Schedules

Schedule-A (See Clauses 2.1 and 8.1)

Site of the Project

1 The Site

(i) Site of the Project shall include the land, buildings, structures and road works as described in Annex-I of this Schedule-A.

(ii) The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.

(iii) An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2 (i) of this Agreement.

(iv) The alignment plans of the Project are specified in Annex-III. In the case of sections where no modification in the existing alignment of the Project is contemplated, the alignment plan has not been provided. Alignment plans have only been given for sections where the existing alignment is proposed to be upgraded. The proposed profile of the Project shall be followed by the contractor with minimum FRL as indicated in the alignment plan. The Contractor, however, improve/upgrade the Profile as indicated in Annex-III based on site/design requirement.

(v) The status of the environment clearances obtained or awaited is given in Annex-IV.

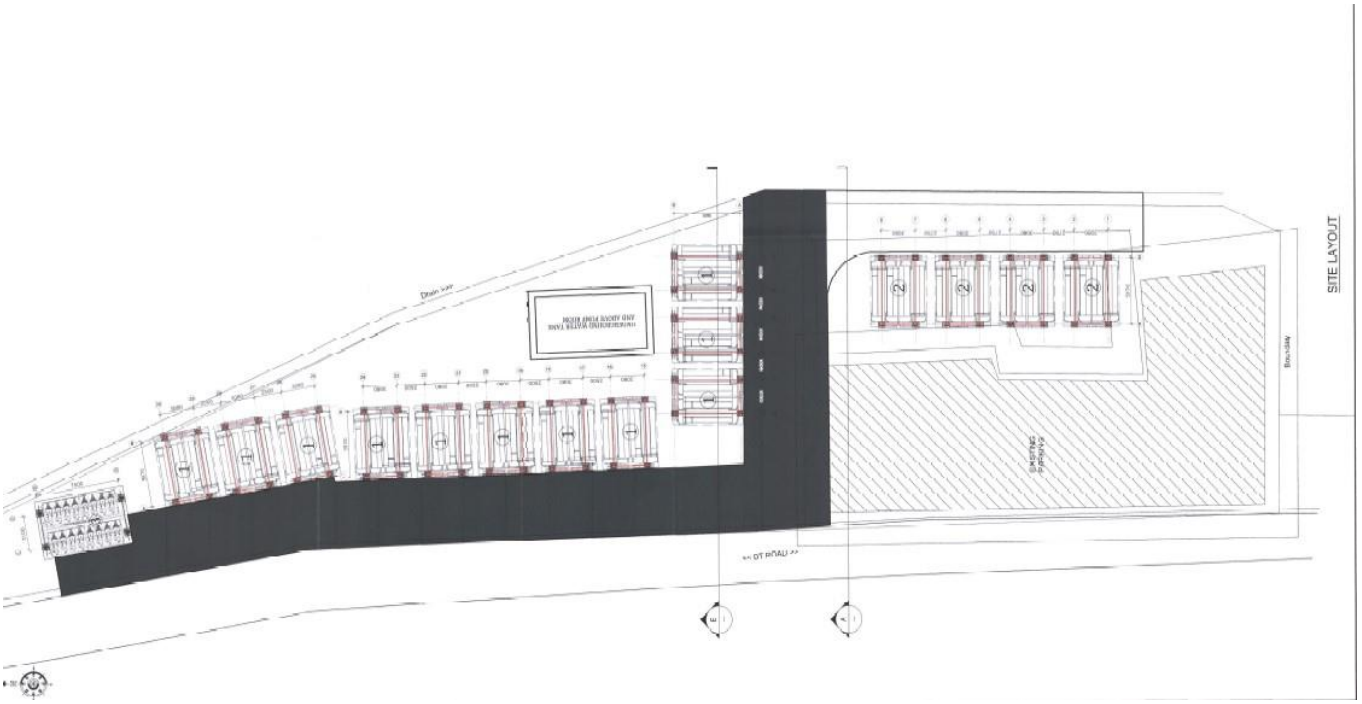
(Schedule-A) Annexure I

1 Background

Traffic congestion in the Nainital during the peak tourist season is common. Vehicles parked on both sides of busy road is a common sight in the city. Therefore, to resolve the issues of parking problem in the place of Nainital, NHIDCL RO Dehradun has been proposed the Automated Multilevel Parking Facilities with the assistance from Govt. of Uttarakhand.

2 The Site

Development of Parking System is located at near National Hotel, Tallital, Nainital, Uttarakhand. Its latitude and longitude are 29.22’43.23” N, 79.27’52.10” E respectively.



Annexure -II

(Schedule-A)

The date of handing over the Site to the Contractor

The 90% of the area shall be handed over to the Contractor on the Appointed Date and remaining 10% within one month.

Annexure –III

(Schedule-A)

Alignment Plans

As specified in Schedule-A (annexure-I) ‘Para’ 2.

Annexure –IV

(Schedule-A)

Environmental Clearances

Not Applicable for this project.

Schedule-B

(See Clause 2.1)

1 Development of the Project work

1.1 The objective here under is to develop Automated Multi Level Parking System to reduce traffic congestion and pollution and improve safety by eliminating the need for drivers to search for parking spaces in the place of Nainital with assistance from State Govt. of Uttarakhand.

State	Description of the work
Uttarakhand	Construction of Automated Multilevel Parking (Rotary System) at near National Hotel Tallital, Nainital in the State of Uttarakhand on EPC Mode including 10 years of Operation & Maintenance of Parking (as a deposit work of Govt of Uttarakhand)" (a) 202 Cars & 96 Bikes (Rotary Parking System for Cars & Bikes)

2 [Rehabilitation and augmentation]

Not Applicable

3 Specifications and Standards

Specifications and standards shall be followed as given in schedule 'D'

(Annexure-I)

Schedule-B

1 Scope of Work

i. The contractor shall carry out total station survey of proposed space of Automated Multilevel Parking and prepare layout plan. Contractor shall prepare and submit other conceptual, architectural drawings to accommodate required number of Cars/Bike. Layout plan and other conceptual, architectural drawings shall be submitted within 15 days after stipulated date of commencement.

ii. The scope of work shall include the Survey, Design, Engineering Construction and Erection, Testing, commissioning of the parking system including painting, lightning, firefighting, landscaping, road works etc. Operation and maintenance services for the electro mechanical Four- Wheeler & Two-Wheeler parking system shall be provided by the contractor. The defect liability period of the Automated Multilevel Parking system will be 10 Years.

iii. The contractor shall submit all the submittals like designs, Good For Construction (GFC) drawings, documents, reports, schedules etc. in minimum six number of hard and six number of soft (CD/DVD) copies.

iv. NHIDCL shall provide soil investigation report to the bidder for design purpose. However, it shall be got re-checked by the bidder at his own cost as per relevant IS code.

v. Design and Drawings prepared by the Agency shall be the property of NHIDCL and Agency cannot issue the same to any other person / organization or use for any other project.

vi. NHIDCL will not be responsible for any lapse/s and /or losses, if so occurs, due to absence of any data /knowledge. The information and site data given in the drawings or mentioned in this tender document are furnished for general information and guidance only and NHIDCL does not take responsibility for their accuracy.

vii. If any requirement arises to transplant/ fell the trees to accommodate the parking system, the agency shall cooperate with NHIDCL in obtaining approvals from the competent body/s for the same and shall continue the work wherever possible without delaying the progress of the whole project.

viii. The Contractor shall make his own arrangement for obtaining electric connection (s) and make necessary payment directly to the concerned department. NHIDCL will assist the Contractor in this regard.

ix. The contractor shall take all necessary precautions/temporary measures to prevent any nuisance or inconvenience to the owners, tenants or occupiers of adjacent properties and to the public in general and to prevent any damage to such properties and any pollution. He shall make good at his own cost and to the satisfaction of the Engineer-in-charge, any damage to roads, paths, underground/overhead services, drainage works or public or private property whatsoever caused by the execution of the work or by traffic brought thereon by the Agency.

x. No labour camp shall be allowed to establish by the bidder in project site. The bidder shall arrange and operate his/their activities accordingly to carry out the project.

xi. Necessary power back up, finished flooring, firefighting system as per NBC norms, electrical cabling including main four-wheeler and two-wheeler parking panel with ELCB, earthing as per approved plans, green measures such as solar heater, energy efficient electrical and mechanical equipment, rainwater

harvesting etc. are also to be provided as per specifications given in schedule 'D'.

xii. The contractor shall provide the structural stability certificate to NHIDCL. However, the checking and vetting of design/drawings shall not absolve the contractor from the responsibilities of any failure in the structural design during construction as well as during the operational stage of the structures.

xiii. Contractor shall barricade entire area and ensure noise control within the permissible limit and install one noise meter essentially.

2 Designated Plinth Area for Automated Multilevel Parking System

SN	Automated Multilevel Parking	Designated Plinth Area (Sqm) (Approx.)
1	Near National Hotel Tallital, Nainital Uttarakhand. (a) 202 Cars & 96 Bikes (Rotary Parking System)	2263

3 Investigation, Planning, Designing for Automated Multilevel Parking

Based on the topographical survey, complete site development and clearance including bushes and natural vegetation's including shrubs (trees) of less than 30 cm girth of the proposed site to the required levels (NGLs) will be the responsibility of the contractor. The disposal of surplus soil, if any, will be disposed of by the contractor under his own arrangements. Additional soil, if required to achieve the desired levels, will be arranged by the contractor under his own arrangement.

Contractor shall carry out the Geo-Technical investigation as per relevant IS code.

Design on appropriate software like STAAD-Pro/ETABS and drawing on a software like Auto CAD including fabrication drawings, bar bending schedule etc. of each and every component of parking/spaces within Scope of work on suitable scale (6 no. of sets of each drawing), including but not limited to:

- Foundation Drawings/Bar bending Schedule
- Column Drawings.
- Beams, plinth beams
- Curved floor plates in plan
- Cantering & shuttering using steel/wooden form work/with all due fitments as necessary.
- All steel structure including 2 hr fire protection using fire paint.
- Mechanical, Electrical & Piping works
- Any other design and drawing as per requirement.

Planning and design of all services shall comply the requirements stipulated in NBC-2016, latest BIS codes, super ECBC norms as per ECBC-2017. In case of any conflict among ECBC, and scope of work, superior provision is to be adopted.

Based on scope of work and preliminary drawings, contractor shall develop, elevations and sections for the buildings and detailed site layout plan (master plan showing road, path, culvert, drains, landscaping and other services) including all services and schedule of finishes, complying the requirements stipulated in NBC-2016, latest BIS codes, super ECBC norms & as per ECBC-2017, any local authority where applicable and any other relevant statutory requirements. The contractor shall develop 3D views & 3D walkthrough and power point presentation of conceptual plan.

The Analysis and design of structure shall be carried out as per latest codes published by BIS. Some of these are IS: 456, IS: 875, IS : 1893, IS : 13920, IS : 3370, IS : 800 and NBC. The seismic zone to be considered is zone IV as per IS: 1893 & Basic wind speed as 39 m/sec (IS: 875 part-3). The design of the civil structure will comply with the requirements of the following:

- National Building Code
- Local Building Regulations
- Bureau of Indian standard codes
- International codes as applicable
- Any other regulation as per requirements

RCC Structure:

- Design of RCC elements shall be carried out using Limit State Method as per IS 456.
- As per Table 3 of IS 456: 2000, the environmental exposure condition can be classified as "moderate."
- The fire resistance of the structure is to be taken as minimum of 2 hours.
- RCC (Design Mix): M30 grade (minimum) of concrete shall be adopted.
- Reinforcement: FE 500D (TMT).

Steel Structure:

- All structural steel shall be designed as per IS: 800, using Limit State Method.
- All structural steel shall conform to IS: 2062.
- The Square Hollow Sections (SHS)/ Rectangular Hollow Sections (RHS) shall be used of grade YST 310 as per IS: 4923. Structural steel shall be of 350 MPa conforming to grade E350A/BO/BR as per IS: 2062.

Underground water tank/Pump room RCC Structures:

Underground water tank/Pump Room RCC structures shall be leak proof and shall be designed as per IS: 456 and IS: 3370. Minimum concrete grade shall be M30 for water tanks. Reinforcement for water retaining structure shall be Fe 500 D CRS/HCR Bars.

