areas of the site such as frontage, rear, courtyard, roof, interior, etc. The schedule shall describe the operations the Contractor intends to carry out in the coming week to cover the items listed in the specification and to ensure that the current weather conditions and growing performances, insect attack, etc is taken into account.

v. A copy of this schedule is to be submitted to the Landscape Architect and Employer every week so that a running record of proposed operations can be checked at the maintenance inspections each month. If in the opinion of the Landscape Architect the maintenance works have not been satisfactorily carried out according to site conditions and the specifications, part of the monthly payment will be withheld until the works have been satisfactorily carried out.
vi. The contractor shall carry out all necessary measures to ensure that all pot plants, trees and shrubs and other plants shall thrive and become established within this period. All landscape areas will be inspected monthly and lists of remedial works issued after each inspection. All items on the remedial lists are to be carried out by the time of the next inspection, ie within one month.
vii. The Contractor shall keep the landscape areas clean and tidy at all times and dispose of all waste materials arising from the cleaning.

Maintenance of Planted Areas

i. The Contractor shall water all trees, palms, shrubs, ground cover, rooted shoots, herbaceous plants and other planting areas as often as necessary to keep the ground moist all around and to the full depth of the roots of the plants to a minimum depth of saturation of:

- 100mm for groundcover

- 300mm for shrubs

- 750mm for trees

ii. Fresh water only shall be used for the Works. Water shall be supplied to the Contractor from agreed points on the site. However, it will be only to necessary for the Contractor to supply his own means of transport from the watering points to the plant beds.

iii. An inspection of watering requirements is to be made by the Contractor at least two times a week in dry weather.

iv. Water shall be supplied using an approved hose or sprinkler so as not to cause compaction or wash-outs of the soil or loosening of plants. The Contractor shall immediately make good any such damage, soil erosion or outwash and plants loosened by erosion are to replanted or if damaged, replaced.

v. All plant beds are to be kept in a weed free condition with a weeding operation once a month. All weeds, stones and rubbish collected from this operation shall be removed from the site to a tip to be found by the Contractor. Herbicides may not be used on this site unless a specific application in writing is made by the Contractor with full back up data on the performance of the chemicals and the particular need for the chemicals use. Approval will in all cases be subject to the Landscape Architect’s decision.

vi. After weeding, at least once per month the soil surface is to be lightly broken up between plants using a pronged fork upto maximum depth of 100mm. Contractor shall Take care not to disturb the root systems of plants. After forking the soil loose, the mulch and loosened soil are to be raked to give an even re-distribution of the mulching materials.

vii. Firming up and adjusting of stakes/ties shall be carried out monthly to ensure that the trees and shrubs are firmly held in the ground. If required guy ropes or tree pits shall be adjusted, tightened or loosened. If tree ties or ropes are rubbing the bark of the trees, the

ties are to be taken off and retied. Any damaged branches are to be carefully pruned and the wounds sealed.

viii. All protective fencing is to be maintained and kept in good condition and in position until the end of the maintenance period.

ix. Trees shall be pruned if dead, rotten or crossed branches are present or to maintain a clear stem up to the specified height using the methods described below. Tree pruning is to be reviewed monthly.

x. All shrubs and ground covers are to be reviewed monthly and pruned as and when required during the Maintenance Period to promote bushy growth and good flowering characteristics. The shrubs shall be checked and all dead wood, broken, damaged or crossed branches shall be cut back, depending on species. Pruning and removal of branches is to be carried out using sharp clean implements to give a clean sloping cut with one flat face. Ragged edges of bark or wood are to be trimmed with a sharp knife.

xi. Pruning for all plants shall be carried out as follows:

- Pruning is to be done with the cut just above and sloping away from an outward facing health bud.

- Removal of branches is to be done by cutting flush with the adjoining stem and in such a way that no part of the stem is damaged or torn.

- Ragged edges of bark are to be trimmed with a sharp knife.

- Any cuts or wounds over 25mm diameter are to be painted with an approved sealant after trimmed.

- All pruning to be cleared up and removed from site after pruning.

xii. All hedges, mat forming herbaceous plants and ground cover plants shall be clipped with shears as often as necessary (at least monthly) to maintain a tidy appearance. Tall hedges are to be cut to forms shown on the drawings. Fertiliser is to be applied to clipped areas around 1-2 weeks after clipping.

xiii. Selective pruning of flowering plants shall be done where special flowering characteristics are required such as for Ixoras, Hibiscus, Allamanda where flowering takes places on twig ends. Heavy clipping must not be used for these species since this will remove future flower buds. Selective pruning by clipping non flowering twigs and leaving flowering twigs is necessary for these plants, and this operation must be done by experienced workers.