Third Party Vetting

The vetting of all design and drawing shall be got done from proof consultant (IIT).
The fees / charges of proof checking/vetting of designs etc. shall be paid by the contractor.
The vetting agency shall be liable and answerable for any design deficiencies detected during DLP period of the parking and may be called upon to address such issues, if any.

Design Parameter of E/M works

Design, supply, installation, commissioning and testing of internal electrification with controls, 5/15 Amps sockets etc. in accordance with ECBC- 2017 and NBC.

Lighting

Design, supply, Installation, commissioning and testing of internal lighting incorporating in accordance with ECBC-2017, and NBC 2016.

External Water Supply

Design, supply, installation and commissioning and testing for external water supply system i.e. GI Pipe lines, Pumps, Control panels, cables, Cable trays with valves and storage tanks U/G LT cables to meet the water requirement & firefighting requirement as per standard specification mentioned in schedule-D.

External Electric supply and Standby Power

Design, Supply, installation, commissioning and testing for external electric supply system i.e. HT switchgears, Transformers (N+1), Standby power DG sets with U/G HT /LT cables/ Bus trucking,

Cable trays to meet the electric requirement requirements stipulated as per ECBC-2017 and NBC 2016. Also all technical & safety parameters as mentioned in Uttarakhand Power Corporation limited should be complied. HT line power supply shall be arranged from the nearest station/sub stations and the cost incurred shall be borne by the EPC contractor.

Fire Detection & Firefighting System

Design, Supply, Erection, Testing and Commissioning of firefighting system consisting of fire hydrant system complete in all respect duly checked and approved by the Authority Engineer. Further, the same should be vetted by Uttarakhand Fire& Emergency Services Govt. of Uttarakhand.

4 Construction of Boundary Wall, Driveway, UG Tank, Pump Room

S. No	Location	Scope of work
	RCC Boundary wall	As per requirement at site or as directed by the Engineer In-charge
	Approach slab (200 mm thick)	As per drawing
	Fire-fighting system	As per drawing
	U.G tank	As per drawing
	Pump House	As per drawing
	Interlocking CC paver block (80mm thick)	300Sqm (minm.)

The each parking location should be covered with pre painted coating 0.50 mm thick with GI sheet shed roof having tensile strength of 550 Mpa and provided as per the drawings.

5. Change of Scope

The quantities proposed for construction of Automated Multilevel Car Parking as specified in Schedule-B of the Contract Agreement hereinabove shall be treated as minimum requirement. Any variations in the quantities specified in the Schedule-B shall not constitute a Change of Scope, save and except any variations in the quantities arising out of a change of Scope expressly undertaken in accordance with the provisions of Article 13.

(Schedule B-1)

The shifting of utilities and felling of trees shall be carried out by the Contractor. The cost of the same shall be borne by the Contractor.

The shifting of utilities, to an appropriate location in accordance with the standards and specifications of concerned Utility Owning Department, and felling of trees is part of the scope of work of the contractor. The bidders may visit the site and assess the quantum of shifting of utilities and trees felling for the project before submission of their bid. The specifications of concerned Utility Owning Department shall be applicable and followed. Contractor has to take necessary clearances from forest department or any other department. An indicative list of utilities to be shifted is as under,

Sr. No	Name of project	Type of Utility	Unit	Remark
1	Near National Hotel Tallital, Nainital Uttarakhand.	Electrical Utilities	**Nos**	02 Pole(approx.)
		Dismantling	**Sqm**	140 cum brick wall 1200 Sqm G.I SHEET Roofing shed
		Felling of Tress	**Nos**	8 no of trees in girth 300-900mm (approx.)

SCHEDULE-C
Project Facilities

1. Project Facilities

The Contractor shall construct the Project Facilities in accordance with the provisions of this Agreement. Such Project Facilities shall include:

(a) Parking lightning/ emergency lightning

(b) Pedestrian facilities

(c) Landscaping/ façade work and tree plantation

(d) Telecom system/CCTV/LED Screening/Advance AI based integrated parking system

(e) Installation of sign/information boards

(f) Toilet

2. Description of Project Facilities

Note: Provide adequate details of each Project Facility to ensure their design and completion in accordance with the project-specific requirements and the provisions of the Manual.

SCHEDULE-D

Specifications and Standards

1 Construction

The Contractor shall comply with the Specifications and Standards set forth in Annexures of this Schedule-D for construction of the parking project.

SN	Items	Annexures
1.	General Guidelines for Design-Civil Works	Annexure-I
2.	Particular Specification and condition for E&M Works	Annexure-II
3.	List of Applicable Codes	Annexure-III
4.	Architectural Finishing Schedule	Annexure-IV
5.	Signage	Annexure-V
6.	Parking Management and Passenger Information Display System	Annexure-VI

2 Design Standards

The Infrastructure Project including Project Facilities shall conform to design requirements set out in the following documents/ codes:

(i) National Building code 2016 India enclosed with the bid.
(ii) IRC Manual for Rigid pavement
(iii) Code for Practice of Road Signs IRC 67:2001.
(iv) General Conditions of Contracts (IAFW-2249) (1989 Print).
(v) IS-1200 (latest) and other relevant BIS standard

Annexure -I

(Schedule-D)

General Guidelines for Design - Civil Works

1 General

1.1 The work in general shall be carried out in accordance with the standard Schedule of Rates (Part-I) (2009) Specifications and (Part-II) (2020) Rates including amendments hereinafter referred as MES Specifications.

1.2 For internal roads, Manual of Standards and Specifications for Two Lining of Highways (IRC : SP: 73 – 2007) published by the Indian Roads Congress and MORTH Specifications for Road and Bridge Works shall be used.

1.3 The other codes and standards applicable for the Project are as follows:

- Indian Road Congress (IRC) Codes and Standards
- Bureau of Indian Standards (BIS)
- National Building Codes 2016 and revisions. (NBC);
- Latest BIS codes, super ECBC norms as per ECBC-2017
- Local fire regulations
- Energy Conservation Building Code 2017 and
- Approved zoning plan of the site.

1.4 Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

1.5 The Contractor shall use indigenous products, wherever feasible and shall provide a list of imported products to the Authority with sufficient details.

1.6 Statutory fees required to be deposited by the contractor for processing the case, shall be reimbursed by the department.

1.7 Approvals / NOCs / clearances from local bodies and other statutory authorities shall be responsibility of Contractor for design, execution and operation of the project or part thereof. All statutory fees / charges required for obtaining approvals / NOCs / clearances shall be paid by the Contractor.

1.8 All equipment shall be delivered with:

(i) Manufacturer's test certificate,

(ii) Manufacturer's technical catalogues, and installation / instruction (O&M) manuals.

Annexure -II

(Schedule-D)

Particular Specification and Condition for E&M Works

1 Scope

The equipment and work shall be confirmed to

(i) ECBC-2017;
(ii) IS: 732-2019
(iii) BIS 15884;
(iv) IS: 374 - 2019;
(v) Central Electricity Authority regulations 2010;
(vi) IS 14665: 2000; Electric Traction Lifts
(vii) IS 4289 Specification for Flexible Cables for Lifts and Other Flexible Connection;
(viii) Selection, Installation and Maintenance of Automatic Fire Detection and Alarm System Code of Practice- IS 2189-2008;
(ix) All amended up to last date of submission of tender, relevant IE rules, relevant IS and as per directions of Authority's Engineer.
(x) All the materials used in the work as far as applicable shall comply with the relevant Indian Standard Specifications with all up to date amendments.
(xi) The contractor shall produce test certificates for their conforming to relevant I.S. specifications.
(xii) The materials having I.S.I. mark shall have precedence over the ones conforming to I.S. specifications.

2 Climatic Conditions

The equipment supplied shall be suitable for satisfactory performance on its rated capacity at all weather conditions i.e. summer, monsoon and winter.

3 Sub Work - Internal & External Electrical Installation of E&M Works

The work shall be carried out in accordance with tender specifications and the following specifications / rules:

(i) ECBC - 2017.
(ii) IS 4289 Specification for Flexible Cables for Lifts and Other Flexible Connections Part 1: 1984 Elastomer Insulation Cables
Part 2: 2000 PVC insulated Circular Cables
(iii) The Indian Electricity Act, 2003.
(iv) National Electrical Code.
(v) Indian Electricity Rules 1956 amended up to date.

3.1 General

The specifications given below pertain to the internal and external electrical installation work to be carried.

3.2 Wiring

(i) The wires used for the point wiring and power wiring shall be of 650 / 1100 Volts grade FRLS PVC insulated multi stranded copper conductor single core confirming to IS:694:1990.
(ii) All mounting boxes for plate type accessories shall be of metallic construction and of the same make as that of the plate type switches and accessories.
(iii) The connections, inter-connections, earthing and inter earthing shall be done by the contractor wherever required for energizing of the installation and nothing extra shall be paid on this account.

(iv) The rupturing capacity of the MCB‟s shall be 10 KA. The MCB‟s shall be ISI marked.

(v) The make of MCB, RCCB etc. shall be the same as that of MCB DB.

(vi) Three phase MCB DBs shall be provided with three independent neutral bars for per phase isolation in addition to main neutral link if provided in schedule of quantity.

(vii) Number of inspection boxes for conduit should be barest minimum, rather these should be avoided.

(viii) Cutting of brick walls shall be with chase cutting machine only. All repairs and patch works shall be neatly carried out to match the original finish and to the entire satisfaction of the Engineer in Charge.

(ix) All the sub main and circuit wiring includes loose wire for connections inside switch boxes and MCB DB s. No payment for these loose wires shall be made.

(x) The connection between incoming switch / isolator shall be made with suitable size of thimble and cable at no extra cost.

(xi) Copper conductor of insulated cables of size 1.5 Sq.mm and above shall be stranded and terminals provided with crimped lugs.

(xii) All hardware items such as screws, thimbles, GI wire etc. which are essentially required for completing an item as per specifications will be deemed to be included in the item even when the same have not been specifically mentioned.

(xiii) All hardware items such as nuts/ bolts/ screws/ washers etc. to be used in work shall be aluminium alloy / cadmium plated iron.

(xiv) Any conduit which is not be wired by the contractor shall be provided with GI fish wire for wiring by some other agency subsequently. Nothing extra shall be paid for the same.

(xv) The make of the materials have been indicated in the list of acceptable makes. Alternate makes are not acceptable. The materials to be used in the work shall be got approved by the Engineer in Charge / his representative before its use at site. The Engineer in-C shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not acceptable.

(xvi) Modular boxes, switches, sockets, regulators etc. shall be of only one make.

(xvii) Wherever light fittings are proposed to be provided on the false ceiling, the respective light / fan point wiring will have to be brought up to the terminal of the light fittings / fans by the contractor. Flexible conduits shall be used for drawing wires from MS conduits on ceiling to fittings on false ceiling and nothing extra shall be paid to the contractor for the same.

(xviii) G.I. pipes shall be medium class as per ISI specification and shall be of single piece without any joints.

(xix) All the light and fans points should be properly earthed with 1.5 sq mm, FRLS PVC insulated copper wire

(xx) Termination of wiring inside the DB's and main board should be done by crimped Copper lugs connections, for which no extra payment will be made.

(xxi) All metallic parts must be properly bonded to the earth. Earth lugs shall be provided to all copper earth wires and shall be fixed whenever required by means of anodized bolts and nuts.

4 Sub Work – Data Networking, IP Based /CCTV System, Fire Detection, Alarm Control System, Firefighting system

4.1 Sub Work – Data Networking.

(i) Passive cabling infrastructure - UTPCAT6 cables & components, fibre optics cable & components

(a) Complete installation shall be done in accordance with installation practices for a well-structured cabling system, using components from a single vendor to ensure consistent and assured performance. The structured cabling distribution network shall serve as a vehicle for transport of data, video and voice telephony signals over a common network throughout the network

(b) Installation, termination and identification of wiring between station outlets and networking rack shall be considered part of the contractor's work.

(c) Wiring utilized for data and voice communications shall originate at networking racks and terminate at IOs terminated at wall.

(d) All cables and terminations shall be identified at all locations.

(e) All balanced twisted pair cable terminations shall comply with, and be tested to TIA/EIA568-C.2 standards for Category 3, Category 5e & Category 6 installations.

(f) Standards Compliance: - Unshielded twisted pair cabling system, conforming to ANSI/TIA/EIA 568-C.2 Category 6 cabling system, ISO/IEC 11801 2nd edition, EN-50173-1.

(g) The contractor carrying out the SITC shall make the system entirely operational for its intended use, by addition of components specific to its make/model even if not specifically mentioned in the BOQ.

(h) It shall be the responsibility of the installer and OEM manufacturer to ensure that the Passive Components of structured cabling distribution network will be free from manufacturing defects in material and workmanship under normal and proper use;

(i) The site will be duly certified by OEM for a period of 20 years from the date of issuance of the registration certificate or installation, whichever is earlier.

(j) 20-year systems performance guarantee by the OEM / manufacturer along with actual test results conducted at site such as attenuation, return loss, NEXT & ACR. Permanent link shall be tested for minimum guaranteed performance as per standards at 500 MHZ operation minimum.

(k) The Supplying, installation, testing and commissioning of UTP CAT6 data cables shall include supply and laying of cables in existing conduit on ceiling / Wall / slab etc. shall be measured and paid on running length basis.

(ii) UTP CAT6 CABLING SYSTEM

SN	Description	Specification
	SPECIFICATIONS OF UTP CABLING SYSTEM	
1	**Following common specifications shall apply to all UTP CAT6 standards based structured cabling components, i.e., Cable, Patch Panel, and IOs & Patch Cords. All components of the Structured Cabling System shall be from the same OEM Manufacturer**.	
i	Standards Compliance	1. Unshielded twisted pair cabling system, conforming to ANSI/TIA/EIA568C. 2. Category 6 Cabling system, ISO/IEC 11801 2nd edition, EN-50173-1.
ii	Warranty	20-year systems performance guaranty by the OEM/manufacturer along with actual test results conducted at site such as Attenuation, return Loss, NEXT & ACR. The cable shall be tested for minimum guaranteed performance as per standards at 500MHz operation minimum
iii	OEM Requirement	All passive cabling must be from same OEM(UTP and fibre)
2	**CAT-6 UTP CABLE**	
i	Standards Compliance	As per 1.i) above
ii	Conductors	23 or 24 AWG solid bare copper
iii	Insulation	PVC jacket or flame retardant LSZH
3	**I/O JACK**	
i	Standards Compliance	As per 1.i) above
4	**PATCH PANEL**	
i	Standards Compliance	As per 1.i) above
ii	Ports	24 Ports loaded with keystone Jacks
iii	Port arrangement	Individual keystone type or 6 port modular. Blank inserts for unused ports
iv	Height	1 U (1.75 inches)
v	Panel	Fully powder coated pencil grey
vi	Approvals	UL listed
vii	Termination Pattern	TIA / EIA 568 A and B;
viii	Performance Characteristics	Attenuation, NEXT, PS NEXT, FEXT and Return Loss
5	**FACE PLATES**	
i	Standard	Conforms to CAT6 Work Area Data I/O Outlet (RJ45) adhering to ANSI / TIA 568-C.2, ISO/IEC 11801(2002) and CENELEC EN50173-1 (2002)specifications
ii	Type	1-port, 2 -port or 4-port, White Face plate
iii	Material	ABS / UL 94 V-0
iv	No. of ports	One/ Two / Four

6	**UTP CAT6 PATCH CORD (3 FT OR 7 FT)**	
i	Standards Compliance	As per 1.i) above
ii	Conductor Size	24-26 AWG, multi -stranded copper
iii	Lengths	3ft or 7ft or 10ft as required in a variety of colours

(iii) FIBER OPTIC CABLE AND COMPONENTS

i	Type	Single mode OS2 fibre cabling system from one OEM (Cables + Components)
ii	Networks Supported	1/10G. All passive components must be from same OEM (Copper + fibre)
iii	Standard Compliance	ITU-T G.652 (A,B,C and D), IEC - 60793-2-50,TIA/EIA492CAAB
iv	Performance Testing	Must be UL listed or ETL certified and fibre Channel compliance to ANSI/TIA568 -C.0 forOS2
v	Warranty	20-year systems warranty; Warranty to cover Bandwidth of the specified and installed cabling system

(iv) SPECIFICATIONS FOR OPTICAL FIBRE CABLE

1	Cable Type	6 core Single Mode, Armored, Loose-tube, Gel filled (Uni-tube construction) - Minimum 6 Tubes Cable)
2	Fiber Type	Single Mode, 9 / 125, 250-micron primary coated buffers. UL Listed fibre
3	fibre core must be	As per Telecordia GR20, ITU-T G652D, IEC-60793-2-50,TIA / EIA 492-CAAB
4	No of cores	6 core – Raw fibre core make can be Corning/Fujikura - ISO 11801 - OS2
5	Armor	Corrugated Steel Tape Armor
6	Cable Construction Type	BELLCORE GR 20 / IEC 794-1 - Loose tube Corrugated steel tape (0.155mm Min) CSTA provided with FRP Rod as strengthening members
7	Outer Jacket Construction	High density polyethylene, anti - termite, anti –rodent suitable for direct burial application. Jacket must be UV Stabilized.
8	Losses @ 1310nm frequency	< = 0.35 dB/Km
9	Losses @1500nm frequency	< = 0.22 dB/Km
10	Max Tensile Load	1500N or higher
11	Maximum crush	2000N or higher
12	Operating Temperature	-40 deg C to +60 deg C
13	Test Parameters	IEC794-1-E1, IEC794-1-E2, IEC794-1-E3, IEC794-1-E4, EIA-455-104, IEC794-1-E7, IEC794-1-E10, IEC794-1-E11, IEC794-1-F5
14	Marking:	The cable shall have identification marking at regular intervals of 1 meter which will be of permanent nature. The accuracy of the sequential marking will be within +/- 0.5%.

15	Multi-Channel requirement	The fiber cable must have been designed to provide optimum performance from 1265nm to 1625nm making it suitable for 16 – channel Course Wavelength Division Multiplexing (CWDM) applications.

(v) SPECIFICATIONS FOR FIBER OPTIC PIGTAILS

1	Connector Type	LC-Style, Simplex - 1 meter - Compliance to ITU-G657.B-Bend Insensitive fibre
2	Operating temperature	-40 Degree C to +60 Degree C
3	Standard	Fully in compliance with JIS C5973 F04Type.
4	Durability	(500 Matting's): < 0.2 dB Max
5	Ferrules	Pre-radius Ceramic Zirconia Ferrule. Bayonet Coupling: 2.5 mm Zirconia Ferrule
6	Attenuation	Not more than 0.75 dB per mated pair
7	Parameters / standard	Meets or exceeds ITU specifications, UL listed

(vi) SPECIFICATIONS FOR FIBER OPTIC PATCH CORDS (1 OR 3MTR)

1	Cable type	LC-LC type SM. Available in either 1.6mm or 3mm simplex or Duplex Zip cord.- Compliance to ITU-G657.B –Bend In sensitive fibre
2	Fiber type	Single mode 9/125 250 micron primary coated buffers
3	No of cores	2 for duplex and 1 for simplex
4	Outside Diameter	1.6mm x 3.0mm (Simplex) or 1.6mm x3.3mm(Duplex)
5	Operating Temperature	-40 Degree to + 60 Degree

(vii) ACTIVE COMPONENTS – NETWORKING SWITCH SPECIFICATIONS

(a) It is a high-performance networking design keeping in mind real time applications and reliability.

(b) Key considerations for network are - gigabit connectivity to each user from the server room to various users/departments/devices in a topology consisting of a central switch followed by the distribution and edge/access switches.

(c) The network shall have a mix of components for supporting PoE+ as well as non-PoE devices.

(d) A robust fibre optics-based backbone is being provided. It shall be based on ring topology using single mode fibre optics cable. The vendor shall ensure that the networking switches shall be populated with the necessary transceivers for achieving this design objective.

(e) Several applications are proposed to run on this network – IP-based voice communications supporting voice-data-video, network-based cameras and storage, integrated audio-video, video conferencing, interactive learning, integrated building management systems and important services integration such as fire detection.

(f) All Wireless Access Points asked in tender document should be fully compatible to existing Wireless LAN Controllers.

(g) All Switches asked in tender document should be fully compatible with existing switches.

(h) All Switches, Wireless Access Points and Existing Wireless LAN Controllers should have capability to manage, configure and troubleshoot from existing Network management system with a single pane of glass.

(viii) WIRELESS LAN INFRASTRUCTURE (CONTROLLER AND ACCESS POINT)

(a) Wireless deployment shall be on centralized controller-based architecture in High Availability mode providing seamless scalability

(b) The architecture should be scalable to 1500 APs in the campus

(c) Redundancy should be built in the architecture, i.e., 1+1configuration

(d) IEEE 802.1x with multiple EAP types (TLS or EAP/MSCHAP or TTLS or equivalent)

(e) Wireless system should support IPv6 from Day1

(f) Radio assurance for radio self-test and healing

(g) Increase available 2.4 and 5GHz wireless device density through management of spurious association traffic

(h) IEEE 802.1q – VLAN Tagging

(i) IEEE 802.1d – Spanning Tree

(j) IEEE 802.1p – Layer 2 Traffic Prioritization

(k) IPv6 Control – Increase wireless device density through control of unnecessary IPv6traffic on IPv4-only networks

4.2 SUB WORK-IP BASED VIDEO SURVEILLANCE/CCTV SYSTEM

(i) GENERAL

(a) The Surveillance System Components must be TCP/IP based components working on the same backbone network as the Data Network (LAN).

(b) Must have mix of IP Cameras as specified in this document.

(c) Must have the Video Analytics and monitoring software capable of meeting the requirements mentioned in this document. The video analytics has to be server based system with capability to interact with third party VMS systems.

(d) Must have the network based storage for the specified time and quality as specified.

(e) Must be scalable in terms of equipment (no. of cameras) as well as features (Analytics).

(f) True open platform functionality is an essential aspect of this specification; cameras from different OEMs must be able to integrate seamlessly with the specified 3rd party VMS platforms without any loss of features" functionality. Similarly, specified VMS platforms must also be able to integrate with a variety of cameras from different manufacturers.

(g) Camera vendors shall be direct original equipment manufacturers.

(h) All cameras must be with wide dynamic range and True D/N capability with removable IR cut filter.

(i) For better saving on storage and bandwidth the compression used shall be H.264 high profile for all types of cameras and devices. H.264 high profile shall be a common requirement for all cameras and devices irrespective of whether mentioned in individual sub-sections or not or if mentioned otherwise.

(j) All cameras shall be vandal resistant as per IK 10 rating.

(k) All cameras shall be ONVIF Profile S compliant

(l) Cameras shall have a wide dynamic range of between 90 to 100 dB for ensuring good image performance in varying light conditions.

(ii) FULL HIGH DEFINITION (HD), TRUE DAY/NIGHT, NETWORK PTZ RAPID OUTDOOR PTZ CAMERA

(a) The camera shall be FHD Rapid Dome PTZ camera supporting triple streaming code simultaneously generating and transmitting JPEG and two independent H.264 (preferably High Profile) video streams which are different in resolutions and frame rates.

(b) The camera shall utilize a 1/3-type CMOS/CCD/MOS sensor of approx. 2.0 Megapixel and have a True day/night capability.

(c) The camera shall be capable of 360-degree pan rotation and a minimum tilt range of 0° to 180°, designed for pole / wall /ceiling mount operation.

(d) The camera shall incorporate a built-in 30X optical, auto-focus zoom lens, and shall have 12X digital zoom capability.

(e) The camera shall be able to automatically sequence through the present positions in programmable sequence, i.e., present tours.

(f) The camera shall produce a high-quality picture with a minimum illumination of 0.6 lux in colour mode or 0.07 lux in B/W mode at F1.6 or better. It shall offer IR cut filter that switches on/off to enhance low-light sensitivity during

B/W mode.

(g) The camera shall be equipped with an intelligent Auto Backlight Compensation feature, mask settings and level adjustment capabilities to compensate for backlight by masking brighter areas.

(h) The camera shall have feature to transform shadows and dark areas into natural and crisp images in real time.

(i) The camera shall support automatic tracing white Balance Adjustment feature.