xiv. The Contractor shall allow for monthly fertiliser operations during the Maintenance Period. An approved slow release fertiliser shall be applied to each plant at the rate of 50gm per shrub and 200gm per tree, one month after planting and thereafter monthly. After spreading the fertiliser around the base of the plant the granules shall be lightly forked into the soil, and the plant well watered. Herbaceous and ground cover areas shall receive 25mm of approved soil conditioner, evenly spread and mixed with 50gm/m2 of approved slow

release fertiliser, evenly spread over entire area and lightly forked into the soil to break up the top layer, and the area well watered on a month by month basis.

xv. The horticultural requirements of different plants or areas may involve variations to those techniques (such as the use of organic liquid fertilisers for sensitive plants) and variations in method will be authorised as required.

xvi. Heavy feeding plants such as Canna, Heliconia and Lantana shall be dressed with a 25mm mulch of approved organic compost or similar approved compost every 2 months, lightly forked in around the base of the plants.

xvii. Additional mulching layer, 25mm deep to be spread and forked in over all planted areas at 3 monthly intervals.

xviii. The Contractor shall make regular weekly checks to ensure that the plant material is insect and pest and fungus free. No pesticides may be used unless approval from the Landscape Architect is given from the Contractor stating the chemical intended for use; concentration, spraying programme and including full technical details of the product.

Maintenance of Lawn Areas

i. The Contractor shall mow all lawn areas using approved cutting equipment to maintain a close sward to a height of not less than 20mm and not more than 30mm for all grass types.

ii. Mowing shall be carried out generally weekly, except in dry weather and grass shall not be allowed to flower between cuts.

iii. Weekly inspections are to be made to ensure adequate planning of grass cuts to suit growth and weather conditions. All clippings to be gathered up and removed from site.

iv. All grass areas are to be watered by means of sprinklers during dry weather as often as is required to keep the grass green and the soil moist.

v. The Contractor shall provide hoses and sprinklers for use from water points provided. Weekly inspections are to be made to determine the need for water and, in dry weather watering must be done to moisten the soil to a depth of 100mm.

vi. Fertiliser of NPK value 10-15-15 or similar approved be spread at a rate of 40gm/sq m over all grass areas at monthly intervals, using approved spreading equipment to give an overall even spread. Grass areas that have been fertilised shall be watered if no rain falls within 24 hours.

vii. The Contractor shall apply top-dressing of not more than 15mm depth fine sand and granulated compost raked and spread evenly over the lawn areas. The next topdressing shall be applied only after the grass has grown through to a mowable height.

viii. There shall be at least two applications of topdressing during the maintenance period, to be directed by the Landscape Architect appointed by Contractor.

ix. If depressions or bumps over 25mm deep or high in turf areas during the maintenance period these are to be levelled out by lifting the turf and raising the soil level with sand/compost mix or trimming to level grades, followed by re-turfing.

x. Grass areas are to be kept free of weeds, annual grasses, fungus and insect attack and free of stones or other debris throughout the maintenance period as often as is required.

xi. All chemicals used shall be to the approval of the Employer/Employer's representative. Assessment of these operations is to be prepared on the basis of the weekly maintenance inspection chart.

xii. If compaction or consolidation takes place or hard passing or baking of the soil occurs, the soil areas are to be well watered first and lightly loosened by mechanical means such as spiking, slitting or hollow tinning using equipment approved by the Employer/Employer's representative.

Replacement Planting

i. If during the course of the Maintenance Period trees or shrubs or other plants die because of a fault by the Contractor, the Contractor shall replace the plant at no cost to the Employer.

ii. All questions related to responsibility for the replacement planting will be subject to site inspection and agreement of the appointment of responsibility.

iii. This will be done very month at the monthly maintenance inspections.

Final Handover

i. Two weeks before the end of the Maintenance Period a joint inspection shall be held with the Maintenance Agency, Contractor and the Employer/Employer's representative review the requirements for alteration or replacement in order to gain approval for Final Handover.

ii. In order to ensure satisfactory handover procedures, the site meetings held each month between the Contractor and Employer/Employer's Representative will be used to inspect and approve the maintenance works which will be reviewed to ensure adequate work has been done.

iii. At the time of the final inspection, all areas under this contract shall be free of weeds, neatly cultivated and raked, and all plant boxes in good order.

iv. Grass shall be neatly cut and all clippings removed. No bare patches of earth shall be visible in turf or planting areas unless specified (that is rings around tree trunks).

v. If, after this inspection, the Employer/Employer's representative is of the opinion that all work has been performed in accordance with the drawings and specifications, the Employer/Employer's representative will give written letter of acceptance and completion of the project.

vi. If, all or certain portions of the work are not acceptable under the terms and intent of the drawings and specifications, the formal maintenance period for all the work shall be extended at no cost to the Employer/Employer's representative until the defects in the work have been corrected and the work is accepted by the Employer/Employer's representative.