(j) The Camera shall be capable of Advanced Auto Tracking function which will track and follow single moving indoor target 10 feet from the camera and occupies approximately 10% of the field-of view, in indoor lighting conditions greater than 2 lux. The Advanced Auto Tracking function shall not require an external video processor to control the network Camera. The Advanced Auto Tracking mode shall be able to be interrupted by manual operator control and automatically resume to its previous tracking mode after operator releases control.

(k) The camera shall have the light control mode to select the environment, i.e., indoor or outdoor, in which it is to be used.

(l) The camera shall have a 2D and 3D noise reduction capability which reduces AGC noise to provide clear images without motion blur.

(m) The network interface shall be via an 8-pin RJ-45 connector, 10Base-T/100Base-TX Ethernet. Both IPv6 and IPv4 shall be supported.

(n) The camera shall utilize JPEG and H.264 high profile compression. The maximum resolution for each codec shall be 1920 x1080.

(o) The camera shall be capable of generating HTML code for the video image, allowing for easy web page integration.

(p) The camera shall be capable of supporting up to twelve (12) users simultaneously over the network.

(q) The camera shall have the capability to stream JPEG and H.264 high profile video in TCP protocol H.264 in UDP (unicast/multicast) protocol.

(r) The camera shall incorporate a built-in algorithm for intelligent motion detection capability. The Camera shall offer this feature with four configurable areas per scene and fifteen sensitivity levels adjustment capabilities.

(s) The camera shall have 2-way audio feature where the Camera shall have built-in Audio input and output jacks and be capable of transmitting and receiving full duplex audio stream through the same Ethernet connection as the video. The audio shall be encoded using the G.726 or equivalent ADPCM standard.

(t) The camera shall support the following network protocols: TCP/IP, UDP/IP, HTTP, HTTPS, RTSP, RTP, RTP/RTCP, FTP, SMTP, DHCP, DNS, DDNS, NTP, SNMP, and UPnP.

(u) The camera shall support HTTPS client authentication.

(v) The camera shall be compliant with the industry standard ONVIF (Open Network Video Interface Forum) specification with Profile S support.

(w) The camera shall have user configurable port settings.

(x) The camera shall have an email (SMTP) notification capability and in addition the Network Camera shall support the scheduled transfer of image data via FTP to an FTP server.

(y) The camera shall have privacy zone masking which blocks out unwanted or prohibited area within the video image to protect privacy.

(z) The camera software should include the IP Setup (including group camera management) program, Firmware Upgrade Tool, Privacy Masking Tool. If required, the software shall be supplied with the camera as a standard accessory.

MECHANICALREQUIREMENTS

(a) The camera shall have 360° endless pan rotation and -14° to 180° tilt range. The unit shall be designed for pole / wall / ceiling mount operation.
(b) The camera shall have maximum pan/tilt speeds of 300° per second in presents and minimum pan/tilt speeds of 0.07° per second. The camera shall have two hundred and fifty six (256) user defined presents.
(c) The camera shall be vandal resistant. With IEC 62262compliance.
(d) The camera shall have inbuilt dehumidification feature to remove moisture from the camera.
(e) The camera shall be outdoor rated for ingress protection of IP66 rating and mechanical impact protection ratingIK-10.

(iii) Full High Definition (FHD), True Day/Night, Very-Focal dome Network Camera

(a) The camera shall be a Full HD dome network camera supporting three codecs, JPEG and 2 nos. H.264 high profile, any two of which can be used simultaneously. The camera shall utilize a 1/3-type, CCD/MOS/CMOS sensor of approx. 2 Megapixels and have a true day/night capability.
(b) The camera shall be ONVIF Profile S compliant.
(c) The camera shall have a vandal-proof housing as standard and shall comply with IEC 62262, IEC 60068-2-75 test standard for impact resistance up to75J.
(d) The network interface shall be via an 8-pin RJ-45 connector, 10Base-T /100Base-TX Ethernet. Both IPv6 and IPv4 shall be supported.
(e) The camera shall utilize JPEG and H.264 high profile compression. The camera shall also be able to support full HD mode of 1920X1080 in H.264 compression mode with 30 fps.
(f) The camera shall incorporate a built-in web server, such that a standard web browser such as Microsoft Internet Explorer can be used to access the camera without need for special viewer software.
(g) The camera shall have an advanced function which allows the camera image to be viewed in JPEG format without using any plug-ins. This allows HTML code for the video image to be generated, allowing for easy web page integration.
(h) The camera shall can support up to ten (10) users simultaneously over the network.
(i) The camera shall have the light control mode to select the environment, i.e., indoor or outdoor, in which it is to be used.
(j) The camera shall have a 2D and 3D noise reduction capability which reduces AGC noise to provide clear images without motion blur.
(k) The administrator shall have complete access/control of the cameras.
(l) The camera shall have built-in motion detection capability.
(m) The camera shall support the following Network protocols: TCP/IP, UDP/IP, HTTP, RTSP, RTP, RTP/RTCP, FTP, SMTP, DHCP, DNS, DDNS, NTP, and

SNMP.

(n) The camera shall support HTTPS client authentication.

(o) The camera shall have user configurable port settings.

(p) The camera shall have an integral 3 to 8 mm auto-iris type vary-focal lens.

(q) The camera shall be Power over Ethernet (PoE) capable, compliant to the IEEE 802.3a/f standard.

(r) The camera shall have privacy zone masking which blocks out unwanted or prohibited area within the video image to protect privacy.

(s) The software provided with camera shall include the IP Setup (including group camera management) program, Firmware Upgrade Tool etc.

(t) The minimum electronic shutter setting shall be 1/30 second, and a maximum of 1/10,000sec.

(u) The camera shall be capable of limiting the bandwidth from 64 kbps to 8 Mbps in MPEG-4 or H.264 high profile, and from 0.5 Mbps to an unlimited bandwidth in JPEG.

(v) The camera shall be capable of being configured to automatically transmit alarm images transfer via FTP file transfer and/or e-mail. In addition the camera shall support the scheduled transfer of image data via FTP to an FTP server.

(w) The camera shall feature a body-based automatic back focus mechanism for automatic and remote back focus adjustment by way of hardware button or software based control.

(x) The camera shall support feature to transform shadows and dark areas into natural and crisp images in real time. The camera shall also feature intelligent digital back light compensation, digital wide dynamic range circuit, digital noise reduction and electronic sensitivity-up for real surveillance purposes under severe conditions. For better picture quality, the camera shall feature digital 2H enhancer, digital aperture correction, knee circuit and digital white detective ATW. The camera shall also offer a user-configurable AWC setting for white balance at a manual setting.

(y) The camera temperature rating shall be -10 to + 50 deg C.

(z) The camera shall feature cropping function which enable to provide whole image (1920x1080) and the part of image (640x360) simultaneously. Up to 4-images capture areas can be specified, and it is also possible to control the sequence.

(aa) The camera shall also have a storage capability at device itself; it shall provide a memory card slot which can support up to a maximum of 64GB memory card that can cache images in the event of a network failure. The camera shall also support manual/alarm recording to the optional memory

Card. The camera shall provide notification of the remaining capacity of the memory card.

MECHANICAL REQUIREMENTS

(a) The Camera shall be IP66 rated and shall adhere to IEC 60529 standard. Also, it shall be vandal resistant body for high reliability for 75Jimpact.

(b) The camera shall have feature to remove the humidity that manages to enter in its body.

(iv) FULL HD, OUTDOOR FIXED CS-MOUNT/BOX OR BULLET CAMERA SPECIFICATIONS

(a) The camera shall be a Full HD fixed-type CS-mount network camera supporting three codecs, JPEG and H.264 high profile (2 Nos), any two of which can be used

(b) Simultaneously. Camera shall utilize a 1/3" type CMOS/MOS sensor and have a resolution of approx. 2.0 MP and have a True day/night capability.

(c) The camera shall feature a Day & Night mode that may be automatically engaged on low light level and permit the use of an external infrared illuminator or manually selected.

(d) The camera shall incorporate independent automatic Colour-to-Black & White switching modes for switchover on light threshold and sensitivity to IR illumination in the 850 nm wavelength. Each Colour-to-Black & White switching mode shall incorporate two switching threshold light levels, high and low. Each Colour-to-Black & White switching mode shall incorporate three duration settings for automated switchover.

(e) The camera shall be ONVIF Profile S compliant.

(f) The camera shall utilize JPEG and H.264 high profile compression. The camera shall also be able to support full HD mode of 1920X1080 in H.264 compression mode with 30fps.

(g) Network interface shall be via an 8-pin RJ-45 connector, 10Base-T /100Base-TX Ethernet.

(h) The camera shall incorporate a built-in web server, such that a standard web browser such as Microsoft® Internet Explorer can be used to access the camera without need for special viewer software.

(i) The camera shall can support up to Ten (10) users simultaneously over the network.

(j) The camera shall incorporate a built-in motion detection capability with 4 areas, and 10 step detection size and sensitivity levels.

(k) The camera shall feature cropping function which enable to provide whole image (1920x1080) and the part of image (640x360) simultaneously. Up to 4-images capture areas can be specified, and the possibility to control the sequence.

(l) The camera shall support the following Network protocols: TCP/IP, UDP/IP, HTTP, HTTPS, RTSP, RTP, RTP/RTCP, FTP, SMTP, DHCP, DNS, DDNS, NTP, SNMP, UPnP, IGMP, ICMP,ARP

(m) The camera shall have both FTP client and server capabilities.

(n) The camera shall have user configurable port settings.

(o) The camera shall have a CS-mount 2MP IR corrected type vary-focal lens (3-8 mm/5- 50mm) as standard accessory.

(p) The camera shall be Power over Ethernet capable, compliant to the 802.3afstandard.

(q) The camera shall have privacy zone masking which blocks out unwanted or prohibited area within the video image to protect privacy.

(r) The camera shall have the capability for Camera ID as well as Date/Time data to be superimposed on the video image.

(s) The camera shall have the light control mode to select the environment, i.e., indoor or outdoor, in which it is to be used.

(t) The camera shall have a 2D and 3D noise reduction capability which reduces AGC noise to provide clear images without motion blur.
(u) The administrator shall have complete access/control of the cameras.
(v) The camera shall be capable of being configured to automatically transmit alarm images transfer via FTP file transfer and/or e-mail. In addition the camera shall support the scheduled transfer of image data via FTP to an FTP server.
(w) The minimum electronic shutter setting shall be 1/30 second, and a maximum of 1/10,000sec.
(x) Thecamerashallbecapablelimitingthebandwidthfrom64kbpsto8192kbpsin
(y) H.264 high profile and unlimited in JPEG.
(z) The camera shall support multi-casting and unicasting.

MECHANICAL REQUIREMENTS

(a) The camera shall have a CS type camera lens mount in case Box type or inbuilt in case of Bullet type camera
(b) The camera lens supplied with the camera shall be IR corrected lens supplied by the camera OEM or other reputed makes of lens such as Tamaron or Fujinon or equivalent and having f 3-8mm, F1.2 to F1.9, DC auto-iris type vary-focal lens.
(c) The camera shall be installed in a vandal resistant IK10 rated housing.

(v) VIDEO SURVEILLANCE STORAGE

Configuration & Specification for Storage System for Video Surveillance & Recordings on a 24 Hrs x 30 Days Basis

High Availability

(a) The Proposed Solution should be a Storage System configured with dual, redundant controllers.
(b) Each Controller must have Intel Sandy Bridge Quad core CPU per controller or equivalent.
(c) The Proposed Solution should be based on real time optimized operating System. (It should not be a general purpose OS)
(d) The Proposed Solution should support Online Microcode / OS Upgrades.

RAM, Scalability and HDD Support

(a) The controllers should have a minimum 30GB cache spread across dual controllers.
(b) The Proposed Solution should be scalable to more than 110 Drives in the same Storage Array without upgrading the controllers.

Host Connectivity and Storage Backend Disk Connectivity

(a) The offered storage shall be supplied with at least 8nos x 1G iSCSI Ports across dual Controllers for Host Connectivity.
(b) The array proposed should have a minimum of 4nos x 6Gbps 2.0 SAS

backend architecture.

Total Aggregate Bandwidth

(a) The Proposed storage disk should ensure a minimum total aggregate bandwidth of 2500Mbps on a 90% write & 10% read application environment.

RAID Support

(a) All RAID types should be industry standard RAID and solution to be configured with RAID5 protection

(b) For every 30 disks, 1 no disk should be configured as global hot spare.

Management

(a) The Proposed Solution should support a browser based built in management. It should have SNMP support. (Traps, e-mail, MIBII)

Current Required Protocols

(a) The Proposed Solution must support and be configured for FC & iSCSI Protocols.

Storage Capacity Requirements

(a) The Proposed Storage Array should be configured with Minimum 114TB Usable Capacity using SATA/NL-SAS Drives. The usable capacity is defined as the Net storage capacity available for the application stack, after deducting the penalties imposed by storage infrastructure requirements, disk and array formatting, RAID penalties, host OS and file system formatting including overheads or any other penalties which eat away usable disk space. Drives offered for the above capacity shall be of the Highest Capacity offered by the Vendor.

(b) The same Storage System should support 50% extra growth in terms of performance and capacity for future expansion without any controller upgrade.

Regulatory Model

(a) The device should have the following certifications - FCC Class A or CE Mark for immunity against electromagnetic emissions.

Safety and Quality Standards

(a) The device should have the following quality and safety standard certifications- CAN/ CSAC22.2-60950/UL60950.

LED DISPLAY

The LED Display shall have the following minimum specifications:

(a) Screen Size: 55”

(b) Resolution: 1920 x1080
(c) Input Interfaces: VGA (D-Sub), DVI-D, Component (CVBS common), HDMI, Stereo Mini Jack
(d) Contrast Ratio (Typical): 5000:11.5.6.
(e) Power Supply: AC 100 - 240 V~ (+/- 10 %), 50/60 Hz
(f) Power Consumption: 86W
(g) Operating Temperature: 0º C ~ 40º C
(h) Emission Standard: EMC
(i) Compliance: ENERGY STAR5.0

4.3 FIRE DETECTION, ALARM AND CONTROL SYSTEM (FAS)

The technical specification, installation, testing and commissioning of Fire Detection, Alarm And Control System (FAS) shall confirm to CPWD General Specifications for Electrical Works Part VI Fire Detection and Alarm System – 2018 and Selection, Installation and Maintenance of Automatic Fire Detection and Alarm System Code of Practice- IS 2189-2008; all amended up to last date.

Annexure -III

(Schedule-D)

List of Applicable Codes

1.1 The Contractor shall use the latest edition of relevant Standards & Specifications for Design and Execution of this project/work. The list of Standards & Specifications provided hereunder is not exhaustive and any other Standard & Specification which are not mentioned in this section are also applicable if required for the completion of work as per the Scope of Work shall be used in consultation with Authority.

1.2 Some of the relevant codes and standards are compiled below:

(i) FOR STRUCTURAL WORKS

S. No.	CODE	NAME
1	IS: 1893 – 2002	Criteria for Earthquake resistant deign of Structures
2	IS: 13920	Ductile detailing of Reinforced Concrete Structures Subjected to Seismic forces.
3	IS: 4326 – 1993	Earthquake resistant Design and construction of Buildings
4	IS: 875 – 1987 (Part I to III & Part V)	Code and Practice for Design Loads (Other than earthquake) for Building and Structures like Dead, Imposed, Wind and other Loads
5	IS: 456 – 2000	Plain and Reinforced Concrete (Code of practice)
6	SP: 16	Design aids for Reinforced Concrete Structure.
7	SP: 34	Handbook on Concrete Reinforcement and Detailing
8	IS: 3370 Part I, Part II and Part IV	Code of practice for Concrete structures for the storage of liquids.
9	IS: 1786	Specification for High Strength Deformed Steel bars and wires for concrete reinforcement
10	IS: 1904	Code and Practice for design and Construction of Foundations in Soils
11	IS: 2950	Code and Practice for Design and Construction of Raft Foundations
12	IS: 800-1980	Code of Practice for general Construction in Steel.
13	IS: 1343-1980	Code of Practice for Pre stressed Concrete.

(ii) FIRE FIGHTING WORKS

SN	I.S. Code	Description / Title
1.	I.S:1239	Specifications for mild steel tubes 106 tubular and other wrought steel fittings. (Fifth Revision)
2.	I.S:778	Specifications for copper alloy gate, globe and check valves for water works purposes.
3.	I.S:5312 (Part-I)	Specifications for swing check type reflux (Non-return) valve
4.	I.S:908	Specifications for fire hydrant (2nd Revision)
5.	I.S:5290	Specifications for landing valve

6.	I.S:901	Specifications for coupling double male and female instantaneous pattern for firefighting (3rd revision)
7.	I.S:884	Specifications for first aid hose reel for firefighting (1st Revision)
8.	I.S:903	Specifications for fire hose delivery couplings branch pipe, nozzles and nozzles spanner (3rd revisions)
9.	I.S:933	Specifications for portable chemical from fire extinguisher
10.	I.S:15683	Specifications for fire extinguisher carbon dioxide type.

(iii) I.S. SAFETY CODES

1.	I.S.660	Safety Code for Mechanical Refrigeration
2.	I.S.659	Safety Code for air conditioning
3.	I.S.3016	Code of Practice for precautions in welding and cutting operations
4.	I.S.818	Code of practice for safety and health requirements in electrical and gas welding and cutting operations
5.	I.S.5216	Code for safety procedure and practice in electrical works
6.	I.S.3696	Safety code for scaffolds and ladders

List of Main Bureau of Indian Standards Codes and Publications with latest revisions and amendments thereto be followed for analysis & Design.

STEEL		
1.	IS:2062 – 1999	Steel for general structural purposes, specification.
2.	IS: 1161 – 1998	Specification of steel tubes for structural purpose.
3.	IS: 800 – 2007	Code of practice for general construction in steel.
4.	IS 4923	Hollow steel section for structural purpose.
5.	IS 1367	Technical specification for Thread bolts
6.	IS 816 - 1969	Code of practice for use of metal ARC welding for general construction in mild steel

ROAD WORKS	
IRC 5	Standard Specifications and Code of Practice for Road Bridges,
	Section I – General Features of Design
IRC 6	Standard Specifications and Code of Practice for Road Bridges,
	Section II – Loads and Stresses
IRC 11	Recommended Practices for the Design of Layout of Cycle Tracks
IRC 19	Standard Specifications and Code of Practice for Water Bound Macadam
IRC 112	Standard Specifications and Code of Practice for Road Bridges
	Section III–Cement Concrete (Plain and Reinforced)
IRC 22	Standard Specifications and Code of Practice for Road Bridges,
	Section VI – Composite Construction
IRC 37	Guidelines for the Design of Flexible Pavement
IRC 48	Tentative Specifications for Bituminous Surface Dressing Using Pre-coated Aggregates
IRC:SP 11	Handbook of Quality Control for Construction of Roads and Runways
IRC:44-2017	Guidelines for Cement Concrete Mix Design for Pavements (Third Revision)

(iv). CONDUIT AND WIRE

Conduit	Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway Containing these conductors, per NEC Article 760-29.
Wire	All system wiring shall be new. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. a. NFPA 72 Smoke Detector Sensitivity Test: The system shall provide an automatic smoke detector test function that meet the requirements of NFPA72. b. Smoke Control Modes: The system shall provide means to perform FSCS mode Smoke Control to meet NFPA-92A And 90B and HVAC mode to meet NFPA90A.

(v) Lighting Protection

IEC 60598-1	Luminaires – Part 1: General requirements and tests
IEC 60598-2	Luminaires – Part 2: Particular requirements
IEC 60400	Lamp holders for tubular fluorescent lamps and starter- holder
NFPA	National Fire Protection Association

Annexure -IV

(Schedule-D)

1 TECHNICAL SPECIFICATIONS FOR CABLES & WIRES

1 Cabling: Cabling shall be carried out as per IE Rules. All other cabling above ground should be suitably mounted on cable trays with proper covers. Only LSHZXLPO cables must be used for DC side, DC grade cables shall be used. For AC power shall be XLPE insulated PVC sheathed aluminium/ copper conductor cables.

2 Wires: Only FRL Copper wires of appropriate size and of reputed make shall have to be used.

3 Cables Ends: All connections are to be made through suitable cable/lug/terminals/MC-4connectors; crimped properly & with use of Cable Glands.

4 Cable Marking: All cable/wires are to be marked in proper manner by good quality ferule or by other means so that the cable can be easily identified.

5 Multi Strand, Annealed high conductivity copper conductor

(i) Overall PVC insulation for UV protection and confirm to IEC69947

(ii) All cables shall conform to BIS standards (IS694)and (IS1554)28

(iii) The size of each type of cable selected shall be based on minimum voltage drop, however, the maximum drop shall be limited to 2%

(iv) All electrical control/power cables/wires inside the building to be fixed in accordance with CPWD specifications for electrical works Part-I internal only Rigid Steel Conduit should be used for wiring inside the building

(v) Proper laying of cables have to be ensured in appropriate cable trays, pipes/trenches as per site requirement.

2 Technical Specifications for Surge Arrestor

2.1 AC DISTRIBUTION PANEL BOARD

(i) AC Distribution Panel Board (DPB) shall control the AC power from Inter connection from ACDB to transformer and then to HT bus (if required to export power) be carried out and complete equipment along with metering (if required to export power) to be installed in the ACDB. Requirement/specifications of DCDB and ACDB may be changed as per site conditions. The AC panel shall be provided with adequate safety features to prevent transmission of fault.

(ii) The existing LT panel shall be upgraded to receive the solar power.

2.2 FIRE EXTINGUISHERS:

The firefighting system for the proposed power plant for fire protection shall be consisting of Portable fire extinguishers in the control room for fire caused by electrical short circuits. Sand buckets in the control room the installation of Fire Extinguishers should confirm to TAC regulations and BIS standards. The fire extinguishers shall be provided in the control room housing the batteries and Inverters.

2.3 LIGHTNING AND OVER VOLTAGE PROTECTION

There shall be the required number of suitable lightning arrestors installed in the array field. Suitable earthing such that induced transients find an alternate route to earth. Protection shall meet the safety rules as per Indian Electricity Act. All building earth conductors shall be interconnected through the concept of earth mats for interconnection with separate earth pits. For each earth pits necessary test points shall have to be provided.

2.4 EARTHING PROTECTION

Each array structure should be grounded properly. Provision should be kept for shorting and grounding of the PV array at the time of maintenance work. All metal casing /shielding of the plants hold be thoroughly grounded in accordance with Indian electricity Act/IE Rules .Earth Resistance should be teste din presence of the representative of CPWD after earthing by calibrated earth tester. Inverter S, ACDB and DCDB should also be earthed properly. The 11KV side equipment and parts shall be earthed in compliance to Indian Electricity Rules‘1956, all non-current carrying metal parts shall be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode.

2.5 TOOLS & TACKLES AND SPARES:

After completion of installation & commissioning of the power plant, necessary tools

Tackles are to be provided free of cost by the contractor for maintenance purpose. List of tools and tackles to be supplied by the contractor for approval of specifications and make from CPWD. A list of requisite spares in case of Inverter comprising of asset of control logic cards, IGBT driver cards etc., Junction Boxes, Fuses, MCCBs etc. along with spare set of PV modules and batteries be indicated, which shall be supplied along with the equipment (at extra cost if required by the department). A minimum set of spares shall be maintained in the plant itself for the entire period of warranty and Operation & Maintenance which upon its use shall be replenished.

2.6 DANGER BOARDS

Danger boards should be provided as and where necessary as per IE Act./IE rules as amended up to date.

3 List of Standards

3.1 FM (Factory Mutual) USA for application in NEC Class1, Division 2, Group C&D

3.2 UL (Under writers laboratory) for electrical and fire safety (Class C fire rating)

3.1.1 IEC 61215

3.1.2 IEC 61646

3.1.3 IEC 61730

3.1.4 UL 1703

3.1.5 CE Mark

3.1.6 Electrical Safety Tester (EST)Series

3.1.7 CE certified.

3.1.8 TUV Rhine land.

3.1.9 RDSO approved.

3.1.10 BBIS approved

3.1.10.1 BIS: 694 PVC insulated Electric cable for working voltage upto and including 1100 volts.

3.1.10.2 BIS:732 Code of practice for electrical wiring and installation

3.1.10.3 BIS: 1651&1652 Stationary cell & batteries, lead acid type.

3.1.10.4 BIS:1885 Glossary of items for electrical cables and conductors

3.1.10.5 BIS: 2551 Danger notice plates.

3.1.10.6 BIS: 3043 Code of practice for earthing.

3.1.10.7 BIS: 5216 Guide for safety procedures and practices in electrical work.

3.1.10.8 BIS:5578 Guide for marking of insulated conductors

3.1.10.9 BIS:8130 Conductors for insulated electric cables and flexible cords

3.1.10.10 BIS:8623 Factory built assemblies of switch gear and control gear for voltages up to and including 1000V AC and 1200V DC.

3.1.10.11 BIS:8828 Miniature Circuit Breakers

3.1.10.12 BIS:9537 Rigid Steel Conduits for electrical wiring (Second Revisions)

3.1.10.13 BIS: 10810 Methods of test for cables.
3.1.10.14 BIS: 11353 Guide for uniform system of marking and identification of conductors and apparatus terminals.
3.1.10.15 BIS:12640 Earth Leakage Circuit Breakers
3.1.10.16 BIS:13947 Melded Case Circuit Breakers
3.1.10.17 BIS: 13947 Degree of protection provided by enclosures for LV switchgear and control gear.
3.1.10.18 BIS: 13947 General requirement for switchgear and control gear for voltage not exceeding 1000 Volts. SP:6(1) Structural Steel Sections
3.1.10.19 BIS:325 Three Phase Induction Motors
3.1.10.20 BIS: 554 Dimensions for pipe threads where pressure tight joints are required on the threads.
3.1.10.21 BIS:800Codeofpracticeforgeneralconstructioninsteel
3.1.10.22 BIS:1367 (Part1) Technical supply conditions for threaded steel fasteners
3.1.10.23 Part1 Introduction and general information.
3.1.10.24 BIS: 1367 (Part2) Technical supply conditions for threaded steel fasteners: Part2 product grades and tolerances.
3.1.10.25 BIS:2026 (Part I-IV) Power Transformer
3.1.10.26 BIS:111 71 Dry type Transformer

(aa) BIS: 1554 (Part1) PVC insulated (heavy duty) electric cables: Part1 for working voltages upto and including 1100V.
(bb) BIS: 1554 (Part2) PVC insulated (heavy duty) electric cables: Part2 for working voltages from 3.3KV upto and including 11KV.

Annexure -VII

(Schedule-D)

Signage

1 General

The Contractor shall develop shop drawings for all types of required signage's for the Project as per the intent suggested by the Architect and shall submit to the Authority's Engineer for approvals before executing the works. Contractor will arrange samples and required mock-ups as instructed by Authority's Engineer for some important areas.

The scope in this section shall be engineering, procurement and execution of all types of Signage like informative cautionary and mandatory.

2 External Signage's

The Contractor shall provide following signage as required and necessary. Sizes mentioned are indicative for intent purpose.

2.1 Main Building Signage:

Main Building Signage in brushed finished SS cut letters in both English and Hindi alphabets, stuck on dry stone wall, back lit with approved shade and colour of LED. SS to be of 316 L grade, letters to be fixed on the wall with inbuilt nails

(i) At GF Location-I size having size not lets than 50mm deep and height 450mm.
(ii) At GF Location-II size to be 50mm deep and height 450mm
(iii) At Roof Level Location-I size to be 100mm deep and height 900mm.
(iv) At Roof Level Location-II size to be 100mm deep and height 900mm.

2.2 Legal Entity with Signage

Legal Entity with Signage in brushed finished 3mm thick Stainless Steel plate, laser engraved text (English and Hindi Language) in approved colour laser fused pigment, fixed on wall by means of SS screws / Studs. SS to be of 316 L grade

(i) At GF Compound Wall at Entry and Exit gates size to be 600mm x 900mm
(ii) At Building Entrance size to be 600mm x 600mm

2.3 External Way finding Signage

External Way finding Signage in brushed finished stainless steel 3mm brush finished Plate with 3mm grooves slits, laser engraved text (English and Hindi Language) in approved colour laser fused pigment. Some signage may be fixed on wall or some shall be individual pole structure. SS to be of 316 L grade Size: 450mm x 900mm

Reference Image

2.4 External Parking / General Signage

External Parking / General Signage in brushed finished stainless steel 3mm brush finished Plate with 3mm grooves slits, laser engraved text (English and Hindi Language) in approved colour laser fused pigment. Some signage may be fixed on wall or some shall be individual pole structure. SS to be of 316 L grade Size 400mm x 400mm

Reference Images

2.5 Fire Exit, Emergency, Informatory Signage's: As per codal provisions specified in Schedule-D.

3. EXTERNAL ELELCTRIC SUPPLY & STANDBY POWER SUPPLY (DG SET)

S. No	Description of item	Unit	Qty
1	Incoming HT Cable from Existing Tapping point to Transformer along with four pole Structure, GOD, Lightning Arrestor, and connected accessories including platform of transformer, Earthing of machinery and size of cable Not less than 95 Sq.mm 3 core.	Each	As per site requirements
2	Transformer 11:0.433 KV 3 phase copper wound, outdoor type complete in all respect with standard accessories and fitments capacity not less than AC 415 V	Each	As per site requirements
3	Stand by DG Set with AMF panel complete with acoustic enclosure all as per CPCB guidelines capacity including foundation not less than 62.5 KVA (100 % load of water supply pump and Fire Fighting System)	Each	As per site requirements
4	LT Panels with essential supply and non-essential supply and bus couplers	Each	As per site requirements
5	LT Cables from Transformer / DG Set to main LT Panels		
6	LT cables from Main LT panels to other panels / Feeder Pillar Boxes to equipment's and Buildings		
7	Earthing of Machinery/Equipment set of using 32x6 Cu strip electrode along with Copper /Chemical Bore earthing	Each	As per site requirements
8	Perimeter Lighting of proposed building with LT pole and LED Lighting of suitable wattage.		

the electric requirement of AC 415 V worked out for the proposed parking will be met through 11 KV supply from existing source of their respective project locations.

5. Site Office

Scope of work includes construction/providing of site office (pre-fabricated structure or equivalent) with modern outlook for use by Engineer-in-charge and his staff consisting of 3 rooms for NHIDCL officers & staff. The location and plan shall be got approved from Authority's Engineer. Specification for the site office shall be suitable and matching for running an office which shall be got approved from Authority's Engineer. All running cost & charges shall be borne by the Contractor.

Technical Specification for Rotary Car Parking System

SPECIFICATION		
BRAND NAME		SMART CAR PARKING
TYPE		VERTICAL ROTARY CAR PARKING
AVAILABE SPACE PER PALLET (SUV and Sedan)	LENGTH	5200 MM
	WIDTH	2100 MM
	WEIGHT	2150 KG
PALLET CLEAR HEIGHT		1600 MM
AVAILABE SPACE PER SYSTEM	LENGTH	6510 MM
	WIDTH	5050 MM
	HEIGHT	20,910MM

MOTOR CAPACITY		18.5 KW
MOTOR CONTROL		INVERTER DRIVE
SAFETY SENSOR		HUMAN SAFETY SENSOR
		PROXIMITY SENSOR
		PALLET STOPPING SENSOR
		PHOTO SENSOR AT THE FRONT OF ENTRANCE
		OVER CURRENT RELAY FOR MOTOR PROTECTION
		EMERGENCY STOP DEVICE
		OVERRUN STOPPER ON PALLET
CONTROL POWER SUPPLY		AC415V X 3PH X 50Hz 17KWA
SPEED (m/min.)		5~8

SCHEDULE-E
MAINTENANCE REQUIREMENTS

1 General

1.1 Maintenance for Project shall be 10 years from the date of successful handing over and issue of completion certificate with requisite staff deployed at site in terms of the plan finalised with the Authority.

1.2 The contractor shall be responsible for minimum 30-year warranty on all the Equipment Installed.

2 Maintenance

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

2.2 The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E 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 Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.

2.3 All Materials, works and construction operations shall conform to the MORTH/ CPWD/ Uttarakhand PWD Specifications for Building & Infrastructure Works, and the relevant IRC publications. Where the specifications for a work are not given, Good Industry Practice shall be adopted. The obligations of the Contractor in respect of Maintenance Requirements shall include repair and rectification of the Defects and deficiencies specified in Annexure-I of this Schedule-E within the time limit set forth therein.

3. Other Defects and deficiencies

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

4. Extension of time limit

Not with standing anything to the contrary specified in this Schedule-E, 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 Authority's Engineer and conveyed to the Contractor and the Authority with reasons thereof.

5. Emergency repairs/ restoration

Not with standing anything to the contrary contained in this Schedule-E, if any Defect, deficiency or deterioration in the Project poses a hazard to safety or risk of damage to property, the Contractor shall promptly take all reasonable measures for eliminating or minimizing such danger.

6. Daily inspection by the Contractor

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

7. Pre-monsoon inspection / Post-monsoon inspection

The Contractor shall carry out a detailed pre-monsoon inspection of all the Authority's Engineer before [1st June] every year. Report of this inspection together with details of proposed maintenance works as required on the basis of this inspection shall be sent to the Authority's Engineer before the [10th June] every year. The Contractor shall complete the required repairs before the onset of the monsoon and send to the Authority's Engineer a compliance report. Post monsoon inspection shall be done by the [30th September] and the inspection report together with details of any damages observed and proposed action to remedy the same shall be sent to the Authority's Engineer.

8. Repairs on account of natural calamities

All damages occurring to the Project on account of a Force Majeure Event or default or neglect of the Authority shall be undertaken by the Authority at its own cost. The Authority may instruct the Contractor to undertake the repairs at the rates agreed between the Parties.

9. Operation of Automated Multilevel Parking

(i) Contractor shall deploy the requisite nos. of parking operators with adequate necessary qualifications along with general tools, safety gears etc.

(ii) Contractor will be formulated the Parking price with the consultation of District Level Development Authority of Nainital.

(iii) Contractor will be responsible for Parking area cleaning, parking safety, Parking assistant etc.

(iv) Contractor shall at all times maintain, keep in good operating condition, repair and renew, replace and upgrade to the extent reasonably necessary, the equipment, systems, and facilities. All maintenance and repair works shall be carried out in such a way as to minimize inconvenience to users of the Parking Systems.

(v) The complete automated system shall have the provision of emergency evacuation of

vehicles manually also.

(vi) Contractor will be maintaining all the necessary inventory of electro-mechanical part of the system during operation and maintenance period and also provide a list of wear and tear part of the system to authority at the time of hand over.

(vii) All the electric usage charges incurred on operation of the parking system will be borne by contractor.

Annexure -I

(Schedule-E)

Repair/rectification of Defects and Deficiencies

The Contractor shall repair and rectify the Defects and deficiencies specified in this Annex-I of Schedule-E within the time limit set forth in the table below.

SN	Nature of Defect or Deficiency	Time limit for Repair/ Rectification
1	Gates	24hours
2	Security Block utilities	24 hours
3	Sign Boards	48 hours
4	RCC structure	7 days
5	Soil Sink	7 days
6	Plaster & Paints	7 days
7	Flooring	7 days
8	Any cracks in approach slab	48 hours
9	Defects in electrical, water and sanitary installations in the Terminal Block	24 hours
10	Obstruction by plants in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs	24 hours
11	Removal of fallen trees	4 hours
12	Deterioration in health of trees and Bushes	Timely watering and treatment
13	Trees and bushes requiring replacement	15 days
14	Removal of vegetation inside the parking campus	10 days
15	Maintenance of Major Equipment	24 hours
16	Major faults / Breakdown of parking equipments	24 hours

Note:

- Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the Authority Engineer.
- The Contractor shall submit a warranty for all equipment, material and accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.
- The form of warranty shall be as approved by Authority Engineer.
- The warranty shall expressly include replacement of all defective or under capacity equipment/material. Authority Engineer may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.
- The warranty includes replacement of any equipment found to have capacity lesser that the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Authority Engineer.

SCHEDULE-F

Applicable Permits

1 Applicable Permits

1.1 The Contractor shall obtain all necessary permits/ NOC as required under the Applicable Laws of Govt. of Uttarakhand.

Building Construction Permission	Local Authority / Municipal Corporation of Haridwar
Environment Clearance	Ministry of Environment And Forests
Heritage Clearance	Permission from ASI/ relevant Authority
Water & Sewerage Connection	Concerned Authority
Shifting of Services and utilities	Directorate of State Transport Concerned Authority, Local Authority, PWD (B&R) Department
Application for PAN, sales tax and other tax registrations etc.	Concerned departments of Government of Uttarakhand,
Electricity connection	Respective Electricity Board in Government of Uttarakhand.
Clearance for employing labour-Primary Employer	Labour Commissioner, Government of Uttarakhand
Clearance for blasting and use of explosives	Commissioner of Explosives and Police Department, Government of Uttarakhand
Employment of migrant labour	Labour Commissioner, Government of Uttarakhand
License for commercial activities	Concerned Authority
Realignment and channelization of Nallah	Concerned Authority, UK PWD (B&R)
Installation of Lifts	Concerned Authority
Fire safety equipment	Concerned Authority /Police Department
Drains and Sewers	Concerned Authority, UK PWD (B&R)
Diesel Generator	UK State Pollution Control Board
Labour Camps	District Health Officer
Working in Night Shifts	Concerned Authority, Police Department
Re-routing of vehicular traffic	Concerned Authority, Traffic Police

Completion Cum Occupancy Certificate Stage
Completion certificate from local authority
Consent to operate from State Pollution Control Board
NOC from Industry department
NOC from labour department

1.2 The above list is indicative and not necessarily complete or accurate. The Contractor shall make his / her own assessment of the statutory clearances required and shall be responsible for obtaining all such clearances. The Contractor shall at all times, obtain and maintain all Applicable Permits which are required by Applicable Law to undertake the Project. Charges for all permits etc. shall be borne by the Contractor.

Applicable Permits, as required, relating to environmental protection and conservation shall have been procured by the Authority in accordance with the provisions of this Agreement.

SCHEDULE-G

(See Clauses 7.1 and 19.2)

Annex-I : Form of E-Bank Guarantee

(See Clause 7.1)

[Performance Security /Additional Performance Security]

To

_____ [name of Authority]

_____[address of Authority]

WHEREAS_____[name and address of Contractor] (hereafter called the "Contractor") has undertaken, in pursuance of Letter of Acceptance (LOA) No._Dated _ for construction of [name of the Project] (hereinafter called the "Contract")

AND WHEREAS the Contract requires the Contractor to furnish an {Performance Security/ Additional Performance Security} for due and faithful performance of its obligations, under and in accordance with the Contract, during the {Construction Period/ Defects Liability Period and Maintenance Period} in a sum of Rs….. cr. (Rupees ……..….. crore) (the "**Guarantee Amount**"[1]).

AND WHEREAS we, …….. through our branch at

.....

.....

(the "**Bank**") have agreed to furnish this Bank Guarantee (hereinafter called the **"Guarantee**") by way of Performance Security.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Contract, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

** Guarantee Amount for Performance Security and Additional Performance Security shall be calculated as per Contract.

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager of National Highways & Infrastructure Development Corporation Limited], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Contract shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Contract and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Contract or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Contract or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Contract and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Contract or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Contract.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect on ****$. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Contract.

12. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

13. This guarantee shall also be operatable at our .....Branch at Dehradun, from whom, Confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

14. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

$Insert date atleast 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 2.21 the RFP). The Contractors can submit the BG for periods of two years at one time and keep on renewing the same till the DLP is over if they have problems in getting the BG in one go for the entire DLP.

S.No.	Particulars	Details
1	Name of Beneficiary	NHIDCL RO DDN UT GOVT DPR
2	Beneficiary Bank Account No.	120002182762
3	Beneficiary Bank Branch Name and Address	Canara Bank, Dehradun
4	Beneficiary Bank IFSC	CNRB0018518

Signed and sealed this ……. day of ……., 20…… at ……..

SIGNED, SEALED AND DELIVERED
For and on behalf of the Bank by:
(Signature)
(Name)
(Designation)
(Code Number)
(Address)

Notes:-

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

Annex - II
(Schedule - G)
(See Clause 19.2)

Annex – II: Form for E- Bank Guarantee for Advance Payment

To

_____[name of Authority]
_____[address of Authority]

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the construction of the ***** on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing @Bank Rate + 3% advance payment (herein after called "**Advance Payment**") equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in two installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} installment of the Advance Payment is Rs.__cr. (Rupees__crore) and the amount of this Guarantee is Rs._____cr. (Rupees_____crore) (the "**Guarantee Amount**")[2].

(C) We, through our branch at (the "Bank") have agreed to furnish this bank guarantee (hereinafter called the "Guarantee") for the Guarantee Amount.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid instalment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed

[2] The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment

default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever

2. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

3. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

4. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

5. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.

6. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

7. The Guarantee shall cease to be in force and effect on ****[3] Unless a demand or

[3] Insert a date being 90 (ninety) days after the end of one year from the date of payment of the Advance payment to the Contractor (in accordance with Clause19.20 of the Agreement).

claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.

8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

10. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

11. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

12. This guarantee shall also be operatable at our…….Branch at Dehradun from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

S.No.	**Particulars**	**Deta ils**
1	Name of Beneficiary	NHIDCL RO DDN UT GOVT DPR
2	Beneficiary Bank Account No.	120002182762
4	Beneficiary Bank Branch Name and Address	Canara Bank, Dehradun
5	Beneficiary Bank IFSC	CNRB0018518

Signed and sealed this..... day of .. , 20..... at

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by: (Signature)

(Name) (Designation) (Code Number)

(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

SCHEDULE-H

Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs ----------

1.2 Proportions of the Contract Price for different stages of Construction of the Automated Multilevel Parking System shall be as specified below:

Distribution of items into sub weightage and payment schedule

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage
Parking System	76.829%	**A- Completion of Civil Works**	
		Excavation	0.50%
		Foundation works up to plinth level	0.37%
		After plinth level completed all columns and other reinforced cement concrete works	6.28%
		After completed approach slab/pathway	6.27%
		B. Parking structure (include Designing & Installing & commissioning of CCTV Cameras covering all, Installation of DG set, covering entry & exit points of each parking tower and main gates with adequate display of cameras on LED screens, including control rooms, display system and software support system and required data cabling etc.)	76.58%
		C- External Finishing	5.00%
		D- Internal Electrical & Mechanical Machine Installation	5.00%
UG tank	1.171%	**Excavation**	10.00%
		Concrete Work with all finishing	90.00%
Firefighting	2.000%	1) On submission of vetted Fire-fighting drawing	10.00%
		2) On delivery of equipments at site	40.00%
		3) On installation of equipments	20.00%
		4) Testing and Commissioning of equipments	30.00%
Operation and maintenance for 10 years during defect liability Period	20.000%	1st Year	10.00%
		2nd Year	10.00%
		3rd Year	10.00%
		4th Year	10.00%

		5th Year	10.00%
		6th Year	10.00%
		7th Year	10.00%
		8th Year	10.00%
		9th Year	10.00%
		10th Year	10.00%

1.3 Procedure of estimating the value of work done

1.3.1 Procedure for estimating the value of work done shall be as follows:

Item	Weightage in percentage to the Contract Price	Stage for Payment	Percentage weightage	Payment Procedure
Parking System	76.829%	**A- Completion of Civil Works**		
		Foundation works up to plinth level	0.87%	Payment shall be released in completion of foundation of each tower/ model
		After plinth level completed all columns and other reinforced cement concrete works	6.28%	Payment shall be released in completion of works in all respect
		After completed approach slab/pathway	6.27%	Payment shall be released in completion of works in all respect
		B. Parking structure (include Designing & Installing & commissioning of CCTV Cameras covering all, Installation of DG set, covering entry & exit points of each parking tower and main gates with adequate display of cameras on LED screens, including control rooms, display system and software support system and required data cabling etc.)	76.58%	On delivery, Installation and commissioning in the ration of 40:20:40 respectively.

		C- External Finishing	5.00%	Payment shall be released in completion of external work (covering) for each tower/ model
		D- Internal Electrical & Mechanical Machine Installation	5.00%	On delivery, Installation and commissioning in the ration of 40:20:40 respectively.
UG tank	1.171%	**Excavation**	10.00%	Payment shall be released on 100% Completion of the work
		Concrete Work with all finishing	90.00%	Payment shall be released on 100% Completion of the work
Firefighting	2.000%	1) On submission of vetted Fire-fighting drawing	10.00%	
		2) On delivery of equipments at site	40.00%	
		3) On installation of equipments	20.00%	
		4) Testing and Commissioning of equipments	30.00%	
Operation and maintenance for 10 years during defect liability Period	20.000%	1st Year	10.00%	Payment shall be released in quarterly basis.
		2nd Year	10.00%	
		3rd Year	10.00%	
		4th Year	10.00%	
		5th Year	10.00%	
		6th Year	10.00%	
		7th Year	10.00%	
		8th Year	10.00%	
		9th Year	10.00%	
		10th Year	10.00%	

~~**2.** Procedure for payment for Maintenance~~

~~2.1 The cost for maintenance shall be as stated in Clause 14.1(v).~~

~~2.2 Payment for Maintenance shall be made in quarterly instalments in accordance with the provisions of Article 14 and Article 19.~~

SCHEDULE-I: Drawings

1 Drawings

In compliance of the obligations set forth in Clause 10.2 of this Agreement, the Contractor shall furnish to the Authority's Engineer, free of cost, all Drawings listed in Annex-I of this Schedule-I.

2 Additional Drawings

If the Authority's Engineer determines that for discharging its duties and functions under this Agreement, it requires any drawings other than those listed in Annex-I, it may by notice require the Contractor to prepare and furnish such drawings forthwith. Upon receiving a requisition to this effect, the Contractor shall promptly prepare and furnish such drawings to the Authority's Engineer, as if such drawings formed part of Annex-I of this Schedule-I.

Annexure -I

(Schedule-I)

List of Drawings

Note: The Authority shall describe in this Annex-I, all the Drawings that the Contractor is required to furnish under Clause 10.2.

INDEX

a) Goods for Construction Drawing
b) Typical Cross Section of Road
c) Layout plan of Automated Multilevel Parking
d) Foundation, Beam, Column Drawing
e) Steel Structural drawing of Automated Multilevel Parking
f) Drawing of Underground Water Tank & Fire Pump Room
g) Firefighting Drawing
h) Schematic drawing of power supply, water supply & other services
i) Drawing of traffic circulation, marking, safety barriers, delineation of pedestrian, ventilation, delineation of parking space etc.
j) Drawing of Boundary Wall
k) Drawing of Façade/landscaping works
l) PEB Structure Drawing
m) Rain Water Harvesting Drawing
n) Elevation & Treatment of Automated Multilevel Parking
o) Any other Drawing as per instruction of Authority's Engineer

SCHEDULE-J: Project Completion Schedule

1 Project Completion Schedule

During Construction period, the Contractor shall comply with the requirements set forth in this Schedule-J for each of the Project Milestones and the Scheduled Completion Date. Within 15 (fifteen) days of the date of each Project Milestone, the Contractor shall notify the Authority of such compliance along with necessary particulars thereof.

2 Project Milestone-I

(i) Project Milestone-I shall occur on the date falling on the 132 (one hundred thirty two) day from the Appointed Date (the "Project Milestone-I").
(ii) Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 20% (twenty per cent) of the Contract Price.

3 Project Milestone-II

(i) Project Milestone-II shall occur on the date falling on the 260 (two hundred and sixty) day from the Appointed Date (the "Project Milestone-II").
(ii) Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with construction of the Project and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 45% (forty five per cent) of the Contract Price.

4 Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the 387 (three hundred eighty seven) day from the Appointed Date (the "Project Milestone- III").
(ii) Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 70% (seventy per cent) of the Contract Price and should have provided of all project facilities.

5 Scheduled Completion Date

(viii) The Scheduled Completion Date shall occur on the 540 (five hundred forty) day from the Appointed Date.
(ix) On or before the Scheduled Completion Date, the Contractor shall have completed construction in accordance with this Agreement.

6 Extension of time

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Completion Date, as the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

SCHEDULE-K: Tests on Completion

(See Clause 12.1 (ii))

1 Schedule for tests

(i) The Contractor shall, no later than 30 (thirty) days prior to the likely completion of construction, notify the Authority's Engineer and the Authority of its intent to subject the Project to Tests, and no later than 10 (ten) days prior to the actual date of Tests, furnish to the Authority's Engineer and the Authority detailed inventory and particulars of all works and equipment forming part of Works.

(ii) The Contractor shall notify the Authority's Engineer of its readiness to subject the Project to Tests at any time after 10 (ten) days from the date of such notice, and upon receipt of such notice, the Authority's Engineer shall, in consultation with the Contractor, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Authority's Engineer shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule-K.

2 Tests

(i) Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include [***].

(ii) Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project with Specifications and Standards, except tests as specified in clause 5, but shall include measuring the reflectivity of road markings and road signs; and measuring the illumination level (lux) of lighting using requisite testing equipment.

(iii) Environmental audit: The Authority's Engineer shall carry out a check to determine conformity of the Project with the environmental requirements set forth in Applicable Laws and Applicable Permits.

(iv) Safety Audit: The Authority's Engineer shall carry out, or cause to be carried out, a safety audit to determine conformity of the Project with the safety requirements and Good Industry Practice.

3 Agency for conducting Tests

All Tests set forth in this Schedule-K shall be conducted by the Authority's Engineer or such other agency or person as it may specify in consultation with the Authority.

4 Completion Certificate

Upon successful completion of Tests, the Authority's Engineer shall issue the Completion Certificate in accordance with the provisions of Article 12.

SCHEDULE-L

(See Clause 12.2)

Completion Certificate

1 I, ……. (Name of the Authority's Engineer), acting as the Authority's Engineer, under and in accordance with the Agreement dated …… (the "**Agreement**"), for [construction of the **** (the "**Project**") on Engineering, Procurement and Construction (EPC) basis through ……. (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project of Automated Multilevel Parking with the provisions of the Agreement, and I am satisfied that the Project can be safely and reliably placed in service of the Users thereof.

2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project have been completed, and the Project is hereby declared fit for entry into operation on this the …… day of …… 20….. , Scheduled Completed Date for which was the …… day of ……20…..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Authority's Engineer by:

(Signature)

(Name)

(Designation) (Address)

SCHEDULE-M: Payment Reduction for Non-Compliance

1 Payment reduction for non-compliance with the Maintenance Requirements

(i) Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements as set forth in Schedule-E.

(ii) Any deduction made on account of non-compliance with the Maintenance Requirements shall not be paid even after compliance subsequently. The deductions shall continue to be made every month until compliance is done.

(iii) The Authority's Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph 2.

2 Percentage reductions in lump sum payments

(i) The following percentages shall govern the payment reduction:

S. No.	Item/Defect/Deficiency	Percentage
(a)	**Parking Area**	
(i)	Potholes, cracks, other surface, Defects in Interlocked concrete paver block	10%
(ii)	Defect in UG Tank, Pump Room, Rain Water Harvesting	5%
(b)	**Road, Shoulders**	
(i)	potholes, obstructions etc.	10%
(ii)	Boundary wall	5%
(c)	**Automated Multilevel Parking System**	
(i)	Defect in Automated Multilevel Parking Steel Structure, parking senser , vehicle assessment senser etc.	20%
(ii)	Any Defects in PEB Steel Structure	10%

S. No.	Item/Defect/Deficiency	Percentage
(iii)	Painting, repairs/replacement, number plate scanner	5%
(d)	**Drains**	
(i)	Cleaning and repair of drains	2.50%
(e)	**Project facilities**	
(i)	Cleaning, painting, replacement of road/parking signs, delineators, road/parking/firefighting markings	2.50%
(f)	**Defects in Power Supply System (Mains)**	10%
(g)	**Defects in Fire Safety System**	12.50%
(h)	**Defect in CCTV, LED, revenue monitoring System etc**	10%

(ii) The amount to be deducted from monthly lump-sum payment for non- compliance of particular item shall be calculated as under:

R=P/IOO x M x C1

Where,
P = Percentage of particular item/ Defect/deficiency for deduction
M = Monthly lump-sum payment in accordance with the Bid
C = its % in the Schedule H (of Contract Price)
R = Reduction (the amount to be deducted for non-compliance for a particular item/ Defect/ deficiency

The total amount of reduction shall be arrived at by summation of reductions for such items/ Defects/ deficiency or non-compliance.

Schedule - N

(See Clause 18.1 (i))

Selection of Authority's Engineer

1 Selection of Authority's Engineer

(i) The provisions of the Model Request for Proposal for Selection of Technical Consultants, issued by the Ministry of Finance in May 2009, or any substitute thereof shall apply for selection of an experienced firm to discharge the functions and duties of an Authority's Engineer.

(ii) In the event of termination of the Technical Consultants appointed in accordance with the provisions of Paragraph 1.1, the Authority shall appoint another firm of Technical Consultants forthwith and may engage a government-owned entity in accordance with the provisions of Paragraph 3 of this Schedule-N.

2 Terms of Reference

The Terms of Reference for the Authority's Engineer (the "**TOR**") shall substantially conform with Annex 1 to this Schedule N.

3 Appointment of Government entity as Authority's Engineer

Notwithstanding anything to the contrary contained in this Schedule, the Authority may in its discretion appoint a government-owned entity as the Authority's Engineer; provided that such entity shall be a body corporate having as one of its primary functions the provision of consulting, advisory and supervisory services for engineering projects; provided further that a government-owned entity which is owned or controlled by the Authority shall not be eligible for appointment as Authority's Engineer.

Annexure -I
(Schedule-N)

Terms of Reference for Authority's Engineer

1 Scope

(i) These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated ..... (the "**Agreement**), which has been entered into between the [name and address of the Authority] (the "**Authority**") and

..... (the "**Contractor**")[#] for **** in the State of *** on Engineering, Procurement, Construction (EPC) basis, and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

- In case the bid of Authority's Engineer is invited simultaneously with the bid of EPC project, then the status of bidding of EPC project only to be indicated

(ii) The TOR shall apply to construction and maintenance of the Project.

2 Definitions and interpretation

(i) The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.

(ii) References to Articles, Clauses and Schedules in this TOR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of this TOR.

(iii) The rules of interpretation stated in Article 1 of the Agreement shall apply, mutatis mutandis, to this TOR.

3 General

(i) The Authority's Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.

(ii) The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:

(a) any Time Extension;

(b) any additional cost to be paid by the Authority to the Contractor;

(c) the Termination Payment; or

(d) issuance of Completion Certificate or

(e) any other matter which is not specified in (a), (b), (c) or (d) above and which creates a financial liability on either Party.

(iii) The Authority's Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions under this Agreement. Such reports shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.

(iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, that it shall not delegate the authority to refer any matter for the Authority's prior approval in accordance with the provisions of Clause 18.2.

(v) ~~The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.~~

(vi) In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Authority's Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

4 Construction Period

(i) During the Construction Period, the Authority's Engineer shall approve the Drawings furnished by the Contractor along with supporting data, including the geo-technical and ~~hydrological~~ investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1 (vi). The Authority's Engineer shall complete approval and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

(ii) The Authority's Engineer shall approve any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.

(iii) The Authority's Engineer shall approve the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty one) days stating the modifications, if any, required thereto.

(iv) The Authority's Engineer shall complete the approve of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.

(v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, of the Project of Automated Multilevel parking for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.

(vi) The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.

(vii) The Authority's Engineer shall inspect the Construction Works and the Project and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.

(viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance.

(x) The Authority's Engineer shall test check at least 50 (fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

(xi) The timing of tests referred to in Paragraph 4 (ix), and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

(xii) In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.

(xiii) The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project of Automated Multilevel Parking, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.

(xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the

steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.

(xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.

(xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.

(xvii) In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

(xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate, as the case may be. For carrying out its functions under this Paragraph 4 (xviii) and all matters incidental thereto, the Authority's Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-K.

5 Maintenance Period

(i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.

(ii) The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.

(iii) The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Project is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.

(iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule- E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.

(v) The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project of Automated Multilevel Parking for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause 14.5.

6 Determination of costs and time

(i) The Authority's Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.

(ii) The Authority's Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.

(iii) The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause 18.5.

7 Payments

(i) The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2 (iv) (d).

(ii) Authority's Engineer shall -

(a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 19.4, determine the amount due to the Contractor and recommend the release of 90 (ninety) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and

(b) within 15 (fifteen) days of the receipt of the Stage Payment Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an Interim Payment Certificate certifying the amount due and payable to the Contractor, after adjustments in accordance with the provisions of Clause 19.10.

(iii) The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.

(iv) The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

(v) The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of
The Authority's Engineer shall perform all other duties and functions as specified in the Agreement.

8 Other duties and functions

The Authority's Engineer shall perform all other duties and functions as specified in the Agreement.

9 Miscellaneous

(i) A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.

(ii) The Authority's Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.

(iii) Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project as actually designed, engineered and constructed, including an as- built survey illustrating the layout of the Project and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

(iv) The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Dispute between the Parties.

(v) The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

Schedule - O

(See Clauses 19.4 (i), 19.6 (i), and 19.8 (i))

Forms of Payment Statements

1 Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) the estimated amount for the Works executed in accordance with Clause 19.3 (i) subsequent to the last claim;

(b) amounts reflecting adjustments in price for the aforesaid claim;

(c) the estimated amount of each ~~Change of Scope~~ Order executed subsequent to the last claim;

(d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2 (iii) (a);

(e) total of (a), (b), (c) and (d) above;

(f) Deductions:

i. Any amount to be deducted in accordance with the provisions of the Agreement except taxes;

ii. Any amount towards deduction of taxes; and

iii. Total of (i) and (ii) above.

(g) Net claim: (e) – (f) (iii);

(h) The amounts received by the Contractor upto the last claim:

i. For the Works executed (excluding ~~Change of Scope~~ orders); ~~ii. For Change of Scope Orders, and~~

iii. Taxes deducted

2 Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

(i) the monthly payment admissible in accordance with the provisions of the Agreement;

(j) the deductions for maintenance work not done;

(k) net payment for maintenance due, (a) minus (b);

(l) amounts reflecting adjustments in price under Clause 19.12; and

(m) amount towards deduction of taxes

3 Contractor's claim for Damages

Note: The Contractor shall submit its claims in a form acceptable to the Authority.

Schedule - P

(See Clause 20.1)

Insurance

1 Insurance during Construction Period

(i) The Contractor shall effect and maintain at its own cost, from the Appointed Date till the date of issue of the Completion Certificate, the following insurances for any loss or damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:

(a) insurance of Works, Plant and Materials and an additional sum of [15 (fifteen)] per cent of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature; and

(b) insurance for the Contractor's equipment and Documents brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.

(ii) The insurance under sub para (a) and (b) of paragraph 1(i) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

2 Insurance for Contractor's Defects Liability

The Contractor shall effect and maintain insurance cover of not less than 15% of the Contract Price for the Works from the date of issue of the Completion Certificate until the end of the Defects Liability Period for any loss or damage for which the Contractor is liable and which arises from a cause occurring prior to the issue of the Completion Certificate. The Contractor shall also maintain other insurances for maximum sums as may be required under the Applicable Laws and in accordance with Good Industry Practice.

3 Insurance against injury to persons and damage to property

(i) The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (except things insured under Paragraphs 1 and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount stated below with no limit on the number of occurrences.

The insurance cover shall be not less than: Rs. [*****]

(ii) The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor's performance of this Agreement excluding:

(a) the Authority's right to have the construction works executed on, over, under, in or through any land, and to occupy this land for the Works; and

(b) damage which is an unavoidable result of the Contractor's obligations to execute the Works.

4 Insurance to be in joint names

The insurance under paragraphs 1 to 3 above shall be in the joint names of the Contractor and the Authority.

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

Visual and physical test:

The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include measurement of cracking, rutting, stripping and potholes, etc and shall be as per the requirement of maintenance mentioned in Schedule-E.

Schedule-R

(See Clause 14.10)

Taking Over Certificate

I, ……. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated …… (the "**Agreement**"), for [construction of the **** of****] (the "**Project**") on Engineering, Procurement and Construction (EPC) basis through……. (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature

) (Name and designation of Authority's Representative)

(Address